

**PROJECT SPECIFICATIONS**  
**FOR**  
**LOXAHATCHEE RIVER DISTRICT**



**LIFT STATION #82 REHABILITATION**  
**ITB 21-001-00100**

**October 2020**

**Prepared by:**



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# LIFT STATION #82 REHABILITATION

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## NOTICE TO CONTRACTORS

Bids will be received by the Loxahatchee River Environmental Control District (the "District via DemandStar, until **2:00 p.m.** local time on **December 8, 2020**. Any Bids received after **2:00 p.m.** local time on **December 8, 2020**, will not be accepted under any circumstances. Any uncertainty regarding the time a Bid is received will be resolved against the Bidder. The Bids will be publicly opened and read aloud on **December 10** at **2:00 p.m.** local time in the Governing Board room of the District, at the above address. The Work to be performed is located in the Town of Jupiter, within Palm Beach County, and consists of furnishing all labor, tools, materials, and equipment necessary for the rehabilitation of an existing wastewater pump station as shown on the Contract Plans and Specifications and as specified herein to include:

LIFT STATION #82 REHABILITATION - ITB 21-001-00100

**Conversion of existing Lift Station No. 82 from a dry pit pump station to a triplex submersible pump station. The converted lift station includes three (3) new submersible pumps, a new section of concrete wet well, HDPE, ductile iron, and PVC piping, concrete top slab, concrete lift station pad, and electrical and control equipment. Project includes all demolition necessary to convert the existing station from a dry pit configuration to a submersible station. The Work includes general conditions, bonds, indemnification, mobilization, demobilization, start-up, testing, record drawings, operation and maintenance manuals, training, and any all other necessary items to provide a complete and operating system.**

The District reserves the right to determine material elements of the Bid and to award the Contract, if at all, to the lowest, qualified, responsive, and responsible Bidder. The District further reserves the right to reject any and all Bids; to not proceed with the Project; and/or to waive any irregularities contained in a Bid.

A pre-bid conference will be held at **2:00 p.m.**, local time on **November 17** via Microsoft Teams. A meeting invite will be distributed to all plan holders prior to the scheduled date and time. If a bidder downloads Bid Documents from the District's website the bidder must send a request to be included in the pre-bid conference meeting invite to [purchasing@lrecd.org](mailto:purchasing@lrecd.org). All contractors planning to submit Bids on this Project are encouraged to attend.

Bid Documents may be downloaded at the District's website, <https://loxahatcheeriver.org/governance/purchasing-bids/> or DemandStar. Bid Documents will be available on **November 2, 2020** after **8:00 a.m.** local time. The Bid Documents are made available on the above terms solely for the purpose of obtaining Bids and do not confer a license or grant for any other use.

Character and amount of security to be furnished by each Bidder are stated in the Instruction to Bidders. The Bidder shall hold its Bid open for acceptance by the District for a period of not less than ninety (90) calendar days following the date of the Bid opening.

This solicitation has been issued as an Electronic Bid with the same title on DemandStar. To submit a response for this bid electronically follow the instructions on DemandStar. Electronic responses

are the only method allowed for Bidders to respond to this solicitation. Bids shall be submitted on or before the date and time specified.

LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT

Stephen B. Rockoff, Chairman

## **INSTRUCTIONS TO BIDDERS**

### **ARTICLE 1**

1. The following defined terms shall govern this Section and all other Contract Documents unless otherwise noted in the Contract Documents:

- a. “Bid” shall mean the documents that comprise the submission for the Work of this Project.
- b. “Bid Period” shall mean the time period from when the Bid Documents will become available to the deadline for submitting Bids.
- c. “Bidder” shall mean one who submits a Bid directly to the District, as distinct from a sub-bidder, who submits a Bid to the Bidder.
- d. “Bid Documents” include the Advertisement for Bids, Instructions to Bidders, Proposal, Questionnaire, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipts of Bids).
- e. “Change Order” shall mean a written change, addition, or deletion to the Contract Documents signed by both Contractor and the District.
- f. “Contract” shall mean the agreement between the Successful Bidder and the District for performance of the Work.
- g. “Contract Documents” shall mean all documents that comprise the agreement of the parties related to the Project. The Contract Documents include the Notice to Contractors, Instructions to Bidders, Proposal, Questionnaire, Bid Security, Contract, Public Construction Bond, Sworn Statement of Public Entity Crimes, Opinion of District’s Attorney, Releases of Liens, Special Conditions, General Conditions, Technical Specifications, Standard Details and Plans, Plans and Specifications including all modifications, addenda, and Change Orders contained in any documents before or after execution of the Contract.
- h. “Contract Sum” shall mean the total amount due to Contractor as a result of the Work performed on the Project, including any amounts due as a result of Change Orders.
- i. “Contract Time” shall mean the time to complete the Project as set forth in the Contract Documents. Reference to “days” shall mean calendar days unless otherwise noted.
- j. “Contractor” shall mean the Successful Bidder with whom the District executes a contract for the Work or its duly authorized agents.
- k. “County” shall mean Palm Beach County, as may be applicable.
- l. “Defective” shall mean the Work does not conform to the Contract Documents or does not meet the requirements of any applicable inspection, reference standard, test, or approval.

- m. "District" shall mean the Loxahatchee River Environmental Control District, acting through its properly authorized representatives.
- n. "Engineer" shall mean the engineer designated by the District as its engineering representative during the course of construction to make appropriate inspection and computation of payments, whether acting directly or through properly authorized agents, inspectors or representatives of the Engineer, acting within the scope of duties entrusted to them. The Engineer may or may not be an employee of the District.
- o. "Final Completion" shall mean the time when Engineer determines that all of the Work and associated punch list items have been completed in accordance with the Contract Documents.
- p. "Notice of Award" shall mean the District's notification of award of the Contract to the Successful Bidder.
- q. "Plans" shall mean any and all drawings, plans, sketches, diagrams, designs, lists, or other graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work for the Project.
- r. "Project" shall mean the entire construction to be performed as provided in the Contract Documents.
- s. "Specifications" shall mean the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services.
- t. "Substantial Completion" shall mean the date as certified by Engineer when the construction of the Project is sufficiently completed, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with the Contract.
- u. "Successful Bidder" shall mean the lowest, qualified, responsible, and responsive Bidder to whom the District, based on the District's evaluation hereinafter provided, makes an award.
- v. "Work" shall mean any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment, services, and other incidentals and the furnishing, installation, and delivery thereof and all Work reasonably inferable therefrom.

2. **Bids:** Bids will be received by the Loxahatchee River Environmental Control District (the "District" via DemandStar until **2:00 p.m.** local time on **December 8, 2020**. Any Bids received after **2:00 p.m.** local time on **December 8, 2020**, will not be accepted under any circumstances. Any uncertainty regarding the time a Bid is received will be resolved against the Bidder. The Bids will be publicly opened and read aloud **December 10, 2020** at **2:00 p.m.** local time in the Governing Board

room of the District, at 2500 Jupiter Park Drive, Jupiter, Florida 33458. The Bidder shall hold its Bid open for acceptance by the District for a period not less than ninety (90) calendar days following the date of the Bid opening.

Bid Documents may be downloaded at the District's website, <https://loxahatcheeriver.org/governance/purchasing-bids/> or via DemandStar. Bid Documents will be available on **November 2, 2020** after **8:00 a.m.** local time. The Bid Documents are made available on the above terms solely for the purpose of obtaining Bids and do not confer a license or grant for any other use.

A pre-bid conference will be held at **2:00 p.m.**, local time on **November 17, 2020** via Microsoft Teams. A meeting invite will be distributed to all plan holders prior to the scheduled date and time. If a bidder downloads Bid Documents from the District's website the bidder must send a request to be included in the pre-bid conference meeting invite to [purchasing@lrecd.org](mailto:purchasing@lrecd.org). All contractors planning to submit Bids on this Project are encouraged to attend.

All Bids shall be made on the blank form of proposal attached hereto. All blanks on the Bid Forms must be printed in blue or black in ink or typed. Completed Bid Forms shall be scanned to the PDF format and uploaded to Demandstar. The Bid shall contain an acknowledgment of receipt of all Addenda. A single Bid shall be submitted for all portions of the Work. Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature. Bids by partnerships must be executed in the partnership name and signed by a general partner, whose title must appear under the signature. The official address of the partnership must also be shown below the signature. If requested, the person signing a Bid for a corporation or partnership must produce evidence satisfactory to the District of the person's authority to bind the corporation or partnership. All names must be typed or printed below the signature. The address and telephone number for communications regarding the Bid must be shown.

After commencement of the Bid Period, no Bidder, or its agents, representatives, or persons acting at the request of such Bidder shall contact, communicate with or discuss any matter relating to the Bid with any District officer, agent, Board member, or employee other than Engineer or their designee. This prohibition ends upon execution of the final contract for the Work or when the Bid has been cancelled. A Bidder who violates this provision will be subject discipline, including at a minimum a written reprimand and up to and including rejection of its Bid and/or cancellation of the Contract.

3. **Bid Security:** Each Bid must be accompanied by bid security in the form of a certified check or Bidder's Guaranty Bond ("Bid Bond") issued by a surety meeting the requirements of this Instruction to Bidders Section 3 and payable to the District for ten percent (10%) of the total amount of the Bid ("Bid Security"). Bidders will send the ORIGINAL Bid Bond to the District immediately after the Bid Due Date. The District will hold all bids unopened for 48 hours from the Bid Due Date. The original Bid Bond is to be received within 8 hours of the Bid Due Date or the bid will be deemed on-responsive. The Bid Security of the Successful Bidder will be retained until the Bidder has executed the Contract and furnished the required payment and performance bonds in the form of a Public Construction Bond, whereupon the Bid Security will be returned. If the Successful Bidder

fails to execute and deliver the Contract and furnish the required Bonds within fourteen (14) calendar days after the Notice of Award, the District may annul the Notice of Award and the Bid Security of that Bidder will be forfeited to the District. The Bid Security of any Bidder whom the District believes to have a reasonable chance of receiving the award may be retained by the District for ninety (90) calendar days after the date of the opening of the Bid. The Bid Security of other Bidders will be returned seven (7) calendar days after the opening of the Bids. The Bid Bond shall be issued by a company having a registered agent in the State of Florida.

4. **Bonds and Qualification of Security Companies:** Upon award of the Contract, Contractor shall execute a Public Construction Bond, in the amount of the total Contract Sum with a qualified surety company, covering performance of the Project and payment of subcontractors, substantially similar in form to that provided in Article 5 of the Contract Documents and in compliance with the requirements of Section 255.05, Florida Statutes.

In order to be acceptable to the District, Bid Bonds, Public Construction Bonds, or Maintenance Bonds shall, at a minimum be written by a surety company that:

- a. is admitted/authorized to do business in the State of Florida and complies with the provisions of Section 255.05, Florida Statutes;
- b. has been in business and has a record of successful continuous operations for at least five (5) years;
- c. files a certified copy of a power of attorney with the signed Bid, Public Construction, or Maintenance bonds;
- d. lists the surety's agency name, address, and telephone number on all bonds; and
- e. has at least the following minimum ratings based on the following contract amounts:

<u>CONTRACT AMOUNT</u>	<u>BEST'S RATINGS</u>
\$ 25,000.00 to \$100,000.00	B+ Class V or better
\$100,000.01 to \$500,000.00	A Class VI or better
\$500,000.01 and over	A Class VII or better

The life of the Construction Bonds or Maintenance Bonds shall extend twelve (12) months beyond the date of Final Completion and shall contain a waiver of alteration to the terms of the Contract, extensions of time, and/or forbearance on the part of the District.

Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended).

5. **Subject of Bids:** All Work for the Project shall be constructed in accordance with the Plans and Specifications prepared by Holtz Consulting Engineers, Inc. Bids shall be submitted for furnishing, delivering, and installing all materials, equipment, incidentals and services, including labor for the Work as specified

in the Contract Documents and all items reasonably inferable therefrom. Engineer will compute the quantities that will be the basis for payment applications, both progress and final.

All Work shall be done as set forth in the Contract Documents and substantially completed, tested, cleaned, and ready for operation within the periods stated in Article 4 of the Contract, Section 2.

6. **Modification and Withdrawal of Bids:** Bids may be withdrawn or modified by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted during the Bid Period. A request for withdrawal or a modification must be in writing and signed by a person duly authorized to withdraw or modify the Bid. If signed by a deputy or subordinate, the principal's written authorization to such deputy or subordinate granting the power to act on the principal's behalf must accompany the request for withdrawal or modifications. Withdrawal of a Bid will not prejudice the rights of a Bidder to submit a new Bid within the Bid Period. After expiration of the Bid Period, no Bid may be withdrawn or modified, except as provided below.

If, within twenty-four (24) hours after Bids are opened, any Bidder files a duly signed, written notice with the District and within five (5) calendar days thereafter demonstrates to the reasonable satisfaction of the District that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid Security will be returned. Thereafter, the Bidder will be disqualified from further bidding on the Project.

7. **Award, Waiver, and Rejection of Bids:** The Contract will be awarded pursuant to the requirements of applicable federal, state, and local laws and regulations. The Contract award will be made to the lowest cost, qualified, responsive, and responsible Bidder whose proposal materially complies with all the requirements. The District reserves the option to award or rebid the Project at any time if deemed to be in the best interest of the District.

It is the intention of the District to award the Contract to a Bidder competent to perform and complete the Work in a timely and satisfactory manner. Additionally, the District may conduct such investigations as the District deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to the District's satisfaction and within the prescribed time.

To the extent permitted by applicable federal, state, and local laws and regulations, the District reserves the right to: determine materiality of Bid components; determine qualifications of the Bidder; determine responsibility of Bidder; determine responsiveness of Bidder; reject any and all Bids; waive any informality or irregularities in any Bid received; or accept the Bid deemed by the District to be in its best interest. Bids may be rejected at the option of the District if the District determines in its sole discretion the Bid is materially incomplete, unbalanced, conditional, or obscure; the Bid contains additions not called for, erasures, alterations, irregularities of any kind; the Bid does not comply materially with the Notice to Contractors and/or Instruction to Bidders; or the Bid is from a Bidder that does not meet pre-bid conference attendance requirements.

Documented poor performance of contractors on previous contracts with the District or other governmental entity will be considered during evaluation and may be sufficient cause not to award.

8. **Construction Schedule:** Prior to signing the Contract, the Successful Bidder shall submit on a form acceptable to the District and Engineer, the overall proposed construction schedule for the Project. The schedule shall conform to the requirements of Special Conditions Section 9.36. This construction schedule shall specify the Project completion date as set forth in the Contract.

9. **Execution of the Contract:** When the District gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Contract and all other written Contract Documents. Within fifteen (15) days thereafter, Contractor shall sign and deliver the counterparts of the Contract and other written Contract Documents to the District with the required bonds and insurance certificates. Within fifteen (15) days thereafter, the District shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the appropriately identified Plans and Specifications. Following execution of the Contract by the District, the construction schedule shall be modified to begin upon the execution of the Contract by both Parties of the Contract.

10. **Examination of Contract Documents and Site:** It is the responsibility of each Bidder, prior to submitting a Bid to (a) examine the Bid and Contract Documents thoroughly, (b) visit the site of the Work and become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the Work, (c) consider federal, state, and local laws, ordinances, rules, and regulations that may affect cost, progress, performance or furnishing of the Work in any manner, (d) examine the Plans and Specifications, requirements of the Work, and the accuracy of the quantities of the Work to be completed, and (e) notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

Bidder may rely upon the accuracy of the technical data contained in the reports of exploration and tests of subsurface conditions at the site of the Work which have been utilized by Engineer in preparation of the Contract Documents. Bidder may not rely upon the completeness of the documents, non-technical data, interpretations or opinions of the reports of exploration and tests of subsurface conditions, for the purposes of bidding and/or construction. Further, information and data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site are based upon information and data furnished to the District and Engineer by the owners of such underground facilities or others. The District does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions. Elevations of the ground are shown on the Plans and Specifications and are believed to be reasonably correct. However, such elevations are not guaranteed and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The lands upon which the Work is to be performed, right-of-ways and easements for access thereto, and other lands designated for use by Contractor in performing Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage materials and equipment shall be provided by Contractor.



Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, studies and any additional information and/or data which pertain to the physical conditions (subsurface, surface and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents. In advance, the District will provide each Bidder access to the site of the Work at reasonable times to conduct such explorations and tests as each Bidder deems necessary for the submission of the Bid, provided Bidder provides two (2) business days written notice prior to the date access is requested.

The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with the requirements as set for in the Instructions to Bidders and all other Contract Documents; the Bid is premised upon performing and furnishing the Work required by the Bid and Contract Documents; the means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Bid and Contract Documents will be followed; and that the Bid and Contract Documents are sufficient in scope and detail to indicate and convey an understanding of all terms and conditions of performance and furnishing of the Work.

The Contract Documents contain the detailed provisions required for the construction of the Project. No information, verbal or written, obtained from any officer, agent or employee of the District on any such matter shall in any way affect the risk or obligation assumed by Contractor, or relieve Contractor from fulfilling any of the conditions of the Contract Documents.

**11. Interpretations and Addenda:** All questions about the meaning or intent of the Contract Documents are to be directed to Engineer. All questions must be submitted to Engineer in writing as early as possible during the Bid Period. No oral answers or interpretations will be provided. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by addenda mailed to all persons recorded by Engineer as having received the Bid Documents. Questions received less than ten (10) calendar days prior to the deadline to submit Bids will not be answered. Only questions answered by formal written addenda will be binding. Oral responses and other interpretations or clarifications will be without legal effect, and shall not be relied upon by a Bidder.

Addenda may also be issued to modify the Bid Documents as deemed necessary by the District and/or Engineer. Contractor agrees to use the products and methods designated or described in the Plans and Specifications and as amended by any addenda. Addenda shall control in the event of conflict with Contractor's Bid.

**12. Substitute Material and Equipment:** The Contract will be based on material and equipment described in the Plans and Specifications without consideration of possible "substitute" or "equal" items. Whenever it is indicated in the Plans and Specifications that a Contractor may furnish or use a "substitute" or "equal" item of material or equipment, written application for such acceptance will not be considered by Engineer until after the effective date of the Contract. The written application for acceptance of a substitute item of material or equipment will be handled in accordance with the field order procedure.

13. **Subcontractors:** Each Bid must identify the names and addresses of the subcontractors. If requested by the District or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the date of the request, submit to the District an experience statement with pertinent information as to similar projects and other evidence of qualification for each such subcontractor, person, and organization. The amount of subcontract work shall not exceed sixty percent (60%) of the Work. If the District or Engineer, after due investigation, has reasonable objection to any proposed subcontractor, supplier, other person, or organization, either party may, before issuing the Notice of Award, request the Successful Bidder to submit an acceptable substitute without an increase in Contract sum or Contract Time. If the apparent Successful Bidder declines to make any such substitution, the District may award the Contract to the next lowest qualified, responsive, and responsible Bidder that proposes to use acceptable subcontractors, suppliers, and other persons and organizations. Declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security of any Bidder. Any subcontractor, supplier, other person or organization listed and not objected to in writing by the District or Engineer prior to giving of the Notice of Award, will be deemed acceptable to the District and Engineer, subject to revocation of such acceptance after the Effective Date of the Contract. The Successful Bidder shall be solely responsible for all payment to its subcontractors. No Contractor shall be required to employ any subcontractor, manufacturer, other person or organization against whom it has reasonable objection.

14. **Taxes:** Contractor shall pay all applicable sales, consumer, use, and other similar taxes required by law.

15. **Compliance with Laws:** Bidders must comply with all applicable federal, state, or local laws and regulations, including, but not limited to, the Department of Labor Safety and Health Regulations for construction promulgated under the Occupations Safety and Health Act of 1970 (PL 91-956) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

Any chemicals used in the performance of this Project by the Bidder must have prior approval of the Environmental Protection Agency (EPA) and/or United States Department of Agriculture (USDA).

Bidders shall comply with the requirements of Sections 553.60-553.64, Florida Statutes (the “Trench Safety Act”) and 29 CFR Section 1926.650 Subpart P (the “Occupational Safety and Health Administration’s Excavation Safety Standards”). If the Project provides for trench excavation in excess of five (5) feet deep, the Bidder shall include in its Bid a reference to the Trench Safety Act and the standards that will be in effect during the period of construction of the Project; written assurance by the Bidder, that if selected, the Bidder will comply with applicable trench safety standards; and a separate item identifying the cost of compliance with the Trench Safety Act, in accordance with Section 553.64, Florida Statutes.

16. **Liquidated Damages and Additional Delay Damages:** Bidder and the District recognize the Work is of a critical nature, that time is of the essence, and the difficulty associated with ascertaining the extent of delay damages the District will suffer as a result of delay in the Work. As a result, if awarded the Contract, Bidder agrees to pay the District as liquidated damages, and not as a penalty, the amount of Liquidated Damages and Additional Delay Damages as outlined in Article 4- Contract Section 2.

17. **Insurance:** Contractor shall provide and maintain throughout the terms of this Contract, liability insurance with all the subject features in accordance with the instruction given in the Special Conditions Section 9.08.

18. **Required Disclosures:** With its Bid submission, Bidder shall disclose all material facts pertaining to any felony conviction or any pending felony charges in the last three (3) years in this state, any other state, or the United States against (i) Bidder, (ii) any business entity related to or affiliated with Bidder, or (iii) any present or former executive employee, officer, director, stockholder, partner or owner of Bidder or of any such related or affiliated entity. This disclosure shall not apply to any person or entity which is only a stockholder, owning twenty percent (20%) or less of the outstanding shares of a Bidder and whose stock is publicly owned and traded.

At its sole discretion the District may reject the Bid of any Bidder whose present or former executive employees, officers, directors, stockholders, partners, or owners are currently accused of or have ever been convicted of bidding violations. The discretion of the District may be exercised based on the disclosure required herein. By submitting a Bid, Bidder recognizes and accepts that the District may reject the Bid based upon the exercise of its sole discretion, and Bidder waives any claim it might have for damages or other relief resulting from the rejection of its Bid based on these grounds.

19. **Public Entity Crime/ Convicted Vendor List:** A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public Work, may not submit bids on leases of real property to a public entity, may not be awarded or perform Work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, Florida Statutes, Category Two, for a period of thirty-six (36) months from the date of being placed on the convicted vendor list.

20. **License and Permits:** The District has obtained the permits specified within the Contract Documents. Contractor shall obtain and pay for all permits and licenses required for the Work as defined in Section 01000 of the Technical Specifications, including the cost of all Work performed in compliance with the terms and conditions of such permits, whether by itself or others.

No construction Work shall commence until all applicable licenses and permits have been obtained and copies delivered to Engineer.

21. **Protest:** The District is responsible for resolution of protests of contract awards, claims, disputes, alleged patent infringements, alleged license fee(s) and other related procurement matters in accordance with sound business judgment and good administrative practice. By submitting a Bid to the District, Bidders agree to the procedures outlined in the District's Procurement Policy which can be found on the District's website, [www.loxahatcheeriver.org/purchasing.php](http://www.loxahatcheeriver.org/purchasing.php), to resolve all protests.

22. The Contract Documents include various divisions, sections, and conditions which are essential parts of the Work to be provided by the Contractor. A requirement occurring in one is binding as though occurring in all. The Contract Documents are intended to be complementary and

to describe and provide for complete Work. In case of discrepancy, the following precedence will govern the interpretation of the Contract Documents prior to award of the Contract:

1. Addenda
2. Bid Documents, including the Contract
3. Special Conditions
4. Technical Specifications / Plans and Specifications
5. General Conditions
6. Bidder's Response

After award, in the event of a conflict, Change Orders, supplemental agreements, and revisions to Plans and Specifications will take precedence over any of the above. Detailed plans shall have precedence over general plans. In the event that any conflicts cannot be resolved by reference to this governing order of Contract Documents provision, then the District shall resolve the conflict in any manner which is acceptable to the District and which comports with the overall intent of the Contract Documents.

23. To render a Bid responsive, the Bidder's Proposal must be accompanied by the Bid Form provided in Article 2 of the Contract Documents. Acceptable references and projects to be included shall be those related to installation of low pressure force main systems. References provided shall be from the "owner" of the Project, not the project engineer or Contractor. The District will not award a Bid to any Bidder who cannot prove to the satisfaction of the District that the corporation/partnership/individual identified on the signature of Bidder form has satisfactory written references for similar work. References that are from a parent corporation or affiliated subsidiary will not be considered by the District.

24. **Notice to Proceed:** The Notice to Proceed for this project will be issued within 180 days of the Award of Contract at a time mutually agreed to by the Owner and lowest responsive bidder.

25. **Health, Safety and Environmental Performance:** The District shall evaluate Bidder's health, safety and environmental performance based on the following performance metrics and documentation reviews. The selected Bidder is solely responsible for all applicable health, safety, and environmental requirements, and the health, safety, and environmental evaluation conducted by the District is not an assumption of any responsibility for health, safety, and environmental requirements by the District. Bidders which fail to submit with their Bid information demonstrating compliance with the following criteria shall be considered non-responsive/non-responsible:

U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Incident Rates and Recordable Injuries:

Total Days Away, Restricted, Transferred (DART) **Benchmark 4.4**  
(U.S. Bureau of Labor Statistics, Table 1). Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, **2018, 25<sup>th</sup> percentile or better for size 11-49, NAICS 237110, Water and sewer line and related structures construction).** Bidder's DART must be less than or equal to benchmark.

Total Recordable Incident Rate (TRIR) **Benchmark 6.8**  
(U.S. Bureau of Labor Statistics, Table 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, **2018, 25<sup>th</sup> percentile or better for size 11-49, NAICS 237110, Water and sewer line and related structures construction).** Bidder's TRIR must be less than or equal to benchmark.

Fatalities: **0** Work related fatalities resulting in OSHA citations within the last three years, OR if 1 or more work related fatalities resulting in an OSHA citation exist within the last three years, the contractor must have mitigated risk of recurrence by implementing adequate industry standard safety procedures and training as determined by OSHA by providing such OSHA determination to the District.

Bidder shall submit a health, safety and environmental plan for Construction and General Industry. The health, safety and environmental plan must address the following minimum requirements:

Lockout/Tagout  
Excavation Trenching and Shoring  
Permit Required Confined Space  
Injury Reporting/Investigation  
Operator Qualifications  
Hot Work  
Personal Protective Equipment  
Electrical Safety  
Near Miss, Behavioral Based Safety  
Qualified, Certified and Competent Employees

OSHA Inspection Detail review must show no Serious or Willful violations in the previous 36 months and no unresolved Failure to Abate Prior Violation in the previous 36 months and no active Failure to Abate Prior Violation.

Bidder shall submit with their Bid OSHA Form 300A completed for the previous year, an Experience Modification Rating letter from its insurance carrier for the current period and a copy of its written health, safety and environmental program with training records for the previous 36 months.

26. **Previous Performance on District Projects:** The District has implemented a Contractor Evaluation Report in an effort to document contractor performance on District projects. Bidders

who have received Unsatisfactory ratings on previous District projects must submit with their Bid a mitigation plan detailing previous unsatisfactory ratings and measures implemented to address the unsatisfactory performance. Bidders with unsatisfactory ratings not submitting a mitigation plan with their bid shall be deemed Non-Responsive/Non-Responsible.

27. **Experience:** The District shall evaluate the Bidder's experience relative to the work to be performed based on the following requirements:

Have successfully performed as Prime Contractor on a minimum of 5 similar projects in the past 5 years. Similar projects shall include municipal gravity sanitary sewer installations including lift stations with a minimum construction contract value of \$300,000. Qualifying projects shall be complete and shall not have been assessed Liquidated Damages, terminated, suspended or defaulted.

Bidder shall submit Project Resumes for all qualifying projects. Resumes shall include project name, description, construction cost, completion date, Owner's project manager contact information (name, phone number and email), Engineer of Record's contact information (name, phone number and email). See Proposal, Article 2A, Questionnaire.

LOXAHATCHEE RIVER  
ENVIRONMENTAL CONTROL DISTRICT

By: \_\_\_\_\_  
Stephen B. Rockoff  
Chairman

I hereby acknowledge receipt of the Notice to Contractors and Instruction to Bidders and have familiarized myself with the contents therein and all other Contract Documents

By: \_\_\_\_\_  
Bidder

\_\_\_\_\_ Date

**PROPOSAL**

**ARTICLE 2**

**LOXAHATCHEE RIVER DISTRICT  
LIFT STATION #82 REHABILITATION**

To the LOXAHATCHEE RIVER DISTRICT of Jupiter, Florida, as the party of the first part:

Proposal made by: \_\_\_\_\_  
as Bidder,

whose business address is: \_\_\_\_\_

State whether Bidder is an individual,  
a partnership or a corporation: \_\_\_\_\_

Accompanying this Proposal is a Bid Security for \$ \_\_\_\_\_ (Numbers)  
\_\_\_\_\_. (Amount Written)

From: \_\_\_\_\_  
(Name of Surety)

1. The undersigned Bidder hereby declares that the Bidder has carefully examined the Contract Documents relating to the above entitled matter and the Work, and has personally inspected the location of the Work. The undersigned Bidder has correlated the results of all observations, examinations, investigations, tests, reports, and studies with the terms and conditions of the Contract Documents.
2. The undersigned Bidder hereby declares that the Bidder is the only person or persons interested in its Bid; that it is made without any connection with any person submitting another bid for the same Contract; that the Bid is in all respects fair and without collusion, fraud, or mental reservations; that no official of the District or any person in the employ of the aforesaid is directly or indirectly interested in said Bid or in the supplies of Work to which it relates, or in any portion of the profits thereof.
3. The undersigned Bidder does hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all Work in the above entitled matter in accordance with the Plans and Specifications relating thereto, and to furnish all labor, tools, implements, machinery, forms transportation, and materials necessary and proper for the said purpose at the prices named below for the various items of Work.
4. The undersigned Bidder does hereby declare that the prices so stated cover all expenses of every kind incidental to the completion of said Work and the Contract, including all claims that may arise through damages or other cause whatsoever. The undersigned Bidder agrees to complete the Work for the price(s) indicated in the Bid Form.
5. The undersigned Bidder does hereby declare that the Bidder shall make no claim on an account of any variation of the approximate estimate in the quantities of Work to be done, nor on account of any misunderstanding or misconceptions of the nature of the Work to be done or the grounds or place where it is to be done.
6. The undersigned Bidder does hereby agree that it will execute the Contract which will contain the material terms, conditions, provisions, and covenants necessary to complete the Work according to the Plans and Specifications, within fifteen (15) calendar days after receipt of written Notice of Award of this proposal by the District; and if the Bidder fails to execute said Contract within said period of time, that the District shall have the power to rescind said award and also retain for the District the Bid Security accompanying Bidder's proposal which shall become forfeited as liquidated damages.
7. The undersigned Bidder also declares and agrees that the Bidder will commence the Work within ten (10) calendar days after receipt of written Notice to Proceed and will complete the Work fully and in every respect on or before the time specified in the Contract Documents, and so authorize the party of the District in case of failure to complete the Work within such specified time to employ such persons, equipment, and materials as may be necessary for the proper completion of said Work and to deduct the cost therefore from the amount due under the Contract.
8. The undersigned Bidder accepts all of the terms and conditions of the Bid Documents, including without limitation those dealing with the disposition of the Bid Security. The undersigned Bidder also makes all representations required by the Instructions to Bidders.



9. The undersigned Bidder agrees to provide Unit Prices of major construction elements of the Work in order to better determine the value of progress payment, in a format as provided in Article 6 Forms for Use During Construction.

10. The undersigned Bidder hereby agrees that the Bidder will, at Bidder's expense, insure all persons employed by it in prosecuting the Work hereunder against accident as provided by the Workers' Compensation Law of the State of Florida.

11. The price for the Work shall be stated in both words and figures in the appropriate place in the proposal form. Discrepancies in the multiplication of units of Work and unit prices will be resolved in the favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in the favor of the correct sum. In the event that there is a discrepancy between the price in written words and the price written in figures, the former shall govern.

12. The undersigned Bidder acknowledges receipt of the addenda, if any, as listed herein and agrees that Bidder will be bound by all addenda whether or not listed herein.

Receipt of Addendum	No. _____	Date _____
	No. _____	Date _____
	No. _____	Date _____
	No. _____	Date _____

13. The following documents are attached to and made a condition of this Bid (initial each item in the space provided):

- a. Initial\_\_\_\_\_. Instructions to Bidders, Proposal, Questionnaire, Sworn Statement Under Section 287.133(3)(a), Florida Statutes, on Public Entity Crimes, Schedule of Bid Prices
- b. Initial\_\_\_\_\_. Bid Security
- c. Initial\_\_\_\_\_. Power of Attorney (for Surety Bond only)
- d. Initial\_\_\_\_\_. Corporate Authority to execute Bid (any corporate employee other than president or vice president)
- e. Initial\_\_\_\_\_. Copies of current valid license(s) issued in accordance with Florida Statutes and/or appropriate local ordinances is hereby acknowledged.
- f. Initial\_\_\_\_\_. OSHA's Form 300A completed for the previous year
- g. Initial\_\_\_\_\_. Experience Modification Rating letter (issued by insurance carrier) for the current period.

- h. Initial \_\_\_\_\_. Written health, safety and environmental program with training records for the previous 36 months.
- i. Initial \_\_\_\_\_. Contractor's Unsatisfactory Rating Mitigation Plan (if required, see ITB 26)
- j. Initial \_\_\_\_\_. Project Resume's for qualifying experience (see ITB 27).

Contractor: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

(Corporation Seal)

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Contractor's License No: \_\_\_\_\_

**BID FORM — BASE BID**  
**LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT**  
**LIFT STATION #82 REHABILITATION**

UNIT PRICES

Bid Item No.	Description	Qty.	Unit	Unit Cost	Total
1	Mobilization/Demobilization	1	LS		
2	Maintenance of Traffic	1	LS		
3	Record Drawings	1	LS		
4	Preconstruction Video	1	LS		
5	NPDES Permit/Erosion Measures	1	LS		
6	Existing Pump Station Demolition	1	LS		
7	11' Diameter Concrete Wet Well	1	EA		
8	11' Diameter Concrete Wet Well Top Slab, Hatch Cover Frame, Cover, Safety Grate, and Vent Pipe	1	EA		
9	Lift Station Corrosion Barrier System	905	SF		
10	Concrete Valve Vault	1	EA		
11	8" DIP Emergency Bypass Assembly with Camlok	1	EA		
12	8" HDPE DR-11 Wet Well Discharge Piping	95	LF		
13	Mechanical Joint Ductile Iron Fittings	1	Tons		
14	Wet Well Drop Bowl and SDR 26 PVC Drop Pipe Assembly for Gravity Influent	1	EA		
15	Wet Well Drop Assembly for Force Main Influent	2	EA		
16	Temporary Bypass Pumping and Piping Assembly	1	EA		
17	Concrete Lift Station Pad	75	SY		
18	Connection to Existing Wastewater Force Main	3	EA		
19	Installation of 60-HP Pumps and Appurtenances (Pumps to be furnished by Owner)	1	LS		
20	8" Plug Valve	4	EA		
21	14" Plug Valve	1	EA		
22	8" Swing Check Valve	3	EA		
23	Concrete Driveway	40	SY		
24	Lift Station Control Panel and Electrical Appurtenances	1	LS		
25	Lift Station Instrumentation	1	LS		
26	Lift Station Generator Installation (Generator to be furnished by Owner)	1	LS		

27	Landscaping and Miscellaneous Restoration	1	LS		
----	---	---	----	--	--

TOTAL BASE BID, ITEMS 1-27 (in words)

Dollars

Cents

THE CONTRACT AWARD SHALL BE EVALUATED BASED ON THE TOTAL BASE BID PRICE FOR ITEMS 1 THROUGH 27 AS SUBMITTED BY THE LOWEST, QUALIFIED, RESPONSIBLE, RESPONSIVE BIDDER.

---

(Name of Bidder)

Bidders Name: \_\_\_\_\_

By: \_\_\_\_\_  
Signature of Authorized Officer, Partner, Member, Manager

Print Name of Person signing: \_\_\_\_\_

Title: \_\_\_\_\_

Business Address: \_\_\_\_\_

\_\_\_\_\_

Incorporated or formed under the laws of the State of \_\_\_\_\_.

**PROPOSAL**  
**ARTICLE 2a**

QUESTIONNAIRE  
For  
**LIFT STATION #82 REHABILITATION**

INSTRUCTIONS

1. The following information must be filled out by **all Bidders**.
2. Please print legibly, type, or word process. Sign in ink. When attaching sheets, please place the question number to which you are responding in the upper right hand corner of each sheet and number the sheets.
3. Note that the person signing this Application must swear that the information provided below is true, accurate, and complete.

\*\*\*\*\*

**1. Basic Information**

- 1.1 Name of Contractor:

\_\_\_\_\_

[Same as on Cover Page of The Proposal]

- 1.2 Contact Person(s):

\_\_\_\_\_

- 1.3 Telephone No: \_\_\_\_\_ Fax No: \_\_\_\_\_ E-mail: \_\_\_\_\_

- 1.4 Address:

\_\_\_\_\_

\_\_\_\_\_

- 1.5 Federal Tax ID No: \_\_\_\_\_

- 1.6 CONTRACTOR'S license: Primary classification: \_\_\_\_\_

State License Number \_\_\_\_\_

Supplemental classifications held, if any: \_\_\_\_\_

Name of Licensee, if different from (1) above: \_\_\_\_\_

\_\_\_\_\_

1.7 Name of person and title who inspected site of proposed WORK for your firm:

Name: \_\_\_\_\_ Date of Inspection: \_\_\_\_\_  
Title: \_\_\_\_\_

## **2. Organizational Structure & History**

2.1 The Contractor is duly organized under the laws of the State of \_\_\_\_\_.

2.2 The Contractor has the following organizational structure.

( ) individual ( ) corporation ( ) partnership  
( ) limited liability company ( ) joint venture ( ) other: \_\_\_\_\_

2.3 Provide the year the Contractor (and not any Predecessor Entities or Related Entities) was first organized. \_\_\_\_\_

2.4 List all Predecessor Entities below (or on attached sheets if necessary).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2.5 Please list all Related Entities below (or on attached sheets if necessary).

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2.6 If organized in any state other than Florida or in a foreign country, are you in compliance with all laws and regulations necessary to legally do business in the State of Florida?

YES \_\_\_\_\_ NO \_\_\_\_\_

### 3. Officers and Owners

3.1 Officers: List the name, title, and address of current Officers, Directors, Partners, Members, and any other persons with similar positions, in descending order of degree of control.

Name	Title	Address
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]

3.2 Owners. Please list the name, address, and percentage of ownership of all persons or entities owning 10 percent or more of the Contractor, in descending order of percentage of ownership.

Owner	Address	%
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]

3.3 Employees. Please list total quantity of employees, # of crews, and discipline of each crew.

Crew Discipline	Number of employees in crew	% of total firm
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Attach additional sheets as necessary.]



#### 4. Experience

4.1 Summary of Contractor Experience With respect to this specific project, list the approximate number of years of experience that the Contractor has as a prime contractor or as a subcontractor with primary responsibility.

<u>Project Type</u>	<u>Years</u>
Utility Construction (primary)	_____
Utility Construction (subcontractor)	_____

4.2 Most Recently Completed Contracts Please provide the following information regarding the last ten contracts completed by the Contractor. Please list in reverse chronological order (most recently completed project first, next most recently completed project, etc.). [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

Contract Amount	Project Type & Location	Month / Year Completed	Name, Address, Contact Person & Tel. # of Owner

4.3 What is the last project similar in nature that you have completed as Prime Contractor for a government entity in Florida? (This must be filled out below or Bid may be considered non-responsive.)

Project: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Project Cost: \_\_\_\_\_  
Year Complete: \_\_\_\_\_  
Government: \_\_\_\_\_

4.4 ATTACH TO THIS BID the experience resume of the person who will be designated chief construction superintendent or on site construction manager.

4.5 List 5 projects completed as Prime Contractor in last 5 years in Florida involving work of similar type and complexity that you have completed as Prime Contractor for a government entity in Florida? See Instructions to Bidders, Paragraph 27, Experience. If 5 projects have not been completed, Contractor must so state (this must be filled out below or Bid may be considered non-responsive).:

a. Project Name: \_\_\_\_\_

Contract Price: \$ \_\_\_\_\_

Detailed Description of Work: \_\_\_\_\_

\_\_\_\_\_

Name, Address and Telephone Number of Government/Contact Person: \_\_\_\_\_

\_\_\_\_\_

b. Project Name: \_\_\_\_\_

Contract Price: \$ \_\_\_\_\_

Detailed Description of Work: \_\_\_\_\_

\_\_\_\_\_

Name, Address and Telephone Number of Government/Contact Person: \_\_\_\_\_

\_\_\_\_\_

c. Project Name: \_\_\_\_\_

Contract Price: \$ \_\_\_\_\_

Detailed Description of Work: \_\_\_\_\_

\_\_\_\_\_

Name, Address and Telephone Number of Government/Contact Person: \_\_\_\_\_

\_\_\_\_\_

d. Project Name: \_\_\_\_\_

Contract Price: \$ \_\_\_\_\_

Detailed Description of Work: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Name, Address and Telephone Number of Government/Contact Person: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

e. Project Name: \_\_\_\_\_

Contract Price: \$\_\_\_\_\_

Detailed Description of Work: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Name, Address and Telephone Number of Government/Contact Person: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4.6 Contracts In Progress Please provide the following information regarding all contracts currently in progress, in descending order of contract amount. [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

Contract Amount	Project Type & Location	% Completed	Name, Address, Contact Person & Tel. # of Owner

4.7 Provide an alphabetical listing of all state or local government agencies, including telephone number and contact person, that have awarded the Contractor (or any Predecessor Entities and Related Entities) a contract during the last five years. Attach additional sheets as necessary.

- |          |          |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |

- 4.8 Subcontractors. This proposal is being submitted by the CONTRACTOR who proposes to perform the Work as required by the Contract Documents. If the CONTRACTOR will be utilizing a Subcontractor for a category of Work set forth below then the CONTRACTOR **must** identify the Subcontractor by name and provide the Subcontractor's address and telephone number. Only **one** Subcontractor may be identified for each category set forth below. If the CONTRACTOR does not identify a Subcontractor for a category of Work specified, this shall constitute a representation and warranty by the CONTRACTOR that the CONTRACTOR is not utilizing a Subcontractor for such Work and will perform such Work with CONTRACTOR's own employees. After submitting this bid the contractor may not add to, subtract from, modify or make substitutions regarding the Supplier/Subcontractor identification and listing without the express written request and consent of the District. Any substitutions must be for legitimate and proper reasons. All Subcontractors listed are subject to the approval of the District.

CONTRACTOR represents and warrants to the District that all of said Subcontractors and their authorized vendors have been made aware of all the appropriate portions of the Contract Documents and agree that their portion of the Work and materials furnished in connection therewith will meet all of the requirements of the Contract Documents and that deliveries will be scheduled so as not to impede the progress of the Work.

Subcontractors:

Surveyor

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

Electrical and Control Systems

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

Demolition

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

Lift Station

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

Restoration

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

Other

\_\_\_\_\_  
Name:

\_\_\_\_\_  
Address & Telephone No.

4.10 Liquidated Damages Within the last five years, has the Contractor (or any Predecessor Entities or Related Entities) had liquidated damages assessed against it?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please provide full details on attached sheets including the per diem amount of liquidated damages, the original contract time, and the number of days for which liquidated damages were assessed. Please feel free to include a written summary of your position on the matter.

4.11 Terminations / Suspensions / Defaults

(a) Within the last five years, has a contract of the Contractor (or any Predecessor Entities or Related Entities) been terminated or suspended for cause?

YES \_\_\_\_\_ NO \_\_\_\_\_

(b) Within the last five years, has another party (e.g. surety) completed Work which the Contractor (or any Predecessor Entities or Related Entities) was originally responsible to perform?

YES \_\_\_\_\_ NO \_\_\_\_\_

(c) Within the last five years, has the Contractor (or any Predecessor Entities or Related Entities) been considered in default of a contract that was not cured within the time frame allowed by the contract?

YES \_\_\_\_\_ NO \_\_\_\_\_

If the answer to any of questions 4.6(a) -(c) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

#### 4.12 Denial of Qualification or Award

(a) Within the last 5 years, has any federal, state, or local government or procurement agency denied the Contractor (or any Predecessor Entities or Related Entities) qualification?

YES \_\_\_\_\_ NO \_\_\_\_\_

(b) Within the last 5 years, has any federal, state, or local government or procurement agency, after the Contractor (or any Predecessor Entities or Related Entities) submitted the apparent low bid, refused to award a contract for reasons related to the Contractor's qualifications, experience, competence, or financial situation?

YES \_\_\_\_\_ NO \_\_\_\_\_

If the answer to either of questions 4.7(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

#### 4.13 Debarments, Etc.

(a) Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been debarred for any reason by any federal, state, or local government or procurement agencies?

YES \_\_\_\_\_ NO \_\_\_\_\_

(b) Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) refrained from bidding for any reason, such as suspension or agreement not to bid, or as part of the settlement of a Dispute of any type with any federal, state, or local government or procurement agencies?

YES \_\_\_\_\_ NO \_\_\_\_\_

If the answer to either of questions 4.8(a) or (b) is YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.14 Claims History Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been a party to a Claim with an originally claimed amount in excess of \$50,000?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please provide full details for each Claim on attached sheets including (a) whether the Claim was brought by or against the Contractor (or any Predecessor Entities or Related Entities), (b) the nature of the Dispute underlying the Claim, (c) originally claimed amounts, (d) the resolution of such Claims (including the amount) or if unresolved, the current status of such Claims, and (e) the name, address and phone number of the primary adverse party who is to be contacted for additional information, and (f) a written summary of your position on the matter (if desired).

4.15 Bid or Other Crimes Within the last 10 years, has the Contractor (or any Predecessor Entities or Related Entities), or any officers, owners, or Key Personnel of the same ever been indicted on, convicted of, or plead or consented to a violation of a bid crime including bid collusion or any other crime involving fraud or knowing misrepresentation?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please provide full details on attached sheets. Please feel free to include a written summary of your position on the matter.

4.16 Quality Control Does the Contractor have a written organizational-level quality control plan (as opposed to project-level plans)?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please answer the following two questions.

- (a) What year was it first adopted? \_\_\_\_\_
- (b) In what year was its substance last revised? \_\_\_\_\_

4.17 Contractor Evaluation Report Has the Contractor performed work with the District where a Contractor Evaluation Report was completed as part of the work?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, did the Contractor receive any UNSATISFACTORY ratings?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, include with the Bid Contractor's UNSATISFACTORY RATING MITIGATION PLAN.

## **5. Key Personnel**

5.1 Please provide the following information for all Key Personnel whose duties consist primarily of one or more the following functions: (a) project management, (b) quality control and (c) safety oversight. [Please feel free to provide this information on attached sheets in another format as long as it contains all the information requested.]

	Name	Job Duties (a-c above)	Relevant Licenses or Certifications	Experience (# of Yrs.)	Education (Degree or # Yrs.)
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____
6	_____	_____	_____	_____	_____

[Attach additional sheets as necessary.]

## 6. **Bonding**

6.1 Is the Contractor capable of obtaining from a Qualifying Bonding Company a performance bond and a payment bond each in the amount of the bid prices that the Contractor will be submitting to the OWNER. A Qualifying Bonding Company is an insurance, bonding, and/or surety company rated in accordance with contract requirements.

YES \_\_\_\_\_ NO \_\_\_\_\_

If NO, please explain why you cannot meet the bonding standards set forth in question 6.1 above on attached sheets.

## 7. **Environmental**

7.1 Environmental Record. Within the last 5 years, has the Contractor (or any Predecessor Entities or Related Entities) been found to be in violation of any federal, state or local environmental law or regulation in an administrative, civil or criminal proceeding in which the fact finder found that the Contractor committed the violation and/or failed to comply after having been notified of the violation?

YES \_\_\_\_\_ NO \_\_\_\_\_

If YES, please provide full details, including a summary of your position, on attached sheets.

## 8. **Financial**

8.1 ATTACH TO THIS BID an abbreviated financial statement on the attached form, references, and other information, sufficiently comprehensive to permit an evaluation of CONTRACTOR'S current financial condition.



### **9. Certifications Under Oath**

By signing below, the person signing below hereby certifies and swears, **ON OATH**, as follows.

1. I have personal knowledge of all the information contained in this Questionnaire OR I am responsible for the accuracy of all such information.
2. The information contained in this Application is true and complete.
3. I hereby authorize the Loxahatchee River District to contact any person or entity necessary to verify or supplement any of the information requested by or provided in this Application without liability, and I hereby further authorize any person or entity contacted to provide any and all information requested without liability.
4. The Contractor has read, understands, and agrees to all terms of the Qualification Questionnaire.
5. I am duly authorized by law and by the Contractor to sign this Qualification on behalf of the Contractor.

\_\_\_\_\_  
Date

CONTRACTOR

\_\_\_\_\_  
Witness

\_\_\_\_\_  
[Signature]

By: \_\_\_\_\_  
[Name and Title Printed]

State of \_\_\_\_\_

County of \_\_\_\_\_

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

The foregoing instrument was acknowledged before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_ by \_\_\_\_\_, who is personally known to me or who has produced a valid \_\_\_\_\_ Driver's License as identification and who did take an oath.

\_\_\_\_\_  
[Signature of Notary Public]

Name Printed: \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_

**SWORN STATEMENT UNDER SECTION 287.133(3)(a),  
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES**

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Bid, Proposal or Contract No. \_\_\_\_\_ for [INSERT PROJECT NAME HERE].
2. This                      sworn                      statement                      is                      submitted                      by  
\_\_\_\_\_  
(name of entity submitting sworn statement)  
whose business address is \_\_\_\_\_ and  
(if applicable) its Federal Employer Identification Number (FEIN) is \_\_\_\_\_.  
(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: \_\_\_\_\_.)
3. My name is \_\_\_\_\_ and my relationship to the entity  
named                      (please print name of individual signing)  
above is \_\_\_\_\_.
4. I understand that a "public entity crime: as defined in Paragraph 287.133(1)(g), **Florida Statutes**, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United states and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
5. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), **Florida Statutes**, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.
6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), **Florida Statutes** means:
  1. A predecessor or successor of a person convicted of a public entity crime: or
  2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "Affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons

when not for fair market value under an arm's length agreement, shall be prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding thirty-six (36) months shall be considered an affiliate.

7. I understand that a "person" as defined in Paragraph 287.133(1)(e), **Florida Statutes** means any natural person or entity organized under the laws of any state or of the United states with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.
8. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. [Indicate which statement applies.]

\_\_\_ Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

\_\_\_ The entity submitting this sworn statement, or one of more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. [attach a copy of the final order].

\_\_\_ There has been a proceeding concerning the conviction before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. [Please attach a copy of the final order].

\_\_\_ The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. [Please attach a copy of the final order].

\_\_\_ The person or affiliate has not been placed on the convicted vendor list. [Please describe any action taken by or pending with the Department of General Services].

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_,  
20\_\_ by \_\_\_\_\_, who is personally known to me or who has produced a valid  
\_\_\_\_\_ Driver's License as identification and who did take an oath.

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
Printed/Typed Name

My Commission Expires:

**Condensed current financial statement for (Name of Contractor)**

**LIFT STATION #82 REHABILITATION**

Condition at close of business \_\_\_\_\_, 20\_\_\_\_\_

**ASSETS**

1. Cash: (a) On Hand \$ \_\_\_\_\_, (b) In bank \$ \_\_\_\_\_, (c) Elsewhere \_\_\_\_\_  
\$ \_\_\_\_\_
2. Notes receivable (a) Due within 90 days  
\$ \_\_\_\_\_  
(b) Due after 90 days  
\$ \_\_\_\_\_  
(c) Past Due  
\$ \_\_\_\_\_
3. Accounts receivable from completed contracts, exclusive of claims not approved for payment  
\$ \_\_\_\_\_
4. Sums earned on uncompleted contracts as shown by Engineer's or Architect's estimate  
\$ \_\_\_\_\_  
(a) Amount receivable after deducting retainage  
\$ \_\_\_\_\_  
(b) Retainage to date, due upon completion of contracts  
\$ \_\_\_\_\_
5. Accounts receivable from sources other than construction contracts  
\$ \_\_\_\_\_
6. Deposits for bids or other guarantees  
\$ \_\_\_\_\_  
(a) Recoverable within 90 days  
\$ \_\_\_\_\_  
(b) Recoverable after 90 days  
\$ \_\_\_\_\_
7. Interest accrued on loans, securities, etc.  
\$ \_\_\_\_\_

8. Real Estate (a) Used for business purposes  
\$ \_\_\_\_\_  
(b) Not used for business purposes  
\$ \_\_\_\_\_
9. Stocks and Bonds (a) Listed – present market value  
\$ \_\_\_\_\_  
(b) Unlisted – present value  
\$ \_\_\_\_\_
10. Materials in stock not included in Item 4:  
(a) For uncompleted contracts (present value)  
\$ \_\_\_\_\_  
(b) Other materials (present value)  
\$ \_\_\_\_\_
11. Equipment, book value  
\$ \_\_\_\_\_
12. Furniture and fixtures, book value  
\$ \_\_\_\_\_
13. Other assets  
\$ \_\_\_\_\_
- TOTAL ASSETS
- \$ \_\_\_\_\_

### LIABILITIES

1. Notes payable (a) To banks regular  
\$ \_\_\_\_\_  
(b) To banks for certified checks  
\$ \_\_\_\_\_  
(c) To others for equipment obligations  
\$ \_\_\_\_\_  
(d) To others exclusive of equipment obligation  
\$ \_\_\_\_\_
2. Accounts Payable \* (a) Not past due  
\$ \_\_\_\_\_  
(b) Past due  
\$ \_\_\_\_\_
3. Real Estate encumbrances  
\$ \_\_\_\_\_
4. Other liabilities  
\$ \_\_\_\_\_
5. Reserves  
\$ \_\_\_\_\_

6. Capital stock paid up:

(a) Common

\$ \_\_\_\_\_

(b) Common

\$ \_\_\_\_\_

(c) Preferred

\$ \_\_\_\_\_

(d) Preferred

\$ \_\_\_\_\_

7. Surplus (net worth)      Earned \$ \_\_\_\_\_ Unearned \$ \_\_\_\_\_

\$ \_\_\_\_\_

TOTAL LIABILITIES

\$ \_\_\_\_\_

**CONTINGENT LIABILITIES**

1. Liability on notes receivable, discounted or sold

\$ \_\_\_\_\_

2. Liability on accounts receivable, pledged, assigned or sold

\$ \_\_\_\_\_

3. Liability as bondsman

\$ \_\_\_\_\_

4. Liability as guarantor on contracts or on accounts of others.

\$ \_\_\_\_\_

5. Other contingent liabilities

\$ \_\_\_\_\_

TOTAL CONTINGENT LIABILITIES

\$ \_\_\_\_\_

---

\*Include all amounts owing subcontractors for all work in place and accepted on completed and uncompleted contracts, including retainage

Certified and Signed By:

Certified Public Accountant

### **AUTHORITY TO EXECUTE BID AND CONTRACT**

If the Bidder is a Corporation, attach to this page a certified copy of corporate resolutions of the Board of Directors of the Corporation authorizing an officer of the Corporation to execute the Contract contained within this document on behalf of the Corporation.

(End of Article.)



## **BID SECURITY**

### **ARTICLE 3**

1. The undersigned Bidder does hereby declare and stipulate that this proposal is made in good faith, without collusion or connection with any other person or persons bidding for the same Work, and that it is made pursuant to and subject to all the terms and conditions of the Notice to Contractors, Instructions to Bidders, the Contract Documents, the Technical Specifications, and the Plans and Specifications pertaining to the Work, all of which have been examined by the undersigned.

2. Accompanying this proposal is a certified check or standard bid bond in the sum of \$\_\_\_\_\_.00, in accordance with the Notice to Contractors and Instruction to Bidders. Such amount shall be equal to ten percent (10%) of the Bid amount.

3. The undersigned Bidder agrees to execute the Contract, and the Public Construction Bond for the total amount of the Bid within fifteen (15) calendar days from the date when written Notice of Award of the Contract is delivered at the address given on this proposal. The name and address of the corporate surety with which the Bidder proposes to furnish the specified Public Construction Bond is as follows:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Bond Company's most recent "Best's Key Rating": \_\_\_\_\_

4. The undersigned Bidder agrees to begin the Work with an adequate work force and equipment within ten (10) calendar days from the date of receipt of official Notice to Proceed, and to complete all of the Work within the number of calendar days specified in the Special Conditions from the date of official Notice to Proceed.

5. The Bid Security will be returned to all, except the three (3) lowest qualified responsive, responsible Bidders, within seven (7) business days after the opening of the Bids and the remaining securities will be returned to the three (3) lowest Bidders within forty-eight (48) hours, after the District and Contractor have executed the Contract, or, if no Contract has been so executed, within one hundred twenty (120) calendar days after the date of the opening of Bids upon demand of the Bidder at any time thereafter so long as it had not been notified of the acceptance of the Bid.

6. All the phases of Work enumerated in the Contract Documents Technical Specifications with their individual jobs and overhead, whether specifically mentioned, included by implication or appurtenant thereto, are to be performed by Contractor under the applicable Bid item irrespective of whether it is named in said list.

7. This Bid is also based on addenda:

No. _____	Date _____
No. _____	Date _____
No. _____	Date _____
No. _____	Date _____

Contractor: \_\_\_\_\_

By: \_\_\_\_\_

Address: \_\_\_\_\_

(SEAL) Contractor's License No. \_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

## CONTRACT

### ARTICLE 4

**THIS CONTRACT**, is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, Two Thousand and \_\_\_\_\_ (20\_\_\_\_), by and between \_\_\_\_\_ (the “Contractor”), and the **LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT**, (the “District.”)

WITNESSETH: That whereas the District has awarded to Contractor the Work of performing certain construction:

**SECTION 1.** Scope of Work: Contractor shall furnish, install and deliver all of the labor, including engineering design, materials (except District-furnished materials), tools, equipment, services, and everything necessary to perform the Work; and shall construct in accordance with the Contract Documents and the terms of this Contract, the Project known and identified as LIFT STATION #82 REHABILITATION and shall do everything required by or reasonably inferable from the Contract Documents. The Work is generally described as follows:

#### LIFT STATION #82 REHABILITATION

**Conversion of existing Lift Station No. 82 from a dry pit pump station to a triplex submersible pump station. The converted lift station includes three (3) new submersible pumps, a new section of concrete wet well, HDPE, ductile iron, and PVC piping, concrete top slab, concrete lift station pad, and electrical and control equipment. Project includes all demolition necessary to convert the existing station from a dry pit configuration to a submersible station. The Work includes general conditions, bonds, indemnification, mobilization, demobilization, start-up, testing, record drawings, operation and maintenance manuals, training, and any all other necessary items to provide a complete and operating system.**

Applicable reference drawings are entitled **LIFT STATION #82 REHABILITATION** as prepared by the District.

**SECTION 2. Time of Completion:** Construction of the Work must begin within ten (10) calendar days from the date of receipt of official Notice to Proceed. Substantial Completion shall be achieved within **210 days** consecutive calendar days from the date of Notice to Proceed. For projects with a value of less than ten million dollars (\$10,000,000.00), Final Completion shall be achieved within **sixty-five (65)** consecutive calendar days from the date of actual Substantial Completion. For projects with a value of more than ten million dollars (\$10,000,000.00), Final Completion shall be achieved within **ninety-five (95)** consecutive calendar days from the date of actual Substantial Completion. The rate of progress and the time of completion are essential conditions of this Contract.

**Deduction for Not Completing on Time:** The District and Contractor recognize that because the Work is of a critical nature, time is of the essence. Therefore, the District will suffer direct financial loss and damage if the Work is not completed within the times specified above. The District and Contractor also recognize that it is difficult to ascertain the extent of those damages in advance and it will be difficult and expensive to determine those damages in a legal proceeding. Accordingly, Contractor shall pay to the District as liquidated damages, and not as a penalty, the amounts set out in (a) and (b) (“Liquidated Damages”) below for each and every calendar day the above deadlines are delayed, as said date may be adjusted as provided in the Special Conditions. Delay shall not include delays caused by factors beyond Contractor’s reasonable control, including but not limited to delays because of strikes, lockouts, work slowdowns or stoppages, accidents, acts of God, failure of any

governmental or other regulatory authority to act in a timely manner, failure of the District to furnish timely information or to obtain the cooperation of the District's design professionals and/or Engineer, or delays caused by faulty performance by the District or by Engineer.

- a. **Substantial Completion Delay.** Contractor shall pay to the District as Liquidated Damages, and not as a penalty, **\$250** per day for each and every calendar day Substantial Completion is delayed.
- b. **Final Completion Delay.** If Final Completion is not reached within **65 days** of actual Substantial Completion, Contractor shall pay to the District as Liquidated Damages, and not as a penalty, **\$75** per day for each and every calendar day Final Completion is delayed.

In addition Contractor shall be responsible for the costs for engineering and other professional fees, delay damage settlements or awards owed by the District to others, fines or penalties imposed by regulatory agencies, and professional fees, including attorneys' fees, incurred in connection with such settlements, awards, penalties or fines (collectively "Additional Delay Damages"). Engineering and inspection fees shall include direct labor costs, indirect costs, and overhead and profit as specified in Section 01010 of the Technical Specifications of the Contract Documents. The District and Contractor agree that the amounts set out in (2)(a) and (2)(b), above are to be paid by Contractor as Liquidated Damages and represent a reasonable estimate of the District's anticipated expenses for delays, inspection, and administrative costs associated with such delays. However, such amounts do not represent additional District costs for Additional Delay Damages. Therefore, in addition to these Liquidated Damages amounts, there shall be other amounts for Additional Delay Damages incurred by the District caused by avoidable delays by Contractor.

Where Liquidated Damages and Additional Delay Damages in connection with the Work of this Contract are duly and properly imposed against Contractor in accordance with the terms of this Contract, Federal law, State law, and/or governing ordinances or regulations, the total amount that Contractor owes to the District may be withheld and reduced from any monies due or to become due Contractor under the Contract, and when deducted, shall be deemed and taken as payment for such Liquidated Damages and Additional Delay Damages. If monies due from the District are not sufficient to cover such Liquidated Damages, Contractor agrees to immediately pay to the District any balance due.

**SECTION 3. General:** Contractor hereby certifies that it has read each and every clause of the Contract Documents and that it has made such examination of the location of the proposed Work as is necessary to understand fully the nature of the obligation herein made; and will complete the same in the time limits specified herein, in accordance with the Contract Documents. Contractor shall work with and report to Engineer to complete the Work set forth in the Contract Documents. Contractor has given Engineer written notice of all conflicts, errors, and discrepancies in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

All Work under this Contract shall be done to the satisfaction of Engineer, who shall, in all cases, determine the amount, quality, fitness, and acceptability of the Work and materials, which may arise, as to the fulfillment of the Contract on the part of Contractor, Engineer's decision thereon shall be final and conclusive, and such determination shall be a condition precedent to the right of Contractor to receive any payment hereunder.

At any time during the performance of the Contract, Contractor shall allow and provide the District access to all of the documents, papers, letters or other materials made or received by Contractor in conjunction with the Contract and Work. Should Contractor fail to provide access to these documents in response to the District's request, the District may unilaterally cancel the Contract. At the conclusion of the Contract, Contractor shall provide the District all public records related to the Project or the Work.

Any clause or section of this Contract or the Contract Documents which may, for any reason, be declared invalid, may be eliminated therefrom; and the intent of this Contract or the Contract Documents and the remaining portion thereof will remain in full force and effect as completely as though such invalid clause or section has not been incorporated herein.

No assignment by a party hereto of any rights, responsibilities, or interests in the Contract Documents will be binding on another party hereto without the written consent of both parties. Unless specifically stated to the contrary in a written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents. Notwithstanding the foregoing, the District may assign this Contract to the State of Florida or any political subdivision, municipality, special district or authority thereof without Contractor's consent and without recourse.

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

**SECTION 4. Contract Sum:** The District shall pay Contractor as just compensation for the performance of this Contract, subject to any additions or deductions as provided in the Contract Documents, based on unit prices, the amounts set forth in the Pricing Schedule attached hereto ("Contract Sum"). The District and Contractor agree that all payments will be processed in accordance with the Local Government Prompt Payment Act, Sections 218.70-218.80, Florida Statutes.

**SECTION 5. Progress Payments:** On or before the tenth (10th) day of every month, except as provided for in the Special Conditions, Contractor shall prepare and submit on a form approved by Engineer a detailed estimate and invoice to Engineer setting forth the schedule of values of the total amount of the Work which has been completed from the start of the job up to and including the last day of the preceding month and the value thereof, less any percentage retained in accordance with the Special Conditions, and the aggregate of any previous payment ("Progress Payment Application"). Contractor shall provide such supporting evidence as may be required by the District and/or Engineer.

As a strict condition precedent to payment, each Progress Payment Application must be accompanied by: a Contractor's Progress Payment Affidavit submitted by Contractor to Engineer indicating that all lienors under Contractor's direct contract have been paid in full; and a waiver and release of lien upon progress payment ("Partial Release of Lien") from all persons with a potential lien interest in the Project, including but not limited to subcontractors, sub-subcontractors, suppliers, and materialmen.

Upon receipt of the Progress Payment Application, Engineer shall either provide the District with its written approval of the Progress Payment Application, or notify the District in writing that it rejects the Progress Payment Application, the reason(s) for such rejection, and its recommendation as to the amount Contractor is owed, if any, within ten (10) days of receipt of the Progress Payment Application.

The District shall review Engineer's recommendation as set forth above. If the District agrees that the Progress Payment Application is complete and accurately reflects the amount Contractor is owed, the District shall pay Contractor the amount set forth on the Progress Payment Application within twenty-five (25) days of Engineer's receipt of the Progress Payment Application.

In the event the District finds the Progress Payment Application is incomplete or does not accurately reflect the amount Contractor is owed, the District shall reject the Progress Payment Application in writing within twenty (20) days of Engineer's receipt of the Progress Payment Application. The rejection shall state with specificity the reason for the rejection and any action necessary to make the Progress Payment Application acceptable to the

District. If Contractor submits a corrected Progress Payment Application within ten (10) days of the rejection, acceptable to the District, the District shall pay the corrected Progress Payment Application within ten (10) business days after the corrected Progress Payment Application is received.

In the event the District disputes the corrected Progress Payment Application, the District shall notify Contractor in writing of such dispute and pay to Contractor the amount not in dispute, if any, within twenty-five (25) days of the District's receipt of the corrected Progress Payment Application. In exchange for such payment, Contractor shall submit to Engineer a Progress Payment Affidavit indicating that all lienors under Contractors direct contract have been paid in full for the Work related to the non-disputed amount.

Contractor and the District agree that prior to instituting any litigation for damages under this Section 5, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. In the event such mediation does not occur within thirty (30) days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

Contractor shall promptly pay each subcontractor and supplier within ten (10) days of receipt of payment from the District. The amount shall be determined in accordance with the terms of the applicable subcontracts and purchase orders. The District shall not have responsibility for payments to a subcontractor.

Contractor warrants that title to all Work covered by the Progress Payment Application will pass to the District no later than the time payment. Contractor further warrants that upon submittal of a progress payment application, all Work previously paid for by the District shall, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the District's interests.

A progress payment by the District shall not constitute acceptance of Work not in accordance with the requirements of the Contract Documents.

**SECTION 6. Acceptance and Final Payment:** When the Work has been fully completed, including all punch list items as provided for in the Special Conditions, in accordance with the terms of the Contract Documents, a Final Payment Application shall be prepared by Contractor and provided to Engineer within thirty (30) calendar days after the date of Final Completion stating the final Work performed to complete the Project plus or minus any Change Orders, and less the aggregate of any previous payment.

As a strict condition precedent to final payment, Contractor shall submit to Engineer with the Final Payment Application:

1. a Final Payment Affidavit stating that all subcontractors, suppliers, and other materialmen have been paid;
2. Waiver and Release of Lien upon Final Payment ("Final Release of Lien") from Contractor and all persons or entities that have, or potentially have, a lien on the Project, including but not limited to all subcontractors and vendors;
3. all close-out documents including, but not limited to the Maintenance Bond, warranties, guarantees, owner's manuals, and start-up certificates by the designer or manufacturer demonstrating that the equipment meets design intent;
4. data establishing payment or satisfaction of obligations, such as receipts, claims, security interests or encumbrances arising out of the Contract.

Upon receipt of the Final Payment Application, Engineer will inspect the Work, the Final Payment Application, and supporting documentation. If Engineer finds the Work acceptable, Engineer will issue a certificate of acceptance stating that the quality Work has been fully completed to Engineer's satisfaction in substantial compliance with the Contract Documents. The Certificate of Final Completion shall constitute Engineer's determination as to the quality of the Work only; it shall not include an opinion as to the timeliness of completion of the Work. If the Engineer finds the Contract fully and timely performed, and the Final Payment Application accurately reflects the final amount Contractor is owed, the Engineer shall issue its written approval to the District of the Final Payment Application within ten (10) days of receipt the Final Payment Application.

If Engineer disputes the Final Payment Application, finds the Work unsatisfactory, or determines that amounts should be deducted as Liquidated Damages and Additional Delay Damages, Engineer shall notify the District in writing of its findings, the support for such findings, and its recommendation as to the amount Contractor is owed, if any, within ten (10) days of receipt of the Final Payment Application.

The District shall review Engineer's recommendation as set forth above. If the District finds that the Work is acceptable, the Contract has been fully and timely performed, and the Final Payment Application is complete and accurately reflects the amount Contractor is owed, the District shall pay Contractor the amount of the Final Payment Application within twenty-five (25) days of Engineer's receipt of the Final Payment Application.

In the event the District finds the Work is not acceptable, the Contract has not been fully and timely performed, or the Final Payment Application is incomplete or does not accurately reflect the amount Contractor is owed, the District shall reject the Final Payment Application in writing within twenty (20) days of Engineer's receipt of the Final Payment Application. The rejection shall state with specificity the reason for the rejection and any action necessary to make the Final Payment Application acceptable to the District. If Contractor submits a corrected Final Payment Application acceptable to the District, the District shall pay the corrected Final Payment Application within ten (10) business days after the corrected Final Payment Application is received.

In the event the District disputes the corrected Final Payment Application, the District shall notify Contractor in writing of such dispute and pay to Contractor the amount not in dispute, if any, within twenty-five (25) days of the District's receipt of the corrected Final Payment Application. This payment shall constitute a progress payment and shall not be deemed final payment. In exchange for such payment, Contractor shall submit to Engineer a Progress Payment Affidavit indicating that all lienors under Contractor's direct contract have been paid in full for the Work related to the non-disputed amount.

The District and Contractor agree that prior to instituting any litigation for damages under this Section, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. Such mediation shall occur within forty-five (45) days of the District's rejection of the corrected Final Payment Application. In the event such mediation does not occur within thirty (30) days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

Acceptance of final payment by Contractor, a subcontractor, or material supplier shall constitute a waiver of claims by the payee.

In the event that a lien is filed or claimed against the Work by any subcontractor, supplier, or laborer, Contractor agrees to immediately (i) pay such subcontractor, supplier, or laborer for work which Contractor has been paid by the District and deliver to the District a Final Release of Lien signed by such subcontractor, supplier, or laborer; or (ii) cause the immediate removal of such lien by providing a bond in accordance with Florida law. If Contractor fails to do the above, the District may, at its option, and at the sole expense and liability of Contractor, bond such

lien or cause the lien to be discharged and deduct the cost of said bond from the amount owed Contractor under any pending invoice or the next invoice. This Section shall survive the termination or expiration of this Contract.

**SECTION 7. WARRANTY:** Contractor warrants to the District and Engineer that (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents.

**SECTION 8. CORRECTION OF THE WORK:** In addition to the warranties provided for in Article 4 – Contract Section 7, Contractor shall promptly correct Work rejected by Engineer and/or District as failing to conform to the requirements of the Contract Documents. Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement, and additional testing.

In addition to Contractor’s other obligations including warranties under the Contract, Contractor shall, for a period of one (1) year after Substantial Completion, correct Work not conforming to the requirements of the Contract Documents.

If Contractor fails to correct nonconforming Work within a reasonable time, the District may correct it in accordance with the Contract Documents.

This period of one (1) year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This Section 8 shall survive acceptance of the Work under the Contract Documents and termination of the Contract Documents.

**(Remainder of this page left blank intentionally)**



IN WITNESS WHEREOF, the parties hereto have executed this Contract this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_. All portions of the Contract Documents have been signed or identified by the District and Contractor or by Engineer on their behalf.

ATTEST:

OWNER: LOXAHATCHEE RIVER  
ENVIRONMENTAL CONTROL DISTRICT

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Stephen B. Rockoff  
Chairman  
Address for notice: 2500 Jupiter Park Dr.  
Jupiter, Florida 33458  
\_\_\_\_\_

CONTRACTOR:

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

\_\_\_\_\_  
As its: \_\_\_\_\_

Address for notice: \_\_\_\_\_  
\_\_\_\_\_

(Affix Corporate Seal)

**STATE OF FLORIDA  
COUNTY OF PALM BEACH**

I HEREBY CERTIFY that on this day, before me, personally appeared \_\_\_\_\_, as \_\_\_\_\_, to me well known and known to be the person described in or who produced as identification a \_\_\_\_\_ (Form of ID) and who executed and acknowledged to and before on behalf of the District, the foregoing Contract, and that he acknowledged in the presence of two subscribing witnesses freely and voluntarily for the purposes therein expressed.

WITNESS my hand and official seal in the County and State last aforesaid this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
Notary Public, State of Florida  
Print Name:  
Commission No.:  
My Commission Expires:

(Notary Ink Stamp)

**STATE OF FLORIDA  
COUNTY OF \_\_\_\_\_**

I HEREBY CERTIFY that on this day, before me, personally appeared \_\_\_\_\_ as \_\_\_\_\_ (Title) of the \_\_\_\_\_ (Name of Company), to me well known and known to be the person described in or who produced as identification a \_\_\_\_\_ (Form of ID) and who executed and acknowledged to and before on behalf of \_\_\_\_\_ (Company Name), Contractor, the foregoing Contract, and that he acknowledged in the presence of two subscribing witnesses freely and voluntarily for the purposes therein expressed.

WITNESS my hand and official seal in \_\_\_\_\_ County and State last aforesaid this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
Notary Public, State of Florida  
Print Name:  
Commission No.:  
My Commission Expires:

(Notary Ink Stamp)

**BID FORM — BASE BID**  
**LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT**  
**LIFT STATION #82 REHABILITATION**

UNIT PRICES

Bid Item No.	Description	Qty.	Unit	Unit Cost	Total
1	Mobilization/Demobilization	1	LS		
2	Maintenance of Traffic	1	LS		
3	Record Drawings	1	LS		
4	Preconstruction Video	1	LS		
5	NPDES Permit/Erosion Measures	1	LS		
6	Existing Pump Station Demolition	1	LS		
7	11' Diameter Concrete Wet Well	1	EA		
8	11' Diameter Concrete Wet Well Top Slab, Hatch Cover Frame, Cover, Safety Grate, and Vent Pipe	1	EA		
9	Lift Station Corrosion Barrier System	905	SF		
10	Concrete Valve Vault	1	EA		
11	8" DIP Emergency Bypass Assembly with Camlok	1	EA		
12	8" HDPE DR-11 Wet Well Discharge Piping	95	LF		
13	Mechanical Joint Ductile Iron Fittings	1	Tons		
14	Wet Well Drop Bowl and SDR 26 PVC Drop Pipe Assembly for Gravity Influent	1	EA		
15	Wet Well Drop Assembly for Force Main Influent	2	EA		
16	Temporary Bypass Pumping and Piping Assembly	1	EA		
17	Concrete Lift Station Pad	75	SY		
18	Connection to Existing Wastewater Force Main	3	EA		
19	Installation of 60-HP Pumps and Appurtenances (Pumps to be furnished by Owner)	1	LS		
20	8" Plug Valve	4	EA		
21	14" Plug Valve	1	EA		
22	8" Swing Check Valve	3	EA		
23	Concrete Driveway	40	SY		
24	Lift Station Control Panel and Electrical Appurtenances	1	LS		
25	Lift Station Instrumentation	1	LS		

26	Lift Station Generator Installation (Generator to be furnished by Owner)	1	LS		
27	Landscaping and Miscellaneous Restoration	1	LS		

TOTAL BASE BID ITEMS 1-27 (in words)

\_\_\_\_\_ Dollars

THE CONTRACT AWARD SHALL BE EVALUATED BASED ON THE TOTAL BID PRICE FOR ITEMS 1 THROUGH 27 AS SUBMITTED BY THE LOWEST, QUALIFIED, RESPONSIBLE, RESPONSIVE BIDDER.

\_\_\_\_\_  
(Name of Bidder)

Bidders Name: \_\_\_\_\_

By: \_\_\_\_\_  
Signature of Authorized Officer, Partner, Member, Manager

Print Name of Person signing: \_\_\_\_\_

Title: \_\_\_\_\_

Business Address: \_\_\_\_\_

Incorporated or formed under the laws of the State of \_\_\_\_\_.

Bid form

## PUBLIC CONSTRUCTION BOND

### ARTICLE 5

Bond No. \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS: That we, \_\_\_\_\_  
(Name of Contractor) as “Principal” at the address of \_\_\_\_\_  
and \_\_\_\_\_ as “Surety” at the address of \_\_\_\_\_  
are bound to the LOXAHATCHEE  
RIVER ENVIRONMENTAL CONTROL DISTRICT (the “District”), at the address of 2500 Jupiter  
Park Drive, Florida 33458, in the sum of \_\_\_\_\_  
(Written Amount) (\$ \_\_\_\_\_ -\_) (the “Bond”) for the payment of which we bind  
ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

WHEREAS, Principal has entered into a contract (the “Contract”) with LOXAHATCHEE  
RIVER ENVIRONMENTAL CONTROL DISTRICT dated \_\_\_\_\_, 2020, in the amount of  
\$ \_\_\_\_\_) for the  
[INSERT PROJECT NAME HERE], which Contract, is by reference made a part hereof.

THE CONDITION of this Bond is that if Principal:

1. Performs the Contract with the District at the times and in the manner prescribed in the Contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statute, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the Work provided for in the Contract; and
3. Pays the District all losses, damages, expenses, costs, and attorney’s fees, including appellate proceedings, that the District sustains because of a default by Principal under the Contract; and
4. Performs the guarantee of all Work and materials furnished under the Contract for the time specified in the Contract, then this Bond is void; otherwise, it remains in full force.
5. Any changes in or under the Contract Documents and compliance or noncompliance with any formalities connected with the Contract or the changes does not affect Surety’s obligation under this Bond.
6. To a claimant who is not in privity with the Principal and who has not received payment for labor, materials, or supplies, that written notice must be delivered to the Principal. This Bond is furnished pursuant to the statutory requirements for bonds on public works projects, Section 255.05, Florida Statutes. A claimant, except a laborer, who is not in privity with the Principal and who has not received payment for labor, materials, or supplies, is hereby notified that Section 255.05(2), Florida Statutes specifically requires that written notice be given to Principal within forty-five (45) days after beginning to furnish labor, materials, or supplies for the prosecution of the Work that claimant intends to look to the Bond for protection. Further notice is hereby given to a claimant who

is not in privity with the Principal and who has not received payment for labor, materials, or supplies, that written notice must be delivered to the Principal and to the Surety, of the performance of the labor or delivery of the materials or supplies and of the non-payment, within ninety (90) days after performance of the labor or after complete delivery of the materials or supplies (but not before 45 days after the first furnishing of labor, services, or materials), or with respect to rental equipment, within ninety (90) days after the date that rental equipment was last on the job site available for use. No action for the labor, material, or supplies may be instituted against Principal or the Surety unless both notices have been given. Further notice is hereby given that no action for labor, materials, or supplies may be instituted against the Principal or the Surety on the Bond after one (1) year from the performance of the labor or completion of delivery of the materials or supplies.

7. Without modifying the foregoing, this Bond shall require no more and no less of the Principal and Surety than is specified in Section 255.05, Florida Statutes. The notice and time limitation provisions of Section 255.05, Florida Statutes are incorporated herein by reference.

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed above, do cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

The provisions and limitations of Section 255.05, Florida Statutes including but not limited to the notice and time limitations in Sections 255.05(2) and 255.05(10), Florida Statutes are incorporated in this bond by reference.

(Remainder of Page Intentionally Left Blank)

SIGNED AND SEALED ON \_\_\_\_\_, 2018.

\_\_\_\_\_  
Name of Principal

\_\_\_\_\_  
Name of Surety

By: \_\_\_\_\_  
Signature of Principal

By: \_\_\_\_\_  
As Attorney-in-Fact (Attach Power of Attorney)

STATE OF FLORIDA  
COUNTY OF \_\_\_\_\_

Sworn to and acknowledged before me this \_\_\_\_ day of \_\_\_\_\_, 202\_\_, by  
\_\_\_\_\_ to me who produced as identification a  
\_\_\_\_\_.

\_\_\_\_\_  
Notary Public, State of Florida

Print Name: \_\_\_\_\_

(Notary Ink Seal)

Commission Expires: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

COUNTERSIGNATURE

BY: \_\_\_\_\_

**ARTICLE 6**  
**FORMS FOR USE DURING CONSTRUCTION**

**6-1 Notice of Award of Contract**

**6-2 Notice to Proceed**

**6-3 Progress Payment Affidavit**

**6-4 Final Payment Affidavit**

**6-5 Certificate of Substantial Completion**

**6-6 Certificate of Final Completion**

**6-7 Partial Release of Lien**

**6-8 Final Release of Lien**

**6-9 Change Order**

**6-10 Application and Certificate of Payment** – Contractor shall utilize American Institute of Architect Form G702 and G703





# Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration  
 2500 Jupiter Park Drive, Jupiter, Florida 33458-8964  
 Telephone (561) 747-5700 • Fax (561) 747-9929 • [www.loxahatcheeriver.org](http://www.loxahatcheeriver.org)  
 D. Albrey Arrington, Ph.D., Executive Director

[Date]

[Contractor Name]

[Contractor Address]

**SUBJECT: Loxahatchee River Environmental Control District**  
**LIFT STATION #82 REHABILITATION**  
**Notice of Award of Contract**

Dear \_\_\_\_\_:

I am pleased to advise you that the District Governing Board has elected to Award the Contract for the subject project to your firm. You are the apparent successful Bidder and have been awarded a contract for:

## LIFT STATION #82 REHABILITATION

The Contract Price of your Contract is \$\_\_\_\_\_

In accordance with the contract specifications you will have 14 calendar days from the date of this Notice of Award, that is by (Day), (Date), to provide the following:

- a.) 4 executed sets of the attached Contract Documents, and
- b.) A Public Construction Bond with power of attorney in the amount of 100% of the contract (\$\_\_\_\_\_) and
- c.) An insurance certificate for this project in accordance with requirements set forth in Section 9.08, (please make sure coverages and additional insureds are as stated); and
- d.) A schedule of activities (received), and
- e.) Any other paperwork as required by the Contract.

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

Within 20 calendar days after you comply with the above conditions, the District will return 1 fully

executed contract after execution.

Should you have any questions in regard to this correspondence, please feel free to contact me or [ENGINEER]

Regards,

Kris Dean, P.E.  
Deputy Executive Director/Director of Engineering Services

Enclosures: 4 sets of Contract Documents



# Loxahatchee River District

Water Reclamation | Environmental Education | River Restoration  
2500 Jupiter Park Drive, Jupiter, Florida 33458-8964  
Telephone (561) 747-5700 • Fax (561) 747-9929 • [www.loxahatcheeriver.org](http://www.loxahatcheeriver.org)

D. Albrey Arrington, Ph.D., Executive Director

[Date]

[Contractor Name]

[Contractor Address]

SUBJECT: LIFT STATION #82 REHABILITATION  
**Notice to Proceed**

Dear \_\_\_\_\_:

You have already received one (1) copy of the fully executed contract for the subject project. With the execution of this document completed by both parties and a Planning Meeting held [DATE], you are hereby provided with **NOTICE TO PROCEED as of [Day], [Date]**.

In accordance with the contract documents, you will have \_\_\_\_\_ consecutive calendar days from \_\_\_\_\_ to Substantial Completion, and \_\_\_\_\_ calendar days from actual Substantial Completion to Final Contract Completion, therefore:

**Substantial Completion Date is:** \_\_\_\_\_  
**Contract Completion Date is:** \_\_\_\_\_

We look forward to working with you toward the successful completion of another project.

Should you have any questions in regard to this matter please feel free to contact me or [ENGINEER].

Kris Dean, P.E.  
Deputy Executive Director/Director of Engineering Services

[ENGINEER]

**PROGRESS PAYMENT AFFIDAVIT**

STATE OF FLORIDA

COUNTY OF \_\_\_\_\_

BEFORE ME, the undersigned authority, personally appeared \_\_\_\_\_  
 who, after being by me first duly sworn, deposes and says of his personal knowledge that:

1. He/She is the \_\_\_\_\_ of \_\_\_\_\_, which  
 does business in the State of Florida, hereinafter referred to as "Contractor".

2. Pursuant to a contract with Loxahatchee River District, Contractor has furnished and will furnish  
 services for the purpose of improving real property, more particularly described as:

**LIFT STATION #82 REHABILITATION**

3. This affidavit is executed in accordance with Section 713.06(3)(c), Florida Statutes, for the purpose  
 of obtaining a progress payment in the amount of \_\_\_\_\_  
 \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ ).

4. All lienors under Contractor's direct Contract have been paid in full, except for the following listed  
 lienors:

NAME OF LIENOR  
 (Use blank sheet if necessary)

AMOUNT DUE OR TO BECOME DUE FOR  
 LABOR, SERVICES OR MATERIAL

_____	_____
_____	_____

SIGNED, SEALED, AND DELIVERED this \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

By \_\_\_\_\_  
 Contractor

SUBSCRIBED AND SWORN TO before me this \_\_\_\_ day \_\_\_\_\_ of 20 \_\_\_\_, by  
 \_\_\_\_\_, personally known to me or who produced as identification a  
 \_\_\_\_\_.

\_\_\_\_\_  
 NOTARY PUBLIC, State of \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Commission No.: \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_

(Notary Ink Stamp)

\* THIS FORM SHALL BE SUBMITTED WITH EACH PAYMENT REQUEST.

**FINAL PAYMENT AFFIDAVIT**

STATE OF FLORIDA

COUNTY OF \_\_\_\_\_

BEFORE ME, the undersigned authority, personally appeared \_\_\_\_\_  
 who, after being by me first duly sworn, deposes and says of his personal knowledge that:

1. He/She is the \_\_\_\_\_ of \_\_\_\_\_, which  
 does business in the State of Florida, hereinafter referred to as "Contractor".
2. Pursuant to a contract with Loxahatchee River District, Contractor has furnished and will furnish  
 services for the purpose of improving real property, more particularly described as:

**LIFT STATION #82 REHABILITATION**

3. This affidavit is executed in accordance with Section 713.06(3)(c), Florida Statutes, for the purpose  
 of obtaining final payment in the amount of \_\_\_\_\_  
 \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ ).

4. All lienors under Contractor's direct Contract have been paid in full, except for the following listed  
 lienors:

NAME OF LIENOR

(Use blank sheet if necessary)

AMOUNT DUE OR TO BECOME DUE FOR

LABOR, SERVICES OR MATERIAL

_____	_____
_____	_____

SIGNED, SEALED, AND DELIVERED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

By \_\_\_\_\_  
 Contractor

SUBSCRIBED AND SWORN TO before me this \_\_\_\_\_ day \_\_\_\_\_ of 20\_\_\_\_, by  
 \_\_\_\_\_, personally known to me or who produced as identification a  
 \_\_\_\_\_.

(Notary Ink Stamp)

\_\_\_\_\_  
 NOTARY PUBLIC, State of \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Commission No.: \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_

**Certificate of Substantial Completion**

[Date]  
[NAME]  
[ADDRESS]

Loxahatchee River Environmental Control District  
Lift Station #82 Rehabilitation  
Substantial Completion

Dear [Name]:

On \_\_\_\_\_ the District, [PARTY NAMES] conducted a Substantial Completion Inspection for the above referenced project. The Substantial Completion inspection resulted in the attached [#] page Punchlist, containing [#] items for completion or correction. Please note per Spec Section 01780, all punch list items are to be corrected prior to Final Payment and before Final Completion is granted.

Based on the above referenced inspection, [name] has **deemed the project Substantially Complete as of [date]**.

Once all of the attached punch list items have been completed or corrected, please contact our office in writing so that we can schedule a time for final inspection.

If you have any questions regarding these items, please call me at \_\_\_\_\_.

Sincerely,

[Name]  
[Title]

Enclosure: Substantial Completion Punchlist

cc: Kris Dean, LRECD  
Lenny Giacobelli, LRECD

**Certificate of Final Completion**

[DATE]  
[NAME]  
[ADDRESS]

Loxahatchee River Environmental Control District  
LIFT STATION #82 REHABILITATION  
**Final Completion**

Dear [Name]:

On \_\_\_\_\_ the Loxahatchee River Environmental Control District, Palm Beach County,  
\_\_\_\_\_, and \_\_\_\_\_ conducted a Final Completion  
Inspection for the above referenced project. Per our inspection, the below listed items were  
determined to be incomplete:

We have now verified that all of the Punch List Items have been completed. Please accept this  
letter for your records, that as of \_\_\_\_\_ has deemed the above  
referenced project to be fully complete and in compliance with the Contract Documents.

We are currently preparing the Final Balancing Change Order to complete the processing of your  
Final Payment Application.

If you have any questions regarding these items, please call me at \_\_\_\_\_.

Sincerely,

[Name]  
[Title]

Enclosure

cc: Kris Dean, LRECD  
Lenny Giacobelli, LRECD

**WAIVER AND RELEASE OF LIEN UPON PROGRESS PAYMENT:**

The undersigned lienor, in consideration of the sum of \$ \_\_\_\_\_, hereby waives and releases its lien and right to claim a lien for labor, services, or materials furnished through (insert date) to (insert the name of your customer) on the job of (insert the name of the owner) to the following property:

## LIFT STATION #82 REHABILITATION

This waiver and release does not cover any retention or labor, services, or materials furnished after the date specified.

DATED on , (year). (Lienor)

WITNESS:

\_\_\_\_\_ By: \_\_\_\_\_  
Contractor (SEAL)

\_\_\_\_\_ Attest: \_\_\_\_\_

SWORN AND SUBSCRIBED TO BEFORE ME, THIS \_\_\_\_\_ day \_\_\_\_\_ of 20\_\_\_\_, by \_\_\_\_\_, personally known to me or who produced as identification a \_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC, State of Florida



**WAIVER AND RELEASE OF LIEN UPON FINAL PAYMENT**

The undersigned lienor, in consideration of the final payment in the amount of \$\_\_\_\_\_, receipt of which is hereby acknowledged, hereby waives and releases its lien and right to claim a lien for labor, services, or materials furnished to \_\_\_\_\_ on the job of the Loxahatchee River Environmental Control District hereinafter referred to as the "District," to the following property [INSERT PROJECT NAME HERE]

WITNESS:

\_\_\_\_\_

By: \_\_\_\_\_  
Contractor (SEAL)

\_\_\_\_\_ Attest: \_\_\_\_\_

SWORN AND SUBSCRIBED TO BEFORE ME, THIS \_\_\_\_\_ day \_\_\_\_\_ of 20\_\_\_\_, by \_\_\_\_\_, personally known to me or who produced as identification a \_\_\_\_\_.

(Notary Ink Stamp)

\_\_\_\_\_  
NOTARY PUBLIC, State of Florida  
Print Name: \_\_\_\_\_  
Commission No.: \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_

6-9

**LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT**

2500 JUPITER PARK DRIVE, JUPITER, FLORIDA 33458  
(561) 747-5700 FAX (561) 747-9929

CHANGE ORDER #1

DATE: \_\_\_\_\_

PROJECT NAME: LIFT STATION #82 REHABILITATION

OWNER: Loxahatchee River Environmental Control District

CONTRACTOR:

THE FOLLOWING CHANGES:

IUSTIFICATION:

CHANGE TO CONTRACT PRICE:

Original CONTRACT PRICE: \$

Current CONTRACT PRICE \$

CONTRACT PRICE due to this Change Order  
will be *INCREASED/DECREASED* by: \$

The New CONTRACT PRICE including  
this Change Order will be: \$

CHANGE TO CONTRACT TIME:

The DATE OF COMPLETION of all work will be: UNCHANGED

APPROVED BY CONTRACTOR: \_\_\_\_\_  
DATE

APPROVED BY ENGINEER: \_\_\_\_\_  
DATE

APPROVED BY OWNER: \_\_\_\_\_  
LOXAHATCHEE RIVER ENVIRONMENTAL CONTROL DISTRICT DATE



**ARTICLE 7**

**CERTIFICATE OF DISTRICT'S ATTORNEY**

**LIFT STATION #82 REHABILITATION**

THIS IS TO CERTIFY that on this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, I have examined the attached Contract Documents, Surety Bonds, and the execution thereof by the parties thereto, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representative have full power and authority to execute said agreements on behalf of the respective parties named therein; and that the foregoing agreements as being legally sufficient in form constitute a binding agreement between the parties.

By: \_\_\_\_\_  
Patrick J. McNamara, Esq.  
de la Parte & Gilbert, P.A.  
Attorney for the  
LOXAHATCHEE RIVER  
ENVIRONMENTAL CONTROL DISTRICT

**ARTICLE 8**  
**RESERVED**

## **SPECIAL CONDITIONS**

### **ARTICLE 9**

#### **TITLE**

- 9.01 Governing Order of Contract Documents
- 9.02 Time of Completion and Amount of Liquidated Damages
- 9.03 Reimbursement of Additional Delay Damages
- 9.04 Percentage of Progress Payments to be Retained
- 9.05 Amount of Minimum Progress Payment
- 9.06 Surety Bonds
- 9.07 Subcontractors
- 9.08 Contractor's Insurance
- 9.09 Water Supply
- 9.10 Pipeline and Manhole Locations
- 9.11 Elevation Datum
- 9.12 Easements
- 9.13 Occupying Private Land
- 9.14 Work in State, County and Town Rights-of-Way
- 9.15 Interference with and Protection of Streets
- 9.16 Traffic Control
- 9.17 Work Adjacent to Telephone, Power, Cable TV  
and Gas Company Structures
- 9.18 Storage of Materials
- 9.19 Salvaged Materials and Excavated Materials
- 9.20 Planning Meeting
- 9.21 Alterations
- 9.22 Extra and Deleted Work
- 9.23 Extension of Time on Account of Extra Work
- 9.24 Changes Not to Affect Bonds
- 9.25 Non-Assignable
- 9.26 District Remedies
- 9.27 Contractor's Remedies

9.28	Discontinuance of Construction
9.29	Contractor's Responsibility
9.30	District's Right to Terminate
9.31	Venue, Disputes and Attorney's Fee
9.32	Coordination with District's Existing Facilities
9.33	Permits
9.34	Coordination of Construction
9.35	Field Layout of Work
9.36	Submittals
9.37	Inspection and Testing
9.38	Utilities and Services
9.39	Security
9.40	Special Controls
9.41	Field Offices, Storage and Construction Areas
9.42	Equipment and Materials
9.43	Project Closeout
9.44	Open Specifications
9.45	Spare Parts List
9.46	Applicable Standards and Codes
9.47	Copies of Plans and Specifications
9.48	Restoration – Special
9.49	Contractor Performance Reviews and Ratings

### **9.01 Governing Order of Contract Documents**

In the event of discrepancy, the interpretation of Contract Documents shall follow the order of precedence as identified in Article 1 Instruction to Bidders Section 22.

### **9.02 Time of Completion and Amount of Liquidated Damages**

Contractor agrees to commence Work on or before a date to be specified in a written Notice to Proceed. In the event Contractor does not reach Substantial Completion or Final Completion of the Work within the time specified in the Notice to Proceed, Contractor shall pay to the District as liquidated damages, and not as a penalty the amounts set forth in Article 4- Contract Section 2.

### **9.03 Reimbursement of Additional Delay Damages**

In the event Substantial Completion and Final Completion of the Work set forth in the Contract Documents and any subsequent modifications, is delayed beyond the time set forth in Article 4- Contract Section 2, Contractor shall also be responsible for Additional Delay Damages as set forth in the Article 4 - Contract Section 2.

### **9.04 Percentage of Progress Payments to be Retained**

The percentage of estimated value to be retained under that heading of the Contract, entitled Progress Payments shall conform to the following schedule:

- a. Retention of up to 10% of payments claimed.
- b. For Projects over \$200,000, when the Project is fifty percent (50%) complete, the retainage amount shall be reduced to 5% from each subsequent progress payment made to the Contractor.
- c. After fifty percent (50%) completion of the Work, Contractor may present a payment application for up to one-half of the retainage held by the District for the first fifty percent (50%) of the Work.
- d. A cash bond or irrevocable letter of credit will be accepted if offered in lieu of cash retainage.

The above retainage reductions shall not require the District to release any amount that is the subject of a good faith dispute or a claim pursuant to Section 255.05, Florida Statutes.

The above retainage reductions shall not apply if the Project is funded, in whole or in part, with federal funds that are subject to federal grantor laws and regulations that are contrary to any provision of the Florida Local Government Prompt Payment Act, or if the retainage reduction is otherwise not required by the Florida Local Government Prompt Payment Act.

### **9.05 Left Blank Intentionally**

### **9.06 Surety Bonds**

Contractor, at the time of execution of the Contract, must deposit with the District a Public Construction Bond providing for the satisfactory performance and completion of the Work and providing security for payment of all persons performing labor and/or providing materials or supplies



in connection with this Contract. The bond shall be furnished in an amount equal to the amount of the contract award. The form and conditions of the bond and the surety shall be in accordance with the statutory requirements of Section 255.05(2), Florida Statutes, and are subject to the District's approval.

A maintenance bond in the amount of 50% of the contract price guaranteeing the repair of all damages due to improper materials or workmanship for a period of one (1) year after Final Completion will also be required. The maintenance bond shall be submitted with the final payment request.

The bonds shall be written by a surety company that has the following ratings based upon amount of the Contract:

<u>CONTRACT AMOUNT</u>	<u>BEST'S RATINGS</u>
\$ 25,000.00 to \$100,000.00	B+ Class V or better
\$100,000.01 to \$500,000.00	A Class VI or better
\$500,000.01 and over	A Class VII or better

The surety must be licensed to do business in the State of Florida, and the bonds must be executed by an Attorney-in-Fact for the surety company with a certified copy of its Power of Attorney attached to the bonds.

The Maintenance Bond shall remain in effect for one (1) year beyond the date of Final Completion and acceptance of the entire Work to repair any Defective Work done under the Contract Documents. The Public Construction Bond shall remain in effect to pay valid claims for payment of labor, supplies, and/or materials submitted after completion of the Work and for items covered under the performance aspect of said bond.

#### **9.07 Subcontractors**

Prior to award of the Contract, Engineer shall notify Contractor of any objection to the subcontractors proposed for the Work, and Contractor shall not employ any subcontractor with whom Engineer or District has an objection.

Contractor shall be responsible to the District for the acts and omissions of any subcontractor and any person directly or indirectly employed by a subcontractor, to the extent Contractor is responsible for the acts and omissions of persons directly employed by Contractor. Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the District.

#### **9.08 Contractor's Insurance**

Contractor shall maintain and pay for, as applicable, through an insurance company or insurance companies acceptable to the District at Contractor's sole expense: Fire, Extended Coverage, Vandalism and Malicious Mischief coverage on buildings and structures in the course of construction. Such coverage shall include foundations, additions, attachments, and all permanent fixtures belonging to and constituting a part of said buildings or structures. The policy or policies shall also cover machinery, if the cost of machinery is included in the Contract. The amount of insurance must at all times be at least equal to the actual cash value of the insured property.

Contractor shall provide the District, prior to the execution of the Contract, with a satisfactory Certificate of Insurance certifying that the required insurance is in force.

During the life of the Project, Contractor shall provide, pay for and maintain insurance of the types and in the amounts described herein. All such insurance shall be provided by responsible companies with A.M. Best ratings of at least A-, authorized to transact business in the State of Florida, and which are satisfactory to the District. Promptly after the District's issuance of the Notice of Award of this Contract, and prior to commencing the Work, Contractor shall provide evidence of insurance coverages of the types and in the amount required by submitting executed Certificates of Insurance, in the form preferred by the District. Each Certificate of Insurance shall set forth the original manual signature of the authorized representative of the insurance company/companies identified therein and shall have attached thereto proof that said representative is authorized to execute the same. In addition, certified true and exact copies of all required policies shall be provided to the District upon request.

Contractor shall obtain and maintain in full force and effect during the life of this Contract, Worker's Compensation Insurance covering all employees in performance of Work under this Contract. Contractor shall make this same requirement of any of its subcontractors. Contractor shall indemnify and save the District and Engineer harmless from any damages resulting from either Contractor or any subcontractor's failure to secure and/or maintain such insurance.

All policies of insurance required shall require that the insurer give the District thirty (30) days written notice of any cancellation, intent not to renew, or reduction in coverage; and ten (10) days written notice of any non-payment of premium. Such notice shall be delivered by U.S. Registered Mail to: Loxahatchee River District, 2500 Jupiter Park Drive, Jupiter, Florida 33458, Attn: Kris Dean, P.E. In the event of any reduction in the aggregate limit of any policy, Contractor shall immediately restore such limit to the amount required herein.

Receipt by the District of any Certificate of Insurance or copy of any policy evidencing the insurance coverages and limits required by the Contract Documents does not constitute approval or agreement by the District that the insurance requirements have been satisfied or that the insurance policies shown on the Certificates of Insurance are in compliance with the requirements of the Contract Documents.

The insurance coverages and limits required of Contractor under the Contract Documents are designed to meet the minimum requirements of the District. They are not designed as a recommended insurance program for Contractor. Contractor shall be responsible for the sufficiency of its own insurance program. Should Contractor have any questions concerning its exposures to loss under the Contract Documents or the insurance coverages needed therefore, it should seek professional assistance.

If the insurance coverage initially provided by Contractor is to expire prior to the completion of the Work, renewal Certificates of Insurance shall be furnished to the District thirty (30) days prior to the expiration of current coverages.

All liability insurance policies obtained by Contractor to meet the requirements of the Contract Documents, other than the Worker's Compensation and Employer's Liability Policy, shall provide that the District, its officers, employees, and agents, and Engineer and its shareholders, officers, and directors, and any other person or entity designated by the District, shall be named "additional

insureds” under the Policy and shall also incorporate a Severability of Interest and Cross Liability provision. All insurance coverages provided under this Special Conditions Section 9.08 shall apply to all of Contractor’s activities under the Contract Documents without regard for the location of such activity. The policy shall include a waiver of subrogation provision in favor of the additional insured. This policy shall include, but not be limited to, all of the following coverage in the following minimum amounts:

- a. Vehicle – Owner, Hired, Non-owner – Any Automobile Coverage
 

Injury or death of any one person:	\$1,000,000
Injury or death of more than one person in any one occurrence:	\$1,000,000
Property Damage- any one occurrence:	\$ 300,000
  
- b. Comprehensive General Liability, other than vehicle, including:
 

Comprehensive Premises Operations Explosions and Collapse Hazard Underground Hazard Products/Completed Operations Hazard Broad Form Property Damage Independent Contractors Personal Injury	
Per Occurrence	\$1,000,000
Aggregate	\$1,000,000
Injury or death of any one person:	\$1,000,000
Injury of death of more than one person in any one occurrence:	\$1,000,000
  
- c. Property Damage:
 

Each occurrence:	\$ 300,000
Aggregate operations:	\$ 500,000
Aggregate protective:	\$ 500,000
Aggregate contractual:	\$ 500,000

Neither Contractor nor any subcontractor shall commence Work under this Contract until they have obtained all insurance required under this Special Conditions Section 9.08, and have supplied the District with evidence of such coverage in the form of the Certificate of Insurance, and such Certificate has been approved by the District in writing. All such insurance policies shall provide for at least thirty (30) calendar days written notice to the District prior to cancellation. Contractor’s and subcontractor’s insurance shall be primary to any other insurance carried by the District, its

consultants, or Engineer. The District's, its consultants', or Engineer's coverage shall be excess insurance only, and Contractor's insurance policies shall so state.

Contractor shall be responsible for and shall obtain and file insurance certificates on behalf of all its subcontractors within ten (10) calendar day of the subcontractor's start of Work. All Certificates of insurance shall be filed with the District in the office designated in the Contract Documents.

Should Contractor fail to maintain the insurance coverages required by the Contract Documents, the District may, at its option, either terminate this Contract for default or procure and pay for such coverage, charge Contractor, and deduct the costs from payments due Contractor. A decision by the District to procure and pay for such insurance coverages shall not operate as a waiver of any of its rights under the Contract Documents.

Failure of Contractor to submit the required Certificates of Insurance within the times required by this Special Conditions Section 9.08 may result in a delay in issuing the Notice to Proceed. The parties specifically agree that such a delay is neither excusable nor compensable and will not entitle Contractor to a change in the Contract Sum or time.

#### **9.09 Water Supply**

Contractor shall, at its own expense, provide all water needed for construction purposes and for testing.

#### **9.10 Pipeline and Manhole Locations**

Pipelines and manholes will be located substantially as indicated on the Plans and Specifications, but Engineer may make such modifications in locations as may be found desirable to avoid interferences with existing structures or for other reasons.

#### **9.11 Elevation Datum**

The datum adopted by Engineer is based on National Geodetic Vertical Datum of 1929. All elevations on the Plans and Specifications refer to this datum.

#### **9.12 Easements**

The District has obtained, or will obtain, permanent easements and temporary construction easements through private property, where required. The temporary construction easements entitle Contractor to the occupancy and use of the designated area near or adjacent to the Work for purposes related to the Work.

Easements are shown on the Plans and Specifications.

Contractor will not encroach on any property unless it has been established that easements have been obtained or that the property owner has given the District permission in writing. On all other land, Contractor has no rights unless he obtains written consent from the proper parties.

#### **9.13 Occupying Private Land**

Contractor shall not (except after written consent from the proper parties) enter or occupy with persons, tools, equipment or materials, any land outside the rights-of-way or property of the District. A copy of the written consent shall be given to Engineer.

#### **9.14 Work in State, County, and Town Rights-of-Way**

Attention is directed to the fact that Work will be going on in County rights-of-way. The District has obtained written consent for Contractor to encroach on these rights-of-way for the Work. Any damage to the areas within these rights-of-way shall be repaired or restored in accordance with their respective standards, specifications, latest revisions and permit requirements.

#### **9.15 Interference with and Protection of Streets**

Contractor shall not close or obstruct any portion of the street, road, or private way without obtaining permits therefor from the proper authorities. During the course of the Work, if any street or private way shall be rendered unsafe by Contractor's operations, Contractor shall make such repairs or provide such temporary ways or guards as shall be acceptable to Engineer.

Streets, roads, private ways, and walks not closed, shall be maintained passable by Contractor at Contractor's expense, and Contractor shall assume full responsibility for the adequacy and safety of provisions made.

Contractor shall, at least forty-eight (48) hours in advance, notify the proper authorities including, but not limited to, the police, ambulance squad, fire departments, and school district, and any other public authority with jurisdiction in writing, with a copy to Engineer, if a closure of a street is necessary. Contractor shall cooperate with the proper authorities in the establishment of alternate routes. Contractor shall provide adequate detour signs, plainly marked and well lit, in order to minimize confusion. All expenses of street closure shall be the responsibility of Contractor.

Contractor shall, when required by Engineer, schedule its Work so as to interfere as little as possible with the operations of adjacent users and to minimize loss of access by public or private agencies to their place of business.

#### **9.16 Traffic Control**

For control of traffic, Contractor shall provide an adequate number of flagmen in accordance with the latest revisions of the Florida Department of Transportation specifications. Contractor shall bear the costs of employing such flagmen.

#### **9.17 Work Adjacent to Telephone, Power, Cable TV and Gas Company Structures**

In all cases where Work is to be performed near telephone, power, water, cable TV, or gas company facilities, Contractor shall provide written notification to the respective companies of the areas in which Work is to be performed, within a minimum of forty-eight (48) hours prior to any Work in these areas. Contractor shall comply with all applicable regulations of the State of Florida regarding the location of underground facilities prior to excavating any area (Sunshine State-One Call of Florida).

### **9.18 Storage of Materials**

Suitable storage facilities shall be furnished by Contractor. All materials, supplies and equipment intended for use in the Work shall be stored by Contractor to prevent damage from exposure, contamination by foreign substances, or vandalism. Engineer shall not accept, or sample for testing, materials, supplies or equipment that have been improperly stored. Materials found unfit for use shall not be incorporated in the Work and shall immediately be removed from the construction or storage site.

### **9.19 Salvaged Materials and Excavated Materials**

In the absence of special provisions to the Contract, salvage materials, equipment or supplies excavated during the course of the Work are the property of the District and shall be cleaned and stored as directed by Engineer.

All excavated materials needed for backfilling operation shall be stored on site. Contractor shall take the appropriate steps to secure any necessary additional area for stockpiling. Contractor shall include in its bid price the removal of such material from site to an area designated by Engineer. The haul distance shall not exceed six (6) miles each way. All excess materials not wanted by the District shall be hauled and disposed of at an approved site, at Contractor's expense.

### **9.20 Pre-Construction Meeting**

Within ten (10) calendar days after the execution of the Contract and prior to start of construction, a planning meeting will be scheduled by Engineer which must be attended by Contractor. This conference will include representatives of Contractor, Engineer, the District, local utilities, regulatory agencies, other contractors performing Work in the area for the District, and any other party that the District may deem as necessary for the orderly performance of the Contract. However, this does not relieve Contractor of the responsibility of contacting local utilities and any other necessary agencies as the circumstances may require. At this meeting the parties shall coordinate the sequence of construction.

### **9.21 Alterations**

Engineer may make alterations in the line, grade, plan, form, dimensions, or materials of the Work or any part thereof, either before or after the commencement of construction of the Work. If such alterations increase or diminish the quantity of Work to be done, compensation for increased Work shall be made at the Contract Unit Prices or under the item for extra Work. For decreased Work, Contractor shall allow the District a credit based on the Contract Unit Prices or by such other means as determined by Engineer. If such alterations diminish the quantity of Work to be done, they shall not warrant any claim for damages or for anticipated profits on the Work that is eliminated.

### **9.22 Extra and Deleted Work**

Contractor shall perform any unforeseen additional Work necessary to the proper completion of the Contract and not otherwise provided for herein, when and as ordered in writing by Engineer and approved by the District ("Extra Work"). For Extra Work, Contractor shall be compensated either:

- a. At the price agreed upon before the Extra Work is commenced and named in the order for the Work, or
- b. If Engineer so elects, for the reasonable cost of said Work, as determined by Contractor and approved by Engineer, plus a percentage of such cost, as set forth below, or
- c. At the unit price indicated in the Contract.

Contractor must submit written notification to Engineer within fifteen (15) days of any event Contractor claims to result in a change in the Scope of the Work or in Extra Work, and Contractor shall quantify such change within thirty (30) days of the event. The District shall provide a response to the Contractor within thirty (30) days from receipt of Contractor's quantification of the change. The cost of Extra Work performed shall include the cost to Contractor of materials used, equipment installed, common and skilled labor and foremen, and the fair rental price of all machinery used on the Extra Work for the period of such use.

At the request of Engineer, Contractor shall furnish itemized statements of the cost of the Work ordered and give Engineer access to all accounts, bills, and vouchers relating thereto.

Contractor may include in the cost for Extra Work the amounts of additional premiums paid to obtain and maintain the required insurance on account of such Extra Work, including but not limited to: Social Security or other direct assessments upon Contractor's payroll by Federal or other properly authorized public agencies; and other approved assessments made by Contractor directly to Contractor's employees, which are recognized to be part of the cost of doing Work.

Compensation for the rental of machinery used for Extra Work shall be based upon an appropriate fraction of the approved monthly rate schedule. The cost of transportation, not exceeding a distance of one hundred (100) miles, of such machinery to and from the Work shall be added to the compensation for rental property provided; however, compensation for rental property shall only apply to machinery or equipment used for Extra Work and not already required to be furnished under the terms of the Contract.

Contractor shall not include in the cost of Extra Work, any cost or rental of small tools, buildings, or any portion of the time of Contractor, its superintendent, or its office and engineering staff.

Contractor may add up to fifteen percent (15%) to the cost of Extra Work done by Contractor's own forces to cover its overhead allowance for use of capital the premium on the Bond as assessed upon the amount of this extra Work, and profit.

Where Extra Work done is performed by a subcontractor, the subcontractor shall compute the cost for the Extra Work, as stated above plus fifteen percent (15%). Contractor shall be allowed an additional five percent (5%) of the subcontractor's charge for the Extra Work to cover the cost of Contractor's overhead, use of capital, the premium on the Bonds as assessed upon the amount of this Extra Work, and profit.

If Extra Work is done, Contractor and/or subcontractor shall keep daily records of such Extra Work. The daily record shall include the names of persons employed, hours worked, materials and

equipment incorporated, and machinery used, if any, in the execution of such Extra Work. This daily record shall be signed by Contractor's authorized representative and approved by Engineer, verifying that such Work has been done. A separate daily record shall be submitted for each Extra Work order.

Notwithstanding anything contained herein the markup to Contractor and/or subcontractor, for overhead, profit, use of capital, and the premium on the Bonds as the same relates to Extra Work within the scope of Section 01020 of the Technical Specifications, shall not exceed twenty percent (20%).

### **9.23 Extension of Time on Account of Extra Work**

When Extra Work is ordered at any time during the progress of the Work which requires, in the opinion of Engineer, an unavoidable increase of time for the completion of the Contract, additional time shall be certified in writing by Engineer.

### **9.24 Changes Not To Affect Bonds**

It is distinctly agreed and understood that any changes made in the Plans and Specifications for this Work (whether such changes increase or decrease the amount thereof) of any change in the manner of time of payments made by the District to Contractor shall in no way annul, release, or affect the liability and surety on the bonds given by Contractor.

### **9.25 Non-Assignable**

Neither the Contract Documents, nor any monies due hereunder, or any part thereof, shall be assigned, transferred, or sublet by Contractor; nor shall the District be liable to any assignee or transferee, or sub-lessee, without the written consent of the District. Any assignment, transfer, or sublease, shall not release or discharge Contractor from any obligation hereunder.

### **9.26 District Remedies**

If Contractor defaults or neglects to carry out any of its obligations under this Contract, or should liens be filed, bills of sale, conditional bills of sale, chattel mortgages, assignments of this Contract without the consent of Contractor, or orders for the payment of money for materials or labor or either, or should Contractor become insolvent or file Bankruptcy, the District shall have the right, in addition to any other rights and remedies provided by law, to (a) perform and furnish through itself or through others any such labor or materials for the Work and to deduct the cost thereof from any money due or to become due to Contractor for all or any portion of the Work; (b) enter upon the premises and take possession for the purpose of completing the Work of all equipment, scaffolds, tools, appliances, and any other items thereon; and (c) to employ any person or persons to complete the Work and provide all labor services, materials, equipment, and other items required therefor. In case of such termination of the employment of Contractor, Contractor shall not be entitled to receive any further payment under this Contract. However, if the unpaid balance of the amount to be paid under this Contract shall exceed the cost and expense incurred by the District in completing the Work, such excess shall be paid by the District to Contractor; but if such cost and expenses shall exceed the unpaid balance, Contractor shall promptly pay the difference to the District on demand. Said cost and expense shall include not only the cost of completing the Work to the satisfaction of the District and of performing and furnishing all labor, services, materials, equipment, and other items required



therefor, but all losses, damages, costs and expenses including attorney's fees sustained, incurred, or suffered by reason of or resulting from Contractor default, or by reason for litigation over this Contract.

#### **9.27 Contractor's Remedies**

If the District fails to make a payment as provided for in the Contract Documents for a period of thirty (30) days after the date the payment is due, through no fault of Contractor, Contractor may, upon seven (7) additional days' written notice to the District terminate the Contract and recover from the District payment for Work executed including reasonable overhead and profit and costs incurred by reasons of such termination.

#### **9.28 Discontinuance of Construction**

Contractor agrees and guarantees to perform the above mentioned Work in accordance with the terms herein, irrespective of any strikes, lockouts, or stoppages and Contractor shall not employ persons, means, materials, or equipment which may cause strikes, Work stoppages, or any disturbances by workmen employed by Contractors.

In the event the District is prevented from proceeding with any or all of this Work as stated in this Contract, due to a declaration of war, or national emergency, by the United States government, whereas the construction of the type contracted for herein is specifically prohibited by statute or governmental edict, or due to the stoppages of construction caused by any governmental agency, State, City, Town, or County regulations, orders, restrictions, or due to circumstances beyond the District's control, or for any reasons whatsoever, then the District herein reserves the right to either suspend the Work to be done for an indefinite period of time or to cancel this Contract outright by giving notice by registered mail for such intention to Contractor herein. In the event of any conditions above mentioned occurring after the Work herein has already been commenced, then the District herein shall be liable only for the Work completed up to the cancellation or suspension without the addition of prospective profits or other charges whatsoever.

#### **9.29 Contractor's Responsibility**

It is specifically agreed, that all materials shall be supplied and Work shall be done in accordance with the rules, requirements, regulations and directives of various Building Departments, other State, County, or Town departments having jurisdiction over the same; mortgagees, if any; and the Federal Housing Administration or the Veteran's Administration, or their Bureaus, Agencies, Subdivisions, or Agencies or any other governmental bureau, agency, or department interested in this job directly or indirectly.

Contractor shall, at its own cost, obtain all necessary permits, licenses, inspections and certificates pertaining to the Work and shall comply with all Federal, State, Municipal and local laws, ordinances, rules, regulations, orders, notices and requirements, whether or not provided by the Plans, Specifications, General Conditions or other Contract Documents without additional expense to the District. Contractor shall also be responsible for and correct at its own cost and expense, any violations thereof resulting from and in connection with its performance of its Work. Engineer shall not be responsible for the means, methods, techniques, sequences or procedures of construction selected by Contractor or the safety precautions and programs incident to the Work of Contractor. Engineer's efforts will be directed toward providing assurance for the District that the completed

Project will conform to the Contract Documents, but Engineer shall not be responsible for the failure of Contractor to perform the construction Work in accordance with the Contract Documents.

Engineer shall have the authority to reject Work which does not conform to the Contract Documents, and shall have authority, but not the obligation, to stop the Work in the event of any unsafe conditions or unsafe practices on the part of Contractor, any subcontractor or any of their employees. Engineer's ability to stop the Work shall not affect Contractor's liability for the existence of unsafe conditions or practice.

### **9.30 The District's Right to Terminate**

The District may terminate this Contract and take possession of all or some of Contractor's materials, tools, equipment and appliances and complete the Work by any means the District deems fit if any of the following occur: if at any time there shall be filed by or against Contractor in any court a petition in bankruptcy, insolvency, for reorganization, or for the appointment of a receiver or trustee of all or a portion of Contractor's property, where Contractor fails to secure a discharge within thirty (30) days of any such petition; if Contractor makes an assignment for the benefit of creditors or petitions for or enters into an agreement or arrangement with its creditors; if Contractor fails to prosecute the Work properly, fails to complete the Work entirely on or before any date established for partial or final completion; fails to make prompt payment to subcontractors, for materials or labor; or without limitation, fails to perform any provisions of this Contract. The District may terminate this Contract by giving Contractor seven (7) calendar days prior written notice of any such default to Contractor. Such termination shall be without prejudice to any other remedy that the District may have. In case of termination, Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum shall exceed (1) the expense of completing the Work including compensation for additional managerial and administrative services, plus (2) the District's losses and damages because of Contractor's default, such excess shall be paid to Contractor. If such expense, plus the District's losses and damages shall exceed such unpaid balance, Contractor shall pay the difference to the District promptly on demand.

The District may terminate this Contract without cause by giving seven (7) calendar days prior written notice to Contractor, and in such event, the District will pay Contractor for that portion of the Contract Sum, less the aggregate of previous payments, allocable to the Work completed as of the date of termination. The District also will reimburse Contractor for all costs necessarily incurred for organizing and carrying out the stoppage of the Work and paid directly by Contractor, not including overhead, general expenses or profit. The District will not be responsible to reimburse Contractor for any continuing contractual commitments to subcontractors or materialmen or penalties or damages for canceling such contractual commitments inasmuch as Contractor shall make all subcontracts and other commitments subject to this provision.

In the event of termination by the District, the District may require Contractor promptly to assign to it all or some subcontracts, construction, plant, materials, tools, equipment, appliances, rental agreements, and any other commitments which the District may in its sole discretion, choose to take by assignment, and in such event Contractor shall promptly execute and deliver to the District written assignments of the same.

The District may, at any time, terminate the Contract for the District's convenience and without cause. Contractor shall be entitled to receive payment for Work executed and costs incurred by reason of such termination

### **9.31 Venue, Disputes and Attorney's Fees**

This Contract shall be governed by the laws of the State of Florida as now and hereafter in force. The venue for actions arising out of this Contract is fixed in Palm Beach County, Florida.

Contractor and the District agree that prior to instituting any litigation for damages under this Special Conditions Section 9.31, the parties shall conduct a non-binding mediation to attempt to resolve their dispute. In the event the parties cannot agree upon a mediator, each party shall select a mediator and such mediators shall select a third mediator who shall serve as the mediator for the dispute. In the event such mediation does not occur within thirty (30) days of a written request of either party, the parties shall be free to pursue litigation without first conducting mediation.

In any dispute arising out of the Contract Documents and/or relating to the Work, the Prevailing Party shall be entitled to recover all costs and expenses incurred, including, without limitation, attorneys' and paralegals' fees and costs whether before suit is filed, after suit is filed, on any appeal, and in any bankruptcy proceedings.

### **9.32 Coordination with District's Existing Facilities**

Contractor shall cooperate and coordinate its activities with those of the District when connecting to the existing District facilities, while working on the District plant site, and as specified in the Contract Documents.

The District has adopted a Standard Operating Procedure (SOP) for System Shutdowns and Bypass included in the Appendix and made part of this Contract. The Contractor is responsible for compliance with the SOP including planning all work requiring system shutdowns and/or bypasses to be completed within the Low Risk Holding Time and the Contractors Wastewater Management/Spill Response Plan. Details required for this compliance are included in the Appendix including the allowable duration of the shutdown or bypass (low risk holding time), the location of the isolation facilities, required facility information to determine residual wastewater volume disposal requirements and disposal locations, anticipated continuous flow the Contractor may expect and other pertinent information.

The Contractor is also responsible for all costs associated with the Emergency Operation Measures should these be implemented due to negligence on the Contractor's part or failure of the Contractor to perform the work within the allowed time frame.

### **9.33 Permits**

Unless otherwise identified in Section 01000 of the Technical Specifications, Contractor shall be responsible for obtaining any and all permits (i.e. building permits) necessary for the Work under this Contract and pay the costs thereof, said permits may be included as part of the Contract Documents. If differences between the specifications and conditions of the permits exist, the permits shall govern.

### **9.34 Coordination of Construction**

#### **A. General**

Contractor shall be responsible for the maintenance of utility operations during construction as specified in the Section 01500 of the Technical Specifications.

#### **B. Temporary Facilities**

District personnel must have ready access at all times to all existing structures. Temporary facilities shall include any equipment, materials, controls, services and accessories temporarily needed for access to, and for protection of all existing structures and equipment, and to maintain an operating system, in accordance with the provisions of these Specifications.

The size or capacity of the temporary facility shall generally be equal to the size or capacity of the facility replaced, unless otherwise indicated on the Contract Plans and Specifications or otherwise directed and approved by the District. All temporary facilities shall be removed when they are no longer required unless otherwise agreed upon in writing. To substitute an unscheduled temporary facility for an existing or new facility, Contractor shall prepare and submit a plan and description of the proposed temporary facility to the District. Upon receipt of the written approval of the District, Contractor shall then submit the notification of intent to commence Work.

#### **C. Coordination with District Personnel**

Before commencing Work involving removing or placing in operation existing or new facilities, Contractor shall notify the District in writing at least thirty (30) calendar days in advance in writing. The District shall be responsible for removing facilities from operation. Only the District can authorize the shutdown of any portions of the sanitary system. Contractor shall, under no circumstances, interfere with any existing lift station or collection system.

### **9.35 Field Layout Work**

All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Contract Plans and Specifications or as directed by Engineer. Elevation of existing ground, structures and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the stake-out survey shall be referred immediately to Engineer for interpretation or correction.

All survey Work for construction control purposes shall be made by Contractor at its expense as set forth in General Conditions Section 10.11.

Contractor shall establish all base lines for the location of the principal component parts of the Work together with benchmarks and batter boards adjacent to the Work. Based upon the information provided by the Contract Plans and Specifications, Contractor shall have the responsibility to carefully preserve the benchmarks, reference points and stakes. In case of destruction thereof by

Contractor or resulting from its negligence, Contractor shall be held liable for any expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such marks, reference points, and stakes.

Existing or new control points, property markers, and monuments that will be established or are destroyed during the normal causes of construction shall be reestablished by Contractor; and all reference ties recorded therefore shall be furnished to Engineer. All computations necessary to establish the exact position of the Work shall be made and preserved by Contractor.

### **9.36 Submittals**

#### **A. Progress Schedule**

Prior to executing the Contract, but after the award of the Contract to the Successful Bidder, the Successful Bidder shall prepare and submit the proposed progress schedule to Engineer for review and comments. The schedule shall be prepared using Oracle - Primavera P6. The contractor shall supply the electronic Primavera P6 schedule and a PDF copy of the Primavera P6 gantt chart.

The schedule shall be prepared using the Critical Path Method ("CPM") and shall depict in detail the proposed sequence of the Work and identifying construction activities for each structure, collection, transmission, or treatment facility. The schedule shall be time scaled, identifying the first day of each week, with the estimated date of starting and completion of each stage of the Work in order to complete the Project within the Contract time.

Contractor shall revise the progress schedule to reflect Engineer's comments prior to approval.

An updated schedule shall be submitted monthly with each Progress Payment Application depicting progress to the last day of the month. Subsequent changes to the schedule shall be accompanied by a letter of explanation with appropriate references and revision dates on the schedule.

#### **B. Operation and Maintenance Instruction for all Valves and Mechanical Devices**

##### **1. Individual Instructions**

When required by Engineer, Contractor, through manufacturer's representatives, shall provide instruction to the District's designated employees regarding the operation and care of all equipment furnished by Contractor and installed hereunder.

##### **2. Written Instructions**

When required by Engineer, Contractor shall furnish and deliver to Engineer, prior to final payment, six (6) complete sets of instructions, technical bulletins, and any other printed matter such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair of all Contractor furnished equipment. Included in this submission shall be a spare parts diagram and complete spare parts list. The information provided shall include a source of replacement parts and names of service representatives,

including addresses and telephone numbers. Extensive pictorial cuts of equipment are required for operator reference in servicing. These requirements are a prerequisite to the operation and acceptance of equipment. Each set of instructions shall be bound together in appropriate three-ring binders. A detailed table of contents shall be provided for each set. Written operation and maintenance instructions shall be required for all equipment items supplied for this Project. The amount of detail required shall be commensurate with the complexity of the equipment item.

Information not applicable to the specific piece of equipment installed on this Project shall be removed from the submission.

When written instructions include shop drawings and other information previously reviewed by Engineer, only those editions thereof which were accepted by Engineer, and which accurately depict the equipment installed, shall be incorporated in the instructions.

C. Maintenance and Lubrication Schedules

When required by Engineer, Contractor shall furnish complete Equipment Maintenance and Lubrication Schedules for each piece of mechanical equipment such as valves, gates, etc. The complete forms (six copies), as provided in Section 01300 entitled "Submittals" of the Technical Specifications shall be submitted along with the shop drawings and included with the furnished O&M Manuals.

D. Schedule of Values

Contractor shall submit as a shop drawing a Schedule of Values for Engineer's review at the Pre-Construction Meeting. The Schedule of values shall contain the installed value of the component parts of the Work for the purpose of making progress payments during the construction period. The Schedule shall provide sufficient detail for the proper identification of Work accomplished. Each item shall include its proportional share of all costs, including Contractor's overhead contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract. For payments on acceptable stored material items, Contractor shall also submit a separate list covering the cost of materials, delivered, and unloaded at the project site along with delivery invoices with taxes paid. Stored materials will be paid for items to be used within thirty (30) days of delivery. In addition, the listing shall also include the installed value of the item with coded reference to the Work items in the Schedule of Values.

Contractor shall expand or modify the above schedule and materials listing as required by Engineer's initial and subsequent reviews.

E. Schedule of Payments

Contractor shall submit a Schedule of Payments at the Pre-Construction meeting to be approved by the District. The Schedule of Payments shall contain Contractor's expected Progress Payment values throughout the construction period, for the purpose of assuring that the District will have sufficient monies available to make payments in the expected amounts

for each payment period. Contractor shall provide an updated Schedule of Payments with each Progress Payment Application.

**F. Contractor's Shop and Working Drawings**

Contractor shall submit shop and Work drawings in accordance with General Conditions Section 10.07.

**9.37 Inspection and Testing**

The Contractor shall employ and pay for the services of an independent test laboratory for specified testing.

The Work or actions of the testing laboratory shall in no way relieve Contractor of its obligations under the Contract. The laboratory testing Work shall include such inspections and testing required by the Contract Document, existing laws, codes, ordinances, etc. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform or approve any of Contractor's Work.

Contractor shall allow Engineer ample time and opportunity for testing materials and equipment to be used in the Work. Contractor shall advise Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for inspection before shipment from place of manufacture. Contractor shall at all times furnish Engineer and Engineer's representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship. Contractor must anticipate that possible delays may be caused in the execution of the Work due to the necessity of materials and equipment being inspected and accepted for use. Contractor shall furnish, at Contractor's own expense, all samples of materials required by Engineer for testing. Contractor shall make its own arrangements for providing water, electric power, or fuel for the various inspections and tests of structures and equipment.

Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other sections of the Specifications. Contractor shall also place orders for such equipment on the basis that, after the equipment has been tested prior to Final Completion of the Work; the manufacturer will furnish the District with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by Contractor, unless otherwise specified in writing.

The Contractor will pay the cost of all tests, inspections, or investigations undertaken by the order of Engineer for the purpose of determining conformance with the Contract Documents if such tests, inspections, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by Engineer as a result of such tests, inspections, or investigations, Contractor shall bear the full cost thereof or shall reimburse the District for said cost. The cost of any additional tests and investigations, which are ordered by Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by Contractor.

**9.38 Utilities and Services**

A. General

Contractor shall provide for utilities and services for its own operations, as well as field offices. These shall include electrical power, water, ventilation, sanitary facilities and telephone service. Contractor shall furnish, install and maintain all temporary utilities during the Contract period including removal upon completion of the Work. Such facilities shall comply with regulations and requirements of the National Electrical Code, OSHA, Florida Power and Light, and applicable Federal, State, and local codes, etc.

B. Temporary Power

Contractor shall arrange with Florida Power and Light for construction period service and pay all costs for the work and power. In addition to providing for a safe construction period distribution system, Contractor shall provide a safe and adequate artificial lighting system for work areas which do not have sufficient natural light. Temporary lighting shall be maintained during non-working periods if the area is subject to access by the public or plant personnel. Contractor shall furnish all electrical or other power required for construction, testing and trial operation prior to final acceptance by the District or at the time of Beneficial Occupancy.

C. Permanent Power

Utility charges for power consumed by permanent electrical facilities used for normal operations and maintenance of the treatment plant will be paid by the District.

D. Temporary Water

Contractor shall pay for all water used for construction, flushing, testing and temporary sanitary facilities. Contractor shall provide and maintain all piping, fittings, adapters, and valves required.

E. Temporary Ventilation

Contractor shall provide and maintain adequate ventilation for a safe working environment. In addition, forced air ventilation shall be provided for the curing of installed materials, humidity control and the prevention of hazardous accumulations of dust, gases or vapors.

F. Temporary Sanitary Facilities

Contractor shall provide and maintain adequate and clean sanitary facilities for the construction work force and visitors. The facilities shall comply with local codes and regulations and be situated at approved locations.

### 9.39 Security

Contractor shall employ watchmen and security guards in its sole discretion, as it deems necessary to protect the job site against vandalism, burglary, theft, trespassing, etc. Contractor shall care for and protect against loss or damage all material to be incorporated in the construction, including but not



limited to, the existing plant structures, equipment and materials for the duration of the Contract, shall repair or replace damaged or lost materials and damaged structures at no additional cost to the District.

Contractor shall be responsible for providing, maintaining and securing gates used for construction purposes for the duration of the Project.

#### **9.40 Special Controls**

##### **A. Chemicals**

All chemicals used during Project construction or furnished for testing or Project operation, whether herbicide, pesticide, disinfectant, polymer, reactant of other classification, must be approved by either EPA or HUD. The handling, use, storage and disposal of such materials, containers or residues shall be in strict conformance to the manufacturer and/or supplier's instructions. Unless otherwise authorized, such materials shall be kept in secured storage. Copies of antidote literature shall be kept at the storage site and at Contractor's job site office. A supply of antidotes shall be kept at Contractor's office.

##### **B. Dust**

During construction Contractor shall, by the application of water and/or calcium chloride or other means, approved by Engineer, eliminate dust annoyance to adjacent property owners, business establishments, and all vehicular traffic. Contractor shall take all protective measures, to the satisfaction of Engineer, necessary to ensure that dust and debris do not enter any adjacent property or roadway. Contractor shall be responsible for the cleanup of existing property and roadways which have become soiled due to lack of proper dust control as determined by Engineer.

##### **C. Noise**

Noise resulting from Contractor's Work shall not exceed the noise levels and other requirements stated in local ordinances. Contractor shall be responsible for curtailing noise resulting from its operation. Contractor, upon written notification from Engineer or the noise control officers, shall make any repairs, replacements, adjustments, additions to and/or furnish mufflers when necessary to fulfill noise level requirements.

##### **D. Erosion Abatement and Water Pollution**

It is imperative that any Contractor dewatering operation does not contaminate or disturb the environment of the properties adjacent to the plant. Contractor shall, therefore, schedule and control its operations to confine all runoff water from disturbed surfaces, and water from dewatering operations that becomes contaminated with lime, silt, muck, and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

Contractor shall construct temporary stilling basin(s) of adequate size and provide all necessary temporary materials, operations, and controls including, but not limited to, filters, coagulants, screens, and other means necessary to attain the required discharge water quality.

Contractor shall be responsible for providing, operating, and maintaining materials and equipment used for conveying clear water to the point of discharge. All pollution prevention procedures, materials, equipment and related items shall be operated and maintained until such time as the dewatering operation is discontinued. Upon the removal of the materials, equipment and related items, Contractor shall restore the area to the existing condition prior to commencing the Work.

E. Pests and Rodents

Contractor shall be responsible for maintaining the job site free from litter, rubbish and garbage. Contractor shall provide containers for the disposal of garbage and other materials that attract and are breeding places for pests and rodents. Contractor shall, at its expense, provide the services of an exterminator on a periodic basis to inspect the job site and to provide services as required to control pests and rodents.

F. Periodic Clean-Up; Basic Site Restoration

During construction, Contractor shall regularly remove from the site all accumulated debris and surplus materials of any kind which result from the construction. Unused equipment and tools shall be stored at Contractor's yard or base of operations for the Project.

Contractor shall perform the clean-up Work on a regular basis and/or as frequently as ordered by Engineer. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such site restoration shall also be accomplished, when ordered by Engineer, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

Upon failure of Contractor to perform periodic clean-up and basic restoration of the site to Engineer's satisfaction, Engineer may, upon five (5) calendar days prior written notice to Contractor, employ such labor and equipment as he deems necessary for the purpose, and all costs resulting therefrom shall be charged to Contractor and deducted from any amounts of money that may be due it.

**9.41 Storage and Construction Areas**

A. Storage and Construction Areas

Contractor shall confine its construction operations within the Contract limits shown on the Plans and Specifications and/or property lines and/or fence lines. All on-site Contractor Staging Areas shall be confined to designated areas as shown on the Plans and Specifications. Any additional staging and storage areas required by Contractor shall be provided by Contractor.

Contractor shall be solely responsible for the protection and safekeeping of equipment and materials at or near the sites. No claim shall be made against the District for any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by

stored equipment and/or materials, Contractor shall immediately move such equipment or materials. No equipment or materials shall be placed upon the District's property until written approval has been received from the District.

Upon completion of the Contract, Contractor shall remove from the staging areas all equipment, fencing, surplus materials, rubbish, etc., from the construction, storage, and staging areas, and restore the areas to their original condition.

#### **9.42 Equipment and Materials**

##### **A. General**

All equipment, materials, instruments or devices incorporated in this Project shall be new and unused, unless indicated otherwise in the Contract Documents or in writing signed by the District and Contractor. All equipment, materials, instruments or devices shall be the products of reliable manufacturers who, unless otherwise specified, have been regularly engaged in the manufacture of such material and equipment for the use as identified for this Project for, at least five (5) years.

Equipment and materials to be incorporated in the Work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the Work, and they shall be delivered as nearly as feasible in the order required for executing the Work.

Contractor shall protect all equipment and materials from deterioration and damage. The equipment and materials shall be handled and stored by the manufacturer, fabricator supplier and Contractor before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, damage or theft of any kind whatsoever. Any equipment exhibiting any of the above, shall be removed and replaced at Contractor's expense; such expense shall include both labor and materials.

##### **B. Storage**

Contractor shall store its equipment and materials in accordance with Special Conditions Section 9.18, Storage of Materials, at the job site in accordance with the manufacturer's recommendations and as directed by Engineer. Contractor shall not store unnecessary materials or equipment on the job site and shall prevent any structure from being overloaded or kept in a condition that would endanger the safety of others. Contractor shall enforce the instructions of the District and Engineer regarding the posting of regulatory signs for loading structures, fire safety, and smoking areas.

##### **C. Handling and Maintenance**

The manufacturer's storage instructions shall be carefully followed and any deviations shall be approved by the manufacturer in writing with a copy to Engineer. Equipment with moving parts, such as gears, electric motors, etc., and/or instruments, control panels, and switch gears, shall be stored in a temperature and humidity controlled building until the equipment is to be installed, and such equipment shall be rotated per the manufacturer's recommendations while in storage and during the period between installation and acceptance of the Work.

The equipment shall be stored fully lubricated unless otherwise instructed by the manufacturer. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance of the Work. New lubricants shall be put into the equipment at the time of acceptance of the Work.

Equipment with electric motors having space heaters shall have the space heaters energized unless stored in a temperature and humidity controlled building. Space heaters shall be energized at the time of installation and maintained until acceptance of the equipment.

#### **9.43 Project Closeout**

##### **A. General**

As construction of the Project enters the final stages of completion, Contractor shall, in accordance with the requirements set forth in the Contract Documents, attend to or have already completed the following items:

1. Schedule equipment manufacturer's visits to site.
2. Calibrate instruments and controls.
3. Required testing of Project components.
4. Schedule facilities start-up and initial operation.
5. Schedule and furnish skilled personnel during initial facilities operation.
6. Correct and/or replace Defective Work, including completion of items previously overlooked or Work which remains incomplete, all as evidenced by Engineer's "Punch List".
7. Attend to any other items listed herein or brought to Contractor's attention by Engineer.

##### **A. Substantial Completion**

Items to be completed and provided prior to issuance of Substantial Completion shall include but not be limited to the following:

1. All equipment mfg. visits to the site
2. Startup tests completed and documentation provided to the Engineer
3. All instruments and controls calibrated and tested
4. All components of the Project successfully tested
5. Instruction provided to personnel on operation of equipment as required by the Technical Specification.
6. Project and its constituent pieces must be fully operational in accordance with Contract requirements and permits.
7. Restore areas disturbed by construction activities.

## B. Cleaning and Restoration

Before the Final Completion of the Project, Contractor shall accomplish the cleaning and final adjustments of the various facility components as specified in the Specifications, including:

1. Clean and lubricate all finish hardware after adjustment for proper operation.
2. Touch up marks or defects in painted surfaces and touch up any similar defects in factory finished surfaces.
3. Remove all stains, marks, fingerprints, soil, spots, and blemishes from all finish surfaces.
4. Restore all areas disturbed by construction operations to conditions equal to or better than that which existed prior to the Work.

## D. Project Record Drawings and Documents

Contractor shall keep a set of drawings at the jobsite. As-built plans shall be submitted for Work completed at the end of each pay period. The payment application will not be processed until the as-built plans are approved by Engineer. Contractor shall be held responsible for the accuracy of such data, and shall bear any costs incurred in finding utilities as a result of incorrect data furnished by Contractor.

Before the Final Completion of the Project, Contractor shall submit to Engineer (or to the District if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. Missing, incomplete, or unacceptable items, as determined by Engineer or the District, shall constitute grounds for withholding Final Payment to Contractor. A partial list of such items appears below, but it shall be Contractor's responsibility to submit any other items which are required in the Contract Documents:

1. Test results of Project components.
2. Performance affidavits for equipment.
3. Operation and maintenance instructions or manuals for equipment.
4. Month-to-month records containing all deviations from the Plans and Specifications, Addenda, and Modifications of Shop drawings. Such records shall be prepared from record drawings showing correct and accurate changes and deviations from the Work made during construction so as to reflect the Work as it was actually constructed. These drawings shall conform to recognized standards of drafting, be neat, legible and be on Mylar or other approved reproducible material. Contractor shall secure and pay for the services of a registered land surveyor for a final survey at every 100 feet of the location of the pipeline upon completion of construction. Signed and sealed "As Built" record drawings showing pipe location, slopes, depths of cover, offsets, and location of all fittings, valves, manholes, and all related appurtenances shall be submitted to Engineer. Missing, incomplete or inaccurate drawings as specified herein and as determined by Engineer, shall constitute grounds for withholding final payment to Contractor.
5. In addition to items specified under Article 4 Section 6 of the Contract, all technical documentation as specified elsewhere in the Contract Documents and particularly in the Technical Specifications.

E. Grease, Oil and Fuel

All grease, oil, and fuel required for testing of equipment shall be furnished by Contractor. Contractor shall also furnish a one (1) year's supply of lubricants including grease and oil in the type recommended by the manufacturer for each item of equipment supplied.

F. Touch-Up and Repair

Contractor shall touch-up and repair damage to all field painted and factory finished equipment. Touch-up of equipment, panels, etc. shall match as nearly as possible to the original finish. If in the opinion of Engineer the touch-up Work is not satisfactory, Contractor shall repaint the item.

G. Chemicals

All chemicals required for testing of equipment or the process shall be furnished by Contractor. Contractor shall also furnish chemicals for the District's use where specified.

H. Closeout and Punch Lists

Contractor shall notify Engineer and the District in writing when the Work has reached Substantial Completion. Engineer will make an inspection of the Project for the purposes of determining the Work has reached Substantial Completion and for discovering and developing a list of Work not found acceptable and requiring cleaning, repair or replacement ("Punch List"). If Engineer determines the Project to be substantially complete, Engineer shall issue the Certificate of Substantial Completion. If the Project has an estimated cost of less than \$10 million, the Punch List shall be developed within thirty (30) days following actual Substantial Completion of the Project. If the Project has an estimated cost of more than \$10 million, the Punch List shall be developed within sixty (60) days following actual Substantial Completion of the Project. The Punch list shall be delivered to Contractor within five (5) days of the development of the Punch List. The Final Completion date shall not be less than thirty (30) days following delivery of the Punch List.

Upon receipt of the Punch List, Contractor shall perform all work necessary to complete the Punch List. Work that has been inspected and accepted by Engineer shall be maintained by Contractor, until Final Completion of the entire Project. Upon completion of the items on the Punch List, Contractor shall notify Engineer in writing that the Project is ready for inspection. This procedure will continue until the entire Project is accepted by Engineer. "Final Payment" will not be processed until the entire Project has been accepted by Engineer in writing by issuance of the Certificate of Final Completion and all of the requirements in Special Conditions Section 9.43 D. - Project Record Drawings and Documents have been satisfied. Contractor's acceptance of final payment from the District shall constitute a full waiver and release by Contractor of all claims against the District arising out of or relating to the Project or Work.

Final cleaning and repairing shall be scheduled upon completion of the Project.

I. Partial Utilization

Prior to the completion of the Project, it may be necessary to place into service various facilities, structures, equipment and processes in accordance with the Sequence of Operation and Construction. Whenever a structure, equipment, or process has been completed and tested, Contractor shall notify Engineer that it is ready for inspection. Any Work not found acceptable will be noted on the "Punch List." Whenever Contractor has completed the Work and it has been accepted by Engineer, the District shall take possession, operate and maintain the facility, and equipment warranties begin ("Partial Utilization"). Partial Utilization shall not constitute Substantial Completion.

#### J. Tools and Spare Parts

##### 1. Tools

Any special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, and maintenance of any equipment shall be furnished with the respective equipment. Contractor shall furnish a complete list of tools and instructions for their use, recommended by the manufacturer or supplier with the Shop Drawing Submittal.

##### 2. Spare Parts

Spare parts for equipment shall be furnished where indicated in the equipment specifications and/or as recommended by the equipment manufacturer. Spare parts shall be identical and interchangeable with original parts. Parts shall be supplied, prepared for storage, in clearly identified containers, except large or bulky items which may be wrapped in polyethylene.

The parts shall be stored separately in a locked area, maintained by Contractor, and shall be delivered to the District at a location designated by the District. Contractor shall furnish an inventory listing all spare parts in the form included herein for each piece of equipment.

#### K. Start-Up and Field Instructions

The bid prices for the equipment furnished by Contractor shall include the cost of competent manufacture representatives of all equipment to supervise the installation, adjustment and testing of the equipment and to instruct the District's operating personnel in their operation and maintenance of all equipment. The supervision may be divided into two or more time periods as required by the installation program or as directed by Engineer.

The manufacturer's representatives shall certify in writing that the installation and testing of the equipment has satisfactorily been completed and that the equipment is ready for operation and the District's operating personnel have been instructed in the operation, maintenance, and lubrication of the equipment.

Contractor shall provide the services of the manufacturer's representative(s) for additional time as required should difficulties arise in the operation of the equipment due to the manufacturer's design or fabrication of the equipment or faulty installation by Contractor.

This additional service shall be provided at no cost to the District for the duration of the Contract and one (1) year maintenance period.

**L. Final Clean-Up and Site Restoration**

Before finally leaving the site, Contractor shall wash and clean all exposed surfaces which have become soiled or marked. Contractor shall remove from the site of the Work all accumulated debris and surplus materials of any kind which result from its operation, including construction equipment, tools, sheds, sanitary enclosures, etc. Contractor shall leave all equipment, fixtures, and Work, which he had installed, in a clean condition. The completed Project shall be turned over to the District in a neat and orderly condition.

All damage, as a result of Work under this Contract, to existing structures, pavement, driveways, curb and gutters, sidewalks, utility poles, utility pipelines, conduits, drains, catch basins, fences, and other obstructions not specifically mentioned herein shall be repaired.

**9.44 Open Specifications**

Where materials or equipment are specified by a trade or brand name, it shall not be the intention of the District to discriminate against an equal product of another manufacturer but rather to set a definite standard of quality or performance and to establish an equal basis for the evaluation of bids. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases, fully equal to approved samples. Where a trade or brand name is specified with the words “or equal” or “equivalent,” this is understood to mean that other trade or brand names may be substituted that are, in the opinion and judgment of Engineer, equal in quality and performance. Even though the words “or equal” or “equivalent” are used in the Specifications, unless a substitute is approved in writing by Engineer, Engineer shall have the right to require the use of the material or equipment specified by trade or brand name.

**9.45 Spare Parts List**

The equipment supplier shall prepare a recommended spare parts list. Six (6) copies of the recommended spare parts list shall be submitted with the shop drawings.

**9.46 Applicable Standards and Codes**

Whenever reference is made to any published standards, codes, or standard specifications, such reference shall mean the latest issue of that standard, code, specifications, or tentative specification of the technical society, organization, or body referred to which is in effect at the date of invitation for bids.

**9.47 Copies of Plans and Specifications**

Contractor shall be provided with three (3) complete sets of Plans and Specifications for its use at no charge. Signed and sealed drawings which are necessary to obtain Building Permits will also be provided to Contractor by Engineer at no charge.

**9.48 Restoration – Special**



Existing areas of special landscaping materials, irrigation systems, ground cover and any other improvements that are damaged shall be restored with new materials to equal or better than existing conditions. Technical Specifications may contain additional requirements.

#### **9.49 Contractor Performance Reviews and Ratings**

The District shall develop a Contractor performance evaluation report. This report shall be used to periodically review and rate the Contractor's performance under the contract with performance rating as follows:

Satisfactory	Performance meets contractual requirements. The contractual performance of the element being assessed may contain some minor problems for which corrective actions taken by the Contractor were satisfactory
Unsatisfactory	Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance contains a serious problem(s) for which the contractor's corrective actions appear or were ineffective.

The report shall also list discrepancies found during the review period. The Contractor shall be provided with a copy of the report and may respond in writing if he takes exception to the report or wishes to comment on the report. Contractor performance reviews and subsequent reports will be used in determining the Contractor's satisfactory performance record on future Contracts.

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## GENERAL CONDITIONS

### ARTICLE 10

#### TITLE

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10.31	Legally Binding

## **10.01 General**

Contractor shall furnish all labor, materials, tools and equipment necessary to do all Work required for the completion of each item of this Contract as specified herein. The Work to be done and paid for under any item shall not be limited to the exact extent mentioned or described, but shall include all incidental Work necessary or customarily done for the completion of that item.

## **10.02 Definitions**

Wherever the words or terms defined in this Section or pronouns used in their stead occur in the Specifications or other Contract Documents, they shall have the meanings herein given.

- a. "AASHTO" shall mean the American Association of State Highway and Transportation Officials.
- b. "ACI" shall mean the American Concrete Institute.
- c. "Addendum" shall mean modification of the Contract Documents issued in writing by Engineer prior to opening the bids.
- d. "ANS" shall mean American National Standard, as approved by the American National Standards Institute, Inc.
- e. "ASTM" shall mean the American Society for Testing and Materials.
- f. "AWWA" shall mean the American Water Works Association.
- g. "Bid" shall mean the documents that comprise the submission for the Work of this Project.
- h. "Bid Period" shall mean the time period from when the Bid Documents will be available to the deadline for submitting Bids.
- i. "Bidder" shall mean one who submits a Bid directly to District, as distinct from a sub-bidder, who submits a Bid to the Bidder.
- j. "Bid Documents" include the Advertisement for Bids, Instructions to Bidders, Proposal, Questionnaire, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipts of Bids).
- k. "Change Order" shall mean a written change, addition, or deletion to the Contract Documents signed by both Contractor and the District.
- l. "Contract" shall mean the agreement between the Successful Bidder and the District for performance of the Work.
- m. "Contract Documents" shall mean all documents that comprise the agreement of the parties related to this Project. The Contract Documents include the Notice to Contractors, Instructions to Bidders, Proposal, Questionnaire, Bid Security, Contract, Public Construction

Bond, Sworn Statement of Public Entity Crimes, Opinion of District's Attorney, Final Release of Lien, Special Conditions, General Conditions, Technical Specifications, Standard Details and Plans, including all modifications, addenda, and Change Orders contained in any documents before or after execution of the Contract

- n. "Contract Sum" shall mean the total amount due to Contractor as a result of Work on the Project, including any amounts as a result of Change Orders.
- o. "Contract Time" shall mean the time to complete the Project as set forth in the Contract Documents. Reference to "days" shall mean calendar days unless otherwise noted.
- p. "Contractor" shall mean the Successful Bidder with whom the District signs the Contract for the Work or its duly authorized agents.
- q. "County" shall mean Palm Beach County, as may be applicable.
- r. "Defective" shall mean the Work does not conform to the Contract Documents or does not meet the requirements of any applicable inspection, reference standard, test, or approval.
- s. "District" shall mean the Loxahatchee River Environmental Control District, acting through its properly authorized representatives.
- t. "Engineer" shall mean the engineer designated by the District as its engineering representative during the course of construction to make appropriate inspection and computation of payments, whether acting directly or through properly authorized agents, inspectors or representatives of Engineer, acting within the scope of duties entrusted to them.
- u. "Final Completion" shall mean the time when Engineer determines that all Contract Document requirements have been completed.
- v. "IEEE" shall mean the Institute of Electrical and Electronic Engineers, Inc.
- w. "Notice of Award" shall mean the District's notification of the Contract to the Successful Bidder.
- x. "Notice to Proceed" shall mean the written notice from the District to the Contractor to proceed with the Work.
- y. "Plans" shall mean any and all drawings, plans, sketches, diagrams, designs, lists, exhibits, or other graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work for the Project.
- z. "Pricing Schedule" shall be based upon the Bid item(s) and shall establish the value of the Contract Award. .
- aa. "Project" shall mean the entire construction to be performed as provided in the Contract Documents.

- bb. "Schedule of Values" is established between Contractor and Engineer to determine the appropriate cost of component items that were used to establish the "Pricing Schedule," and the value to be paid as Work is completed. The Schedule of Values shall be determined during the Pre-Construction Meeting.
- cc. "Specifications" shall mean the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services.
- dd. "Substantial Completion" shall mean the date as certified by Engineer when the construction of the Project or a specified part thereof is completed, in accordance with the Contract Documents and applicable permits, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with the Contract.
- ee. "Successful Bidder" shall mean the lowest cost, qualified, responsive, responsible Bidder to whom the District, based on the District's evaluation hereinafter provided, makes an award.
- ff. "Work" shall mean any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment, services, and other incidentals and the furnishing, installation, and delivery thereof and all Work reasonably inferable therefrom.

### **10.03 Plans and Specifications are Supplementary**

The Plans and Specifications are intended to supplement each other, and together constitute one complete set of Contract Documents, so that any Work exhibited in the one and not the other shall be executed just as if it has been set forth in both, in order that the Work shall be completed in every respect according to the complete design or designs as decided and determined by Engineer. In the event of a conflict in the Plans and Specifications, the Specifications shall be considered prevailing. Should Contractor find that anything is omitted from the Plans and Specifications which is necessary for a clear understanding of the Work, or that there is an error in either Plans or Specifications, Contractor shall promptly notify Engineer. From time to time during the progress of the Work, Engineer may furnish supplementary or working drawings necessary to show changes or define the Work in more detail, and these also shall be part of the Contract Documents.

### **10.04 Handling and Distribution**

Contractor shall, at its own expense, handle, haul, deliver, and distribute all materials and all surplus materials on the different portions of the Work, as necessary. Contractor shall provide suitable and adequate storage room for materials and equipment, until the Final Completion of the Work.

Storage charges and demurrage charges by transportation companies and vendors, which result from delays in handling, shall be borne by Contractor.

### **10.05 Materials, Samples, Inspection, Approval**

Unless otherwise indicated on the Plans and Specifications or specified, only new materials and equipment shall be incorporated in the Work. All materials and equipment furnished by Contractor to be incorporated in the Work shall be subject to the inspection and approval of Engineer.

No material shall be processed for, fabricated for, or delivered to the Work without prior approval of Engineer.

Within thirty (30) calendar days after the award of the Contract, Contractor shall submit to Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment proposed to be incorporated into the Work. When shop and working drawings are required as specified below, such information shall be submitted prior to the submission of the drawings so that Engineer may consider and approve or disapprove the manufacturer and/or the supplier as to the its ability to furnish a product meeting the Specifications, subject to final approval of the particular material or equipment. As requested, Contractor shall also submit data relating to the material and equipment proposed to be incorporated into the Work, in sufficient detail to enable Engineer to identify the particular product in question and to form an opinion as to its conformity to the Contract requirements.

Such data shall be submitted in a manner similar to that specified for shop and working drawings.

Facilities and labor for the handling and inspection of all materials and equipment shall be furnished by Contractor. Defective materials and equipment shall be removed immediately from the site of the Work. The Contractor will make arrangements for, and pay for soil density tests wherever and whenever the District desires, but at no less than every 1 foot lift and 400 LF of trench backfill, 1 foot lift and 100 SF of roadway subgrade and base and 1 foot lift and 100SF of fill beneath concrete on grade. If the results of a soil density test indicate that compaction is less than that specified, Contractor shall recompact and retest soil density with no additional cost to the District.

If Engineer so requires, either prior to beginning or during the progress of the Work, Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the Specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed and shipped as directed, at the expense of Contractor. Contractor shall, at its expense, furnish approved molds for making concrete test cylinders. Except as otherwise specified, the District shall make arrangements for, and pay for, the tests. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or Work and location of which the material is intended, and the name of Contractor submitting the sample. To ensure consideration of samples, Contractor shall notify Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.

Contractor shall submit data and samples to Engineer, or place its orders, sufficiently early to permit Engineer to consider, inspect, test, and approve the materials and equipment before they are incorporated in the Work. Delay resulting from Contractor's failure to do so shall not be used as a basis of a claim against the District or Engineer. When required, Contractor shall furnish to Engineer three (3) sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, concrete and equipment data.

After Engineer approval of the samples, data, etc., the materials and equipment used in the course of the Work shall correspond therewith.

#### **10.06 Inspection of Work Away from the Site**

If Work done off the construction site is to be inspected on behalf of the District during its fabrication, manufacture, or testing, or before shipment, Contractor shall give notice to Engineer of the place and time where such fabrication, manufacture, testing or shipping is to be done. Such notice shall be in writing and delivered to Engineer in ample time so that the necessary arrangements for the inspection can be made.

#### **10.07 Contractor's Shop and Working Drawings**

Contractor shall submit for approval six (6) copies (unless otherwise specified in writing) of shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated especially for this Contract, and materials and equipment for which such drawings are specifically requested. All shop and working drawing submittals shall be prepared and submitted in accordance with Section 01300 of the Technical Specifications.

#### **10.08 Health, Safety and Environmental Program**

The Contractor shall adhere to all applicable federal and state occupational safety and health laws as they apply to this Contract.

The Contractor will enforce the Loxahatchee River Environmental Control District's safety rules and practices as they apply to the Contractor's employee's, in addition to the Contractor's own safety rules and procedures.

The Contractor shall provide all of its subcontractors with copies of all safe working procedures and shall ensure their enforcement.

#### **10.09 Insufficiency of Safety Precautions**

Failure of Contractor to provide these required conditions shall be a material breach of this Contract and the District shall be entitled to stop the Work until such time as Contractor corrects these conditions, without payment to Contractor of extension of time to complete the Work.

#### **10.10 Sanitary Regulations**

Contractor shall provide adequate sanitary conveniences for the use of those employed on the worksite. Such conveniences shall be made available when the first employees arrive on the worksite, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required or approved.

Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. Contractor shall rigorously prohibit the committing of nuisances on the



worksite, on the lands of the District, or any adjacent property. Contractor is solely responsible for the use and maintenance of the sanitary facilities.

The District and Engineer shall have the right to inspect any building or other facility erected, maintained, or used by Contractor, to determine whether or not the sanitary regulations have been complied with.

#### **10.11 Lines, Grades and Measurements**

Contractor shall employ, at its own expense, a land surveyor who shall be registered in the State of Florida and who shall be thoroughly experienced in field layout work. Said surveyor shall establish all lines, elevations, reference marks, etc., needed by Contractor during the progress of the Work, and from time to time Contractor shall verify such marks by instrument or by other appropriate means.

Alignment and grade of all pipe, tunnels and borings shall be controlled by use of lasers, levels or other equipment as required to assure proper alignment and grade. Contractor shall furnish all lasers and accessories as required and approved by Engineer. Contractor's engineer will set and check each laser each day that Work is in progress or more often as required to assure continuous accurate control. Contractor's engineer responsible for lines and grades shall certify to the District in writing that the Work has been constructed to lines and grades as shown on the Plans and Specifications. This certification shall accompany each request for payment.

Engineer shall be permitted at any time to review the lines, elevations, reference marks, lasers, etc., set by Engineer employed by Contractor, and Contractor shall correct any errors in lines, elevations, reference marks, lasers, etc., disclosed by engineer. Such a review shall not be construed to be an approval of Contractor's Work and shall not relieve Contractor of the responsibility for the accurate construction of the entire Work.

Contractor shall make all measurements and review all dimensions necessary for the proper construction of the Work called for by the Plans and Specifications. During the prosecution of the Work, Contractor shall make all necessary measurements to prevent misfitting in said Work, for the accurate construction of the entire Work.

#### **10.12 Dimensions of Existing Structures**

Where the dimensions and locations of existing structures are of critical importance in the installation or connection of new Work, Contractor shall verify such dimensions and locations in the field before the fabrication of any materials or equipment which is dependent on the correctness of such information.

#### **10.13 Work to Conform**

During its progress and on its completion, all Work shall conform to the lines, levels, and grades indicated on the Plans and Specifications or given by Engineer and shall be built in a thoroughly substantial and workmanlike manner, in accordance with the Plans and Specifications and the directions given from time to time by Engineer. In no case shall any Work in excess of the requirements of the Plans and Specifications be paid for unless ordered in writing by Engineer.

All Work done without instructions having been given therefore by Engineer, done without proper lines or levels, or done during the absence of Engineer, or its agent, will not be estimated or paid for except when such Work is authorized by Engineer in writing. Work so done may be ordered uncovered or taken down, removed, and replaced at Contractor's expense.

#### **10.14 Pipe Location**

Pipelines will be located substantially as indicated on the Plans and Specifications, but the right is reserved by the District, acting through Engineer, to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the Plans and Specifications, such notation is for Contractor's convenience and does not relieve Contractor from laying and joining different or additional items where required without additional compensation.

#### **10.15 Planning and Progress Schedules**

Contractor shall prepare and submit all schedule submittals in accordance with Section 01300 of the Technical Specifications.

#### **10.16 Precautions During Adverse Weather**

In the event of, or the possibility thereof, adverse weather, including high tides, and against the possibility thereof, Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood, building paper shelters, and other approved means. Contractor shall be responsible for all changes caused by adverse weather, including tidal fluctuations and Contractor shall take such precautions and procure insurance as Contractor deems prudent.

Engineer may suspend construction operations at any time when, in its sole discretion, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather or tidal conditions may be, in any season.

Contractor shall provide a written tropical storm/hurricane plan consistent with District requirements to Engineer prior to commencement of construction.

#### **10.17 Electrical Energy**

Contractor shall make all necessary applications and arrangements and pay all fees and charges for power and light and other electrical energy as necessary for the proper completion of this Contract during its entire progress. Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.

There shall be sufficient electrical lighting so that all Work may be done in a workmanlike manner when there is not sufficient daylight.

#### **10.18 Bolts, Anchor Bolts and Nuts**

All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by Contractor in accordance herewith.

#### **10.19 Concrete Inserts**

Concrete inserts shall be designed to safely support, in the concrete that is used, the maximum load that can be imposed by the bolts used in the inserts. Inserts shall be of a type which will permit locking of the bolt head or nut. All inserts shall be 316 stainless steel.

#### **10.20 Operating Instructions and Parts Lists**

Operations and Maintenance (O&M) Manuals for each item of equipment shall be submitted in accordance with Section 01300 of the Technical Specifications entitled "Submittals."

#### **10.21 Lubricants**

During testing and prior to acceptance, Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this Contract and as specified in the Contract Documents.

#### **10.22 Special Tools**

For each type of equipment furnished by Contractor, Contractor shall provide a complete set of all special tools (including calibration and test equipment) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment.

Special tools are considered to be those which, because of their limited use, are not normally available, but which are necessary for the particular equipment.

Special tools shall be delivered at the same time as the equipment to which they pertain. Contractor shall properly store and safeguard such special tools to ensure they are in a proper functioning condition, as determined by Engineer. At the completion of the Work the special tools shall be delivered to the District.

#### **10.23 Protection Against Electrolysis**

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other materials approved by Engineer.

#### **10.24 Indemnification and Confidentiality**

For specific consideration received by Contractor, included in the Contract sum beyond the cost of the Work, Contractor shall indemnify and hold harmless the District, its officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of the Contract. The monetary limitation on the extent of the indemnification that bears a reasonable commercial relationship to the

Contract and is part of the Project specifications or Bid Documents, is up to three (3) times the monetary value of the Contract. Notwithstanding the foregoing, the monetary limitation on the extent of the indemnification provided shall not be less than one million dollars (\$1,000,000.00) per occurrence. The District and the insurance carrier shall have the right to “mutually approve” the choice of attorney(s) to provide the defense, with such approval not to be unreasonably withheld. If no agreement on the choice of attorney(s) can be reached in a reasonable length of time, the final authority to choose an attorney will rest with the claims manager in the office where the claim originated.

In any and all claims against the District or any of their officers or employees by an employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone else for whose acts any of them may be liable, the indemnification obligation under this General Conditions Section 10.24 shall not be limited in any way on the amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker’s compensation acts, disability benefits or other employee benefit acts. The intention of these two clauses above is to provide for the legal indemnification allowed for under Section 725.06, Florida Statutes, no more and no less, so as to be completely legal and not void as against public policy. If any provision of this indemnification is determined by a court of law to be void, it shall be severed from this provision and the remainder of this provision shall be given full force and effect under Section 725.06, Florida Statutes.

In the performance of the Work, Contractor may be exposed to the confidential information of the District and other. Contractor shall not disclose to anyone not employed by the District nor use, except on behalf of the District, any such confidential information acquired in the performance of the Work except as authorized by the District in writing and, regardless of the term of this Contract, Contractor shall be bound by this obligation until such time as said confidential information shall become part of the public domain. Information regarding all aspects of the District’s business and information concerning the Work (either directly or indirectly disclosed to it or developed by it in the performance of the Work) shall be presumed to be confidential except to the extent that same shall have been published or otherwise made freely available to the general public without restriction. Contractor also agrees that it will not disclose to the District any information it holds subject to any obligation or confidence to any third persons.

#### **10.25 Work by Others**

The District may perform additional Work related to the Project itself, or the District may engage others to perform Work on the Project which such engagement shall be governed by similar General Conditions. Contractor shall afford the other contractors who are parties to such direct contracts (or the District, if it is performing the additional Work), reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate Contractor’s Work with the Work of others. If any part of Contractor’s Work depends for proper execution or results upon the Work of any such other contractor (or the District), Contractor shall inspect and promptly report to Engineer, in writing, any defects or deficiencies in such Work that render it unsuitable for such proper execution and results. Contractor’s failure so to report shall constitute an acceptance of the other Work as fit and proper for the relationship of its Work except as to defects and deficiencies which may appear in the other Work after the execution of Contractor’s Work.

Contractor shall do all cutting, fitting and patching of its Work that may be required to make its several parts come together properly and fit it to receive or be received by such other Work. Contractor shall not endanger any Work of others by cutting, excavating or otherwise altering their Work and will only cut or alter their Work with the written consent of Engineer and of the other contractors whose Work will be affected.

If the performance of additional Work by other contractors or the District is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to Contractor prior to the state of any such additional Work.

#### **10.26 Record Drawings**

Contractor shall keep and maintain one record copy of all Specifications, Plans and Specifications, Addenda, Change Orders, Modifications and Shop drawings at the site in good order and annotated to show all changes made during the construction process as specified in the Contract Documents. All record drawings shall be kept maintained and updated by Contractor in accordance with Section 01720 of the Technical Specifications entitled "Project Record Drawings."

#### **10.27 Non-Waiver**

Progress or final payments shall not be acceptance of improper, faulty, or defective work or material, and shall not release Contractor of any of its obligations under the Contract Documents, and shall not constitute a waiver of any rights or provisions of the Contract Documents by the District.

#### **10.28 Mutuality of Provisions**

If any provision of the Contract Documents shall for any reason be held to be invalid, illegal, or unenforceable in any respect under the laws of the State of Florida, any such invalidity, illegality or unenforceability shall not affect any other provision of the Contract Documents and the Contract Documents shall be construed as if such invalid, illegal, or unenforceable provision had never been incorporated herein and the rights of the parties hereto shall be construed and enforced accordingly.

#### **10.29 Restoration of Property**

Existing structures and facilities, including but not limited to buildings, utilities, topography, streets, curbs, walks landscape materials and other improvements that are damaged or removed due to the Work, shall be patched, repaired, or replaced by Contractor to the satisfaction of the owner of such structure and facility, and authorities having jurisdiction. In the event that authorities having jurisdiction require that such repairing and patching be done with their own labor and materials, Contractor shall abide by such regulations and pay for such work.

#### **10.30 Notice**

Any notice or writing given hereunder shall be delivered by depositing the notice contained in a sealed envelope, postage prepaid in the United States Postal System as registered or certified mail, with return receipt requested, or by overnight express carrier. Any such notice so deposited shall be conclusively deemed delivered to and received by the addressee forty-eight (48) hours after the deposit if all of the foregoing conditions of notice have been satisfied and addressed as follows:

DISTRICT:

CONTRACTOR:

### **10.31 Legally Binding**

Contractor agrees that the Contract Documents are legally binding documents and has had the opportunity to permit its attorney to review them. The Contract Documents are the joint work product of the Parties hereto and, accordingly, no term or provision shall be more strictly construed against any party.

**(Remainder of this page left blank intentionally)**

**TECHNICAL**

**SPECIFICATIONS**

## SECTION 30

### MISCELLANEOUS REQUIREMENTS

#### 3.01 Lines, Grades and Measurements

Alignment and grade of all pipe, tunnels and borings shall be continuously controlled by use of lasers or other acceptable method. Laser alignment and grade through the pipeline is the preferred method. The District Engineer shall be permitted at any time to check the lines, elevations, reference marks, laser, etc., set by the Contractor or the Design Engineer.

#### 3.02 Work to Conform

The maximum allowed vertical deviation of any single gravity pipe, tunnel or boring from plan grade shall be three percent (3%) of inside diameter. No single gravity pipe shall vary in horizontal alignment right or left, from the pipe centerline by more than five percent (5%) of inside diameter. Force main joint deflections shall be limited by AWWA Standards and manufacturer's recommendation.

#### 3.03 Pipeline location

Pipelines shall not be located closer to an existing or proposed structure than the horizontal distance obtained when drawing a 45-degree angle from the proposed invert of the pipeline to bottom outside face of the footing. In no case shall this distance be less than ten (10) feet. Pipelines shall be located as indicated on the drawings, but the Design Engineer is responsible to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons, which are not material to the interest of the District and which do not otherwise conflict with any other statement or criteria set forth in this manual. The District should be notified of such changes in a timely fashion and such changes shall be recorded on Record Drawings.

#### 3.04 Pipe Adapters

When joining pipes of different types, District approved transition sleeves, adapters, and couplings shall be used.

#### 3.05 Fittings and Stoppers

Branches, stub-outs and fittings shall be laid as indicated in the Standard Details and shown on the approved drawings. Open ends of pipe and branches shall be closed with nonmetallic "wing nut" expansion stoppers secured in place in an acceptable manner. Stoppers shall be designed to remain in place and watertight during infiltration tests.



### 3.06

#### Service Lines

##### a. General

Service lines shall be as shown on the Standard Details. Service lines for a single lot shall be a minimum of 4 inches in diameter; for two lots, a minimum of 6-inches in diameter. Where three or more lots are connected to a single service line, the service line shall be considered a gravity sewer, shall be a minimum of 8-inches in diameter, and shall be in accordance with the criteria covering District maintained gravity sewers. Exceptions to these requirements may be made in specific instances where constructability, environmental impacts or excessive costs require an alternate to these criteria. These exceptions shall be considered non-conforming connections and subject to correction to District Standards if and when criteria used in determining constructability, environmental impacts or excessive costs are no longer valid.

##### b. Easements, Implied Grant of Way of Necessity and Statutory Way of Necessity

If a residential property requires an easement across another residential property to gain access to District sewers the easement shall be conveyed to the District using the District's Standard Easement Agreement. Easements shall only be allowed when no District maintained sanitary sewer is available for connection in public right of way or existing easements adjacent to the property and constructability, environmental impacts or excessive costs render construction of new sewer facilities in public right of way or existing easements adjacent to the property non-viable.

The District recognizes Florida Statutes 704.01, (1) Implied grant of way of necessity, and (2) Statutory way of necessity, may be applicable in providing sanitary sewer service to a property.

In the case of Implied Grant of Way of Necessity there may be instances where a sanitary sewer service existed to a property and that property was then divided into multiple properties each using the existing sanitary sewer service. In these instances the District recognizes the Implied Grant of Way of Necessity for each property's use of the sanitary sewer service under a "grandfather" clause but considers the connection/s non-conforming in that properties may be served by facilities not owned and maintained by the District and/or properties may be served by facilities that may be inadequately sized and/or one property may be served by facilities that cross another property and are not in a District Standard Easement. In these instances, the District shall require the sanitary sewer connections using an Implied Grant of Way of Necessity for sewer service be corrected to current District Standards when renovation or redevelopment of any of the affected properties occurs.

In the case of Statutory Way of Necessity there may be instances where a property is shut off or hemmed in from access to sanitary sewer service by lands, fencing or other improvements. In these instances the District, with agreement from the shut off or hemmed in property, may act on behalf of the shut off or hemmed in property and use and maintain an easement over, under, through and upon the lands which lie between the said shut-off or hemmed-in lands and public right of way or existing easements to supply sanitary sewer service to the shut-off or hemmed-in land granted the shut-off or hemmed-in land is using the lands that lie between for personal ingress and egress. The District considers sanitary sewer connections using Statutory Way of Necessity to be non-conforming in that properties are served by facilities that cross another property and are not in a District Standard Easement. In these instances the District shall require the sanitary sewer connections using a Statutory Way of Necessity for sewer service be corrected to current District Standards when renovation or redevelopment of the property over which a Statutory Way of Necessity is used occurs, or when a public right of way or utility easement becomes accessible to the shut-off or hemmed in property.

c. **Maintenance Responsibility**

The service line (lateral) cleanout will usually delineate the point of responsibility between the District and the property owner; however, the following variations do exist:

1. Multi-family Units - Public right-of-way - Owner's responsibility to the right-of-way line.
2. Multi-family Units - Non-Public right-of-way - Owner's responsibility to the main line connection.
3. Commercial Buildings - Owner's responsibility to the main line.
4. Condominium with Common Areas - Non-Public right-of-way Owner's responsibility to the main line connection.
5. Condominium with Common Areas Adjacent to Public right-of-way - District assumes responsibility within the public right-of-way.

3.07 **Service Line Markers**

A service line marker shall be installed 12-inches {minimum} above the service wye adjacent to the cleanout of each service line. The service line markers shall be Electronic System, Sanitary Marker 1258, as manufactured by 3M.

3.08 **Bolts, Anchor Bolts, and Nuts**

Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal. All anchor bolts, nuts, washers, plates, and bolt sleeves shall be galvanized unless otherwise indicated or specified.

Expansion bolts shall have malleable iron and lead composition elements or the required number of units and sizes.

Bolts, anchor bolts, nuts and washers specified to be stainless steel shall be type 316 stainless steel.

Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of approved design. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done, and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

### 3.09            Concrete Inserts

Concrete inserts shall be designed to safely support the maximum load that can be imposed by the bolts used in the inserts. Inserts shall be of a type which will permit locking of the bolt head or nut. All inserts shall be galvanized.

### 3.10            Protection against Electrolysis

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact with any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other approved materials.

**END OF SECTION 30**

## **SECTION 100**

### **EXCAVATION, PIPE EMBEDMENT, FILL AND GRADING**

#### **100.01      Description**

All excavations shall be made in such manner and to such widths as will provide suitable room for building the structures or laying and jointing the piping. All sheeting, bracing, supports, coffer dams, pumping and draining shall be performed to render the bottom of the excavations firm, dry and acceptable in all respects.

#### **100.02      Sheeting and Bracing**

Sheeting and bracing shall be furnished as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures.

All timber sheeting and bracing shall be left in place unless otherwise directed by the Design Engineer to remove same or cut off at a specified elevation.

All sheeting and bracing, including trench boxes not to be left in place, shall be carefully removed in such manner as not to endanger the construction or other structures. All voids left or caused by the withdrawal of sheeting shall be backfilled immediately with approved material and compacted by ramming with tools especially adapted to that purpose, by watering, or by other means as may be directed by the Design Engineer.

#### **100.03      Drainage**

##### **100.03.01      General**

To ensure proper conditions at all times during construction, all means shall be used to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations. Such excavations shall be kept dry until the structures, pipes and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.

All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of the work. All requirements of all regulatory agencies regarding dewatering and the discharge of water from the project shall be complied with.

All labor, materials, tools, and equipment shall be provided, as necessary, to properly control the quality of the discharge from the dewatering operations as described herein. All applicable laws, rules and regulations governing the discharge of water from dewatering operations shall be

complied with. All dewatering shall be accomplished by the use of sanded well points and other techniques deemed necessary by the Contractor to properly dewater the trench excavations.

The water discharged from the Contractor's dewatering operation shall not exceed the turbidity limits promulgated by the State of Florida Department of Environmental Protection discharge standards for the Loxahatchee River or its tributaries.

Unless otherwise directed by the Design Engineer, an approved siltation tank shall be installed ahead of dewatering discharge points. In addition, silt screens and other devices and techniques may be required to maintain the discharge quality at turbidity levels below the required limits.

Any and all methods approved by the Design Engineer to control the bacteriological quality of well point discharge into existing drainage ditches and/or canals shall be utilized. Levels for fecal coliform in a discharge which ultimately leads to the Loxahatchee River, shall not exceed those promulgated by the State of Florida Department of Environmental Protection discharge standards.

#### 100.03.02     Drainage Well-point System

If it is necessary to drain the soil and prevent saturated soil from flowing into the excavation, an efficient drain well-point system will be utilized. The well points shall be designed especially for this service. The pumping unit shall be designed for use with the well-points and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

#### 100.04         Trench Excavation

Where pipe is to be laid in rock bedding or concrete cradle, the trench may be excavated by machinery to, or to just below, the designated subgrade, provided that the material remaining at the bottom of the trench is not disturbed.

If the trench is excavated below the designated subgrade, the undercut shall be backfilled with compacted bedding rock, uniformly graded from 1/4-inch size.

#### 100.05         Depth of Trench

Trenches shall be excavated to such points as will permit the pipe to be laid at the elevations, slopes, or depths of cover indicated and at uniform slopes between indicated elevations.

#### 100.06         Width of Trench

Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.

Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one (1) foot above the top of the pipe.

100.07        Trench Excavation in Fill

If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to go to a height of at least three (3) feet above the top of the pipe, whichever is the lesser, Particular care shall be taken to ensure maximum consolidation of material under the pipe location, The pipe trench shall be excavated as though in undisturbed material.

100.08        Unauthorized Excavation

If bottom of any excavation is taken out or disturbed beyond the limits indicated or prescribed, the resulting void shall be backfilled with embedment material compacted to a minimum of 90% of AASHTO T-180 or to the standards of the applicable agency having jurisdiction.

100.09        Elimination of Unsuitable Material

Pipe bedding shall extend a minimum of 4 inches below the pipe. The pipe shall be supported on suitable material ascertained by the Design Engineer following good engineering practices.

100.10        Backfilling

As soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started and thereafter it shall proceed until its completion.

100.10.1      Backfill Materials

The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. The materials and the methods shall both be subject to the approval and direction of the Design Engineer. No stone or rock fragment larger than 3 inches in greatest dimension shall be placed in the backfill nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. If necessary, a timber grillage shall be used to break the fall of material dropped from a height of more than 5 feet. Pieces of bituminous pavement shall be excluded from the backfill unless their use is expressly permitted, in which case they shall be broken up as directed.

100.10.2      Embedment Materials

Three broad classes of material shall be used for bedding, haunching, and pipe side support.

CLASS 1 - Angular, ¼-inch to ¾-inch graded stone,  
of which 100% passes a 1-inch sieve such as coral,  
slag, cinders, crushed stone, crushed shells, or

bedding rock.

CLASS 2 - Coarse sands and gravels with maximum particle size 3/4 inch including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW. and SP are included in this class.

CLASS 3 - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class. Included in Class 3 are existing soil types classified as select backfill.

Class 1, Class 2, or Class 3 material shall be used for bedding material to the top of the pipe. Special care must be taken to insure Class 1, 2, or 3 material is worked under the pipe haunch. Class 2 or 3 material shall be compacted to a minimum of 98% density per AASHTO T -180. The District has the option, at any time, to take density tests to confirm the 98% compaction. Precautions shall be taken to prevent movement of the pipe when placing and compacting material under the pipe haunches.

If Class 2 or 3 material is used for bedding and haunching, a dry trench shall be maintained.

Under certain conditions, the Engineer may be faced with an unusual amount of water running in the trench which he may find necessary to remove in order to properly install and compact the embedment material. The Engineer may elect to remove the water with trench side pumps through the use of Class 1 material for bedding. The depth of Class 1 material will depend upon the amount of water but take care to ensure that the trench wall soil material is such that it will not be removed from the area adjacent to the bedding as a result of the running water. The Engineer may also elect to utilize well points or under drain to control excessive ground water. If Class 1 material is used as bedding and under drain, it must be utilized at least up to the top of the pipe.

#### 100.10.3 Zone Around Pipe

The zone around the pipe shall be backfilled with the materials and to the densities and limits indicated on the details.

#### 100.10.4 Compaction

Compaction shall be accomplished by tamping, or under appropriate construction techniques to achieve the required densities.

#### 100.10.5 Maximum Density

Unless specified otherwise, the percent of maximum density referred to in these specifications refers to the maximum density obtained when the material is laboratory tested in accordance with the procedures outlined in Designation AASHTO T-180, Latest Revision or as otherwise required by the governmental agency having jurisdiction over the finished roadway. Field densities shall be determined by a testing laboratory using accepted methods.

100.10.6      Miscellaneous Requirements

Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine materials. Only approved quantities of stones and rock fragments shall be used in the backfill.

All voids left by the removal of sheeting shall be completely backfilled with suitable material, thoroughly compacted.

**END OF SECTION 100**



## **SECTION 110**

### **PIPE, FITTINGS AND ACCESSORIES**

#### **110.01      General**

This section provides standards for all pipe and fittings used in the construction of District wastewater facilities. Approved piping systems include SCH40 and SCH 80 PVC, High Density Polyethylene (HDPE), SDR26 PVC, C900 PVC, C905 PVC and Ductile Iron.

#### **110.02      Schedule 40 and 80 PVC Pipe (1/2" – 3")**

Small diameter PVC (3" diameter or less) pipe and fittings shall be pressure rated ASTM D1784/D1785 schedule 40 for buried applications and schedule 80 for non-buried applications. Small diameter PVC pipe shall be marked with schedule, diameter, pressure rating at 140 F and applicable ASTM standards for dimensions and materials and be white or gray in color.

Small diameter PVC joints shall be solvent weld socket type.

#### **110.03      AWWA C901 High Density Polyethylene (1/2" – 3")**

Small diameter HDPE (3" diameter or less) pipe shall manufactured from PE4710 resin and comply with AWWA C901 and ASTM F714. Small diameter HDPE pipe shall be iron pipe size (IPS) with a standard dimension ratio (SDR) 11. Small diameter HDPE pipe shall be marked with diameter, SDR, AWWA C901, ASTM F714 and PE4710 and shall be black in color with extruded stripes in applicable color; sewer = green, IQ = purple.

Small diameter HDPE pipe shall come in reels sufficient for continuous lay lengths from service latera to service lateral.

Small diameter HDPE pipe shall use brass pack joint style couplings and stainless steel pipe stiffeners.

#### **110.04      AWWA C906 High Density Polyethylene (4" – 63")**

Large diameter HDPE (4" – 63") pipe shall manufactured from PE4710 resin and comply with AWWA C906, ASTM F714 and be listed with the Plastic Pipe Institute's (PPI) TR4. Large diameter pipe shall be ductile iron pipe size (DIPS) with a standard dimension ratio (SDR) 11. Large diameter HDPE pipe shall be marked with diameter, SDR, AWWA C906, ASTM F714 and PE4710 and be black in color with extruded stripes in applicable color; sewer = green, IQ = purple, potable = blue.

Single joints of pipe shall be a minimum of 40 feet in length. Damaged pipe may have the damaged area cut out and the remaining portion reused as long as the remaining portion is a minimum of 20 feet in length.

Large diameter HDPE pipe shall utilize HDPE butt fused fittings of the same SDR.

110.05        SDR 26 PVC Gravity Mains

Gravity main installations whose invert is greater than 4'-0" and less than 14'-0" shall be integral bell and spigot gasketed pipe and comply with ASTM D3034 for SDR 26 up to 15" in diameter. SDR 26 gravity main pipe shall meet the following ASTM Standards: D3212 (Joint), F477 (Gasket), D1784 (PVC Compound), D2412 (Stiffness) and D2321 (installation). SDR 26 gravity main pipe shall be green in color and marked with diameter, SDR and applicable ASTM standards.

Joints of SDR 26 gravity main pipe shall be either 14'-0" or 20'-0" in length

110.06        AWWA C900 Force Mains

Force main installations 4" – 48" shall be integral bell and spigot gasketed pipe and comply with AWWA C900 DR18, Pressure Class 235. C900 Force main pipe shall comply with ASTM Standards D1784 (PVC Compound), D3139 (Joint), and F477 (Gasket). C900 force main pipe shall be marked with diameter, DR and AWWA C900. C900 force main pipe shall be green for sewer and purple for IQ.

Joints of C900 force main pipe shall be either 14'-0" or 20'-0" in length.

C900 force main pipe shall use ductile iron fittings with restrained mechanical joints

110.07        Ductile Iron Pipe

All ductile iron pipe shall be manufactured in accordance with ANSI/AWWA C151/A21.51. Ductile iron pipe shall be pressure class 350 up to 20" and pressure class 250 for larger diameters. Ductile iron pipe shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

Joints shall be conform to ANSI/AWWA C111/A21.11. Restrained push on joints shall use Field Lok 350 Gaskets by US Pipe and Foundry Co., or approved equal.

Ductile Iron Pipe shall be minimum Pressure Class 350 up to 20-inches in diameter and Pressure Class 250 for larger diameters.

Where ductile iron pipe is used, fittings shall be ductile iron and conform to the requirements of ANSI/AWWA C153/A21.53 and shall be of a pressure classification at least equal to that of the pipe with which they are used. Fittings may be flanged or mechanical as applicable.

110.08        SDR 26 PVC Fittings

PVC Gravity main fittings shall conform to the requirements of ASTM D2241 SDR26. Gaskets shall conform to ASTM F477. Fittings in sizes not available in injection molded form shall be fabricated from SDR26 pipe in accordance with ASTM D2241.

#### 110.09        Schedule 40 and 80 PVC Fittings

Fittings used in small diameter PVC piping systems shall match the schedule of the piping system, either Schedule 40 or 80. Fittings shall be socket weld and conform ASTM D1785 for physical dimensions and ASTM D1784 for materials.

#### 110.010       HDPE Butt Fused Fittings

Molded butt fusion fittings and adapters shall conform to ASTM D 3261, utilize HDPE conforming to the pipe to which it will be fused and have the same dimension ratio as the pipe to which it will be fused. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe.

#### 110.011       Large Diameter HDPE to PVC/DI Adapters

Transition from HDPE to other piping systems shall require MJ or flanged HDPE adapters. Instances where these adapters are not practical will require pipe stiffeners in conjunction with ductile iron fittings. The pipe stiffeners shall be stainless steel as manufactured by JCM Industries or pre-approved equal. Pipe stiffeners in conjunction with ductile iron fittings shall only be used with the written approval of the District Engineer for HDPE pipe 12" diameter and smaller. When approved, MEGALUG Series 2000PV mechanical joint restraints or approved equal shall be used.

#### 110.012       Small Diameter HDPE Fittings and Adapters

Small diameter HDPE pipe (1/2" – 3") HDPE to HDPE and HDPE to PVC connections shall use pack joint style fittings as manufactured by Ford Meter Box Co. Stainless steel pipe stiffeners shall also be required.

#### 110.013       Ductile Iron Fittings

Ductile iron fittings shall conform to ANSI/AWWA C153/A21.53 (compact fittings) with a minimum pressure rating of 350 psi. Fittings shall be mechanical joint or flanged as required.

Flanged fittings shall comply with ANSI B16.5, Class 150.

All mechanical joints shall be restrained. Restrained mechanical joints shall use 1100 Series Megalug by EBAA Iron Sales, Inc. or approved equal.

Ductile iron fittings shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

#### 110.014      Ductile Iron Pipe and Fittings Linings and Coatings

Ductile iron pipe fittings shall be epoxy coated on the interior with Protecto 401, Permite 9043 Type II or Linerguard. Coatings shall conform to ANSI/AWWA C104/A21.4

Buried ductile iron pipe and fittings shall receive an external bituminous coating in accordance with ANSI 21.10. and be striped with green for sewer and purple for IQ water.

Above grade ductile iron pipe and fittings shall receive a three coat system; Prime Coat: TNEMEC-Aluminum Mastic #135 (3 to 5 mils DFT), Intermediate Coat Series 66 Epoxoline Hi-Build Epoxy (4 to 6 mils DFT) and Finish Coat Series 73 Endura-Shield III Urethane (2 to 3 mils DFT). Coatings shall be green for sewer and purple for reclaimed water.

#### 110.015      Marking Tape

All buried piping shall include marking tape. Marking tape shall be minimum 2" wide, magnetic and detectable. Marking tape shall be green and marked "SEWER".

#### 110.016      Buried Markers

Buried markers shall be installed at all fittings, valves, service connections, change of direction and every 300' of pipe lay length. Buried markers are not required on gravity main piping but are required on service lateral piping and cleanouts. Buried markers shall be EMS Mini-Markers for Wastewater Model 1258 as by 3M.

#### 110.017      Tracer Wire

When specifically required pressure rated piping shall be installed with tracer wire. Tracer wire shall be attached to the pipe using a half-hitch every 10' for direct bury applications and shall be pulled with the pipe (without attaching) in directional drill installations. Tracer wire in directional drill applications shall be minimum 10 gauge, Copperhead Soloshot EHS or approved equal. Tracer wire in direct bury applications shall be minimum 14 gauge, PVC coated, solid copper wire.

#### 110.018      Handling and Cutting Pipe

The pipe manufacturer's recommendation for handling, storing, unloading and cutting pipe shall be followed. Individual pipes shall not be allowed to drop from the truck when unloading. Pipe units shall not be handled with chains or single cables. Pipe shall not be stored more than two units high. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe or scratching or marring machined or finished surfaces.

Any fitting showing a crack shall be marked as rejected and removed at once from the work.

In any pipe showing a distinct crack and in which it is believed there is not incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved by the Design Engineer, may be cut off before the pipe is laid so that the pipe used is perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.

Except as otherwise approved, all cutting shall be done with knives or saws adapted to the purpose. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends to be used with push on joints shall be carefully chamfered and the reference mark located in accordance with the manufacturer's recommendation to prevent cutting the gasket when the pipe is laid or installed.

#### 110.019      Installing Pipe and Fittings

No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.

Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or required. Care shall be taken to ensure a good alignment both horizontally and vertically.

Each length of pipe shall have a firm bearing along its entire length. Embedment requirements are shown on the Standard Details and in this specification.

The bell of the pipe shall be cleaned of dirt or other obstruction and wiped out before the cleaned and prepared spigot of the next pipe is inserted into it. Only lubricants made by the pipe manufacturer may be used on the spigot. The new pipe shall be shoved firmly into place until properly seated and held securely until the joint has been completed.

#### 110.020      Temporary Plugs

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

#### 110.021      Preparation of Trench Bottom

The trench bottom shall be constructed to provide a firm, stable and uniform support for the full length of the pipe. Unsuitable foundation material shall be removed as required by the Engineer and refilled with Class 1, 2, or 3 material. Class 2 or 3 material shall be compacted to a minimum of 90% standard proctor density.

#### 110.022      Manhole Connections

Where PVC gravity or force main pipe enters the manhole, approved sealing adapters as manufactured by Harco, Fernco or equal, shall be used. Any coupling used shall be coated with an epoxy coated sand finish approved by the District.

110.023      Bell Holes for Elastomeric Seal Joints

When the pipe being installed is provided with elastomeric seal joints, bell holes shall be excavated in the bedding material to allow for unobstructed assembly of the joint. Care should be taken that the bell hole is not larger than necessary to accomplish proper joint assembly. When the joint has been made, the bell hole should be carefully filled with bedding or haunching material to provide for adequate support of the pipe throughout the entire length.

## SECTION 120

### CAST IN PLACE CONCRETE

#### 120.01 Materials

##### 120.01.1 Concrete

Ready-mixed concrete shall be used. It shall comply with the Standard Specifications for Ready-Mixed Concrete, ASTM Designation C94 for the strengths specified herein. Alternate No.2, under Paragraph 4 - Quality of Concrete ASTM C94 shall govern for the design of the concrete mixture.

##### 120.01.2 Cement

Type I cement shall be used in concrete for general purposes. Type II cement shall be used for sewer manholes, wet wells, and all other applications where the concrete may be exposed to a wastewater atmosphere.

#### 120.02 Concrete

##### 120.02.1 Mix

Concrete shall be composed of Portland cement, coarse aggregate, fine aggregate and water. The concrete mix shall be designed to produce the quality specified, proportioned and mixed in accordance with the requirements set forth herein and shall in all cases meet the following requirements:

<u>Class</u>	<u>Location</u>	28 Day Compressive <u>Strength</u>
A.	Specifically Required on Plans	4,000 psi
B.	General Structural Concrete	3,000 psi
C.	Non-structural Applications	2,500 psi

##### 120.02.2 Slump

The concrete, when placed, shall show slumps within the following limits when tested in accordance with the Method of Test for Slump of Portland Cement Concrete, ASTM Standard Specification C-143.

Min.	Max.
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<u>Type of Concrete</u>	<u>Slump</u>	<u>Slump</u>
Mass Concrete	1 Inch	3 Inches
Reinforced Concrete:		
Thin vertical sections and thin columns, 7 inches or less in thickness	3 Inches	6 Inches
Heavy vertical sections more than 7 inches in thickness	3 Inches	5 Inches
Structural Slabs	1 Inch	4 Inches

#### 120.02.3 Air Entraining

Air entrained concrete shall conform with the following requirements:

	<u>Maximum Aggregate Size(Inches):</u>				
	<u>3/8:</u>	<u>1-2:</u>	<u>3/4:</u>	<u>1:</u>	<u>1-1/2:</u>
Average total air content, percent (Plus or minus 1%):	5	5	4	4	3

#### 120.03 Placing Concrete

Concrete shall be placed within 1 hour of the load ticket time stamp and before the initial set has occurred.

The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures in such a manner to prevent segregation of the coarse aggregate.

All concrete shall be placed with an aid of mechanical vibrating equipment supplemented by hand forking or spading. Vibration shall be transmitted directly to the concrete and not through the forms. The duration of vibration at any location in the forms shall be held to a minimum necessary to produce thorough compaction. The concrete shall be placed by suitable equipment as nearly as possible to its final location and without any segregation of the aggregate. Any free vertical drop shall not exceed 4-1/2 feet.

Expansion joints shall be placed as indicated on the plans. Joint material shall be installed as indicated and as approved by the Design Engineer. Construction joints shall be made only at locations indicated on the plans or approved by the Design Engineer, and in such manner as not to impair the strength, water-tightness or appearance of the structure.



#### 120.04      Finishing

All top surfaces which are not covered by forms and which are not to be covered by additional concrete or backfill, shall be carried slightly above grade and struck off by board finish. All edges shall be provided with a 3/4 inch chamfer. All exposed surfaces which show board marks, joint marks or other irregularities after the forms are removed shall, at the discretion of the Design Engineer, be rubbed with carborundum brick, filled or otherwise dressed to produce a smooth true surface.

No special concrete or cement mortar topping course shall be used for slab finish unless shown on the drawings. The slab shall be brought to a true and even finish by power or hand floating. Unless otherwise specified, the surface shall be steel troweled to a smooth finish. Troweling shall be the minimum to obtain a smooth, dense surface and shall not be done until the mortar has hardened sufficiently to prevent excess fine material from being worked to the surface.

#### 120.05      Curing

All concrete shall be kept wet by covering with water and approved water saturated covering, or other approved method which will keep all surfaces continuously wet for a period of seven (7) days, unless otherwise specified by the Design Engineer. All concrete shall be adequately protected from injurious action by the sun. Fresh concrete shall be protected from heavy rains, flowing water and mechanical injury. All concrete shall be kept damp for at least seven (7) days by covering with an approved saturated covering, by a system of perforated pipes or mechanical sprinklers, or by any other approved method which will keep all surfaces continuously damp.

Where wood forms are left in place during curing, they shall be kept wet at all times to prevent opening at the joints and drying out of the concrete. Water for curing shall be clean and entirely free from any elements which might cause staining or discoloration of the concrete.

#### 120.06      Forms

Forms shall be of wood, metal, or other approved material shall be built true to line and grade, mortar tight, adequately braced and supported, and sufficiently rigid to prevent displacement or sagging.

Forms, except those lined with absorptive form lining, shall be coated with a non-staining mineral oil applied shortly before placing the concrete. In lieu of oiling, forms for unexposed surfaces may be thoroughly wetted immediately before placing the concrete.

Forms ties shall be of a design such that when forms are removed no metal shall be within 1 inch of the finished surface. Holes remaining from withdrawn tie rods or bolts shall be filled solid with cement mortar.

Under normal conditions, the minimum waiting period after placing concrete for stripping forms shall be as follows:

<u>Where Used</u>	<u>Time</u>
1. Bottom forms of girders and beams, floor slabs, and other concrete.	5 Days
2. Walls, piers, columns, sides of beams, and other vertical surfaces.	24-48 hours

The use of this schedule shall not operate to relieve the Contractor or the Design Engineer of responsibility for the safety of the structure.

#### 120.07 Embedded Items

In addition to steel reinforcement, pipes, and other metal objects, as shown on the plans or ordered to be built into, or set in, or attached to the concrete, all necessary precautions shall be taken to prevent these objects being displaced, broken, or deformed. Before concrete is placed, care shall be taken to determine that any embedded or wood parts are firmly and securely fastened in place as indicated. They shall be thoroughly cleaned and free of paint or other coating, rust, scale, oil, or any foreign matter. The concrete shall be packed tightly around the pipes and other metal work to prevent leakage and to secure perfect adhesion. Drains shall be adequately protected from intrusion of concrete.

Concrete placing operations shall not begin until the reinforcing steel, utilities, anchor bolts, etc., to be embedded in concrete have been inspected and approved by the Design Engineer.

#### 120.08 Reinforcing Steel

Reinforcing bars and mesh shall be sizes and shapes as indicated on the drawings. Bars shall be deformed bars of intermediate grade, new billet steel conforming with ASTM Designation A-615, Grade 60. Wire mesh shall conform with ASTM Designation A-I85.

#### 120.09 Water Stops

Water stops shall be molded PVC, hollow center bulb, multiple ribbed as manufactured by W.R. Meadows, Inc., Electrovert, Inc. or Serviced Products Corporation, or approved equal.

120.10        Testing Services

Testing shall be performed by an independent commercial testing laboratory approved by the District. The Design Engineer shall furnish the District with copies of compression and slump test reports for every thirty (30) cubic yards or portion thereof of concrete placed. It shall be the responsibility of the Design Engineer to produce concrete of the strength, durability, workability and finish specified, furnish representative material for specimens in quantities required by the testing laboratory, and cooperate and assist in taking samples of materials for testing. The District reserves the right to take and test additional concrete samples.

**END OF SECTION 120**

## **SECTION 121**

### **PRECAST MANHOLES AND STRUCTURES**

#### **121.01      General**

Manholes and structures shall conform in shape, size, dimensions, materials and other respects to the Standard Details or as directed by the District's Engineer.

All manholes and structures shall be precast concrete with monolithic base sections. Invert channels may be formed in the concrete of the base or may be formed of brick and mortar upon the base.

All manholes which will receive direct force main discharges, or are at least 14-feet deep (rim to lowest invert) and the last collection manhole just upstream of any lift station shall receive a minimum 0.5-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

The inverts shall conform accurately to the size of the adjoining pipes. Sides inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining sewers.

Connections to existing structures shall be made only by mechanically coring a hole through the structure. Jackhammer and other methods of cutting a hole through an existing structure are not acceptable.

Rubber "boots" subject to District approval, will be allowed for making pipe connections to structures provided that a layer of non-shrink grout be applied to seal the annular space on the inside of the manhole for the full wall thickness. The boots shall be cast in the precast structure and shall utilize stainless steel bands and screws.

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#### **121.02      Precast Concrete Sections**

Precast concrete sections shall conform to the ASTM Specifications for Precast Reinforced Concrete Manhole Risers and Tops, Designation C-478 or ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures with the following exceptions and additional requirements:

Type II cement shall be used in structures directly exposed to wastewater (i.e. manholes and wetwells.

Sections shall be steam cured and shall not be shipped until at least five (5) days after having been

cast.

Acceptance of the sections will be on the basis of material tests, finished quality, and inspection of the completed product.

Cones shall be 30" - concentric type

Joint material in riser sections shall be of the bitumastic type as manufactured by RAM-NEK or equal.

No more than two (2) lift holes may be cast or drilled in each section.

#### 121.03      Shallow Manhole

When the depth from the deepest invert to the top of the cone section is 4'-0" or less, an approved shallow cone section with a 30" opening shall be used. In no case shall a flat slab top section be used.

#### 121.04      Setting Precast Sections

Precast reinforced concrete sections shall be set so as to be vertical with sections in true alignment.

All holes in sections, used for their handling, shall be thoroughly plugged with mortar. The mortar shall be one part cement and 1-1/2 parts sand; mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

Anti-hydro grout shall be used to fill all voids around sanitary sewer pipe and manhole sections.

#### 121.05      Mortar for Brick and Concrete Block Work

The mortar shall be composed of Portland cement, hydrated lime, and sand, in which the volume of sand shall not exceed three (3) times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense, hard burned brick to 1:3/4 for softer brick. In general, mortar for Grade SA brick shall be mixed in the proportions of 1:1/2:4-1/2.

Cement shall be Type II Portland cement as specified for under Concrete Masonry.

Hydrated lime shall be Type "S" conforming to the ASTM Standard Specification for Hydrated Lime for Masonry Purposes, Designation C207 - Latest Revision.

The sand shall be well graded clean, durable particles all of which shall pass a No. 8 sieve.

#### 121.06        Laying Brick

Only clean, red, fire cured brick shall be used. The brick or block shall be moistened by suitable means, as directed, until they are neither so dry as to absorb water from the mortar, nor so wet as to be slippery when laid.

Each brick or block shall be laid in a full bed and joint of mortar without repairing subsequent grouting, flushing, or filling, and shall be thoroughly bonded as directed.

Brick shall only be used in chimney construction for final adjustment of frame and covers to required grade. Brick chimneys shall not exceed 18 inches in height for manholes 4-6 feet deep and 24 inches for manholes greater than 6 feet deep.

#### 121.07        Plastering and Curing Brick

Outside faces of brick shall be plastered with mortar from 1/4 inch to 3/8 inch thick. If required, the brick shall be properly moistened prior to application of the mortar. The plaster shall be carefully spread and troweled so that all cracks are thoroughly worked out. After hardening, the plaster shall be carefully checked by being tapped for bond and soundness. Unbonded or unsound plaster shall be removed and replaced.

Brick and plaster shall be protected from too rapid drying by the use of burlaps kept moist, or by other approved means and shall be protected from the weather, all as required.

#### 121.08        Frames and Covers

The castings for the frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sandholes and defects of every nature which render them unfit for the service for which they are intended.

All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

Casting shall be at least Class 30 conforming to the ASTM Standard Specification for Gray Iron Castings, Designation A48- Latest Revision, and conform to the standard details.

The contact surface of the frame and cover seat shall be a machine fit and the cover surface shall be "knobbed".

Frame and covers shall be US Foundry Model 230 AB-M

#### 121.09        Setting Frames and Covers

Frames shall be set with the tops conforming accurately to the grade of the pavement or finished

roadway surface, in unsurfaced areas the frames and covers shall be set 3 inches higher than the surrounding ground. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.

Cover shall be left in place in the frames on completion of other work at the manholes.

#### 121.10        Adjustment of Existing Manhole Frames

When it is necessary to raise existing manhole frames due to repaving of roads or other reasons, the frames shall be shimmed with masonry, brick and Type II cement mortar to the new finished grade, or in the case of sodded areas, 2" above finished grade. In cases where raising the existing frame and cover result in chimneys greater than 12" in height the District may require the conical section be raised installation of additional barrel section below the conical section.

When new paving operations cause the manhole frame to be adjusted upwards, manholes will be raised using conventional shimming methods under the frame. The use of adapter rings in the existing frame will not be permitted unless specifically authorized by the District.

**END OF SECTION 121**

## **SECTION 130**

### **VALVES AND APPURTENANCES**

#### **130.01      General**

All buried valves and appurtenances including exposed nuts, bolts, and retainer glands shall be given an exterior approved bitumastic or epoxy coating. All valves shall open counterclockwise. All valves shall have extension stems pinned to the operating nut with a stainless steel pin extension. Stems will not be required where the valve operation nut is less than 30" from finished grade.

Contractors must supply LRD with shop drawings clearly indicating that the criterion for each type of valve or appurtenance listed in this section is satisfied.

#### **130.02      Plug Valves**

All mechanical joint and flanged plug valves shall be of the nonlubricated eccentric type. Valves shall be rated for not less than 125 psi pressure differential acting in either direction (bi-directional). At this differential, the valve shall provide drip tight shutoff. All components shall be of corrosion resistant construction. Valve flanges shall be ANSI B16.1, class 125 pound with a full round or other acceptable type port to assure minimum turbulence and minimum pressure drop. Valve bodies shall be of ductile iron and seats shall be of nickel-alloy. Valves are to have a balance plug, coated with a resilient material solidly bonded to a cast iron or semi-steel core, as required, to assure low torque and bubble-tight shutoff. The valve plug shall touch on the seat when in the closed position.

Plug valve port areas shall be at least 100% through 24 inches in diameter. For plug valves 30" and larger, a port area of at least 75% is required.

Buried plug valves shall be installed vertically with non-rising stems and shall open by turning a two inch square operating nut counterclockwise. An arrow shall be cast into the nut skirt to indicate the open direction.

Plug valves shall be as manufactured by DeZurik Corporation, Milliken, Keystone Valve Manufacturing Company (Ballcentric Type), or approved equal.

#### **130.03      Resilient Seat Gate Valves**

Gate valves shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or C515, Latest Revision, and in accordance with the following specifications. Valves shall have an unobstructed waterway canal equal to or greater than the full nominal diameter of the valve.



The valves are to be non-rising stem with the stem made of cast, forged, or rolled bronze as shown in AWWA C509. Two stem seals shall be provided and shall be of the O-ring type, one above and one below the thrust collar. A 2-inch square operating nut shall be provided for operating the valve. The stem nut, also made of bronze, may be independent of the gate or cast integrally with the gate. If the stem nut is cast integrally, the threads shall be straight and true with the axis of the stem to avoid binding during the opening or closing cycle.

The valve body, bonnet, and bonnet cover shall be ductile iron. All ferrous surfaces inside the valve body shall have a fusion bonded epoxy coating applied at the valve manufacturer's facilities. The coating shall meet or exceed all requirements of AWWA C550. All bolts, nuts and washers shall be stainless steel to limit exterior corrosion and maintain fastener strength.

The sealing mechanism shall consist of a cast iron or ductile iron gate having a vulcanized Buna-N or SBR synthetic rubber coating or a Buna-N rubber seat mechanically retained on the gate. The resilient sealing mechanism shall provide zero leakage at 250-psi working pressure. All valves shall have pressure tests performed to the requirements of AWWA C509 or C515 specifications, as applicable, prior to shipment from the manufacturer. Valve shall seat and be drip-tight at the working pressure when installed with the line flow in either direction.

All valves are to be tested in strict accordance with AWWA C509. Resilient seat gate valves shall be as manufactured by Mueller, Metro-Series, American Darling or approved equal.

Valves shall be covered by a Manufacturer's 10 year limited warranty from date of purchase by end user and delivered within 30 days from receipt of purchase order. The supplier will also provide laminated maintenance manuals.

#### 130.04      Swing Check Valves

Swing check valves for sewage, sludge, and general service shall be in accordance with AWWA C 508, unless otherwise specified below, full-opening; designed for a working pressure of 150 psi unless otherwise shown, and shall have a flanged cover piece to provide access to the disc. Corrosive ferrous surface of valves, 4-inch and larger, which will be in contact with water, shall receive a fusion-bonded epoxy coating conforming to AWWA C550. The valve body and cover shall be of cast iron to ASTM A126, with flanged ends to ANSI B16.1, or mechanical joint ends, as shown.

The valve disc shall be of cast iron, ductile iron, or bronze to ASTM B 62. The valve seat and rings shall be of bronze to ASTM B 92 or B 148, or stainless steel. The hinge pin shall be of bronze or stainless steel.

Suppliers or Equal:

American-Darling Valve Co.

APCO (Valve and Primer Corp.)

Crane Company

Mueller Co.

The valves shall have a lever and counterweight and shall be suitable for horizontal or vertical mounting.

130.05      Air Release, Air Vacuum Valves, and Combination Type Valves

The air release and air vacuum valves shall be of the type especially designed for forced sewer systems. The valve shall be of the short body type and capable of releasing air, gas, or vapor under pressure during system operation or allow air to enter the system when the system is draining, as applicable. The valve shall be as shown on the Standard Details with a two inch inlet. The venting orifice shall be sized by the Design Engineer based on a working pressure of 75 psi.

It shall be the responsibility of the design engineer to determine which valve is necessary for the pipeline conditions encountered.

Air release and air vacuum valves shall be ARI D-025 (See Standard Details).

130.06      Ball Valves

Ball valves shall be limited to ¾" through 2-1/2" in size and shall have cast brass, bronze or stainless steel body, bronze tee head, stem with check, full round way opening and provision for locking in a closed position.

Ball valves can be used for force main and low pressure sewer applications up to 2-1/2" in diameter. The primary use in force main applications is for ARV isolation valve use (See Standard Details).

Valves shall be designed to be fully opened with a 90-degree turn of the operating handle and shall be full port design with bi-directional sealing rated for a minimum 150 psi working pressure.

Brass ball valves in the low pressure system valve shall be as manufactured by Ford, with NPT or pack joint ends as needed.

Where these valves are direct buried, a 2" square gate valve operating nut shall be included with a valve box.

130.07      Brass Check Valves

Brass check valves shall be Proflo PFX31 size 1-1/2" to 2".

130.08      Valve Boxes and Vaults

All buried valves shall be equipped with a valve box. Valve boxes shall be heavy duty construction for traffic loading type, cast iron, three piece, slide type, or screw type with drop covers. The valve boxes shall be adjustable to six inches up or down from the nominal required cover of the pipe.

A number six base section shall be provided. Minimum shaft diameter shall be 5-1/4 inches and minimum metal thickness shall be 3/16 inch. Boxes shall be coated with an approved bitumastic or epoxy coating. Valve box covers shall have the word "SEWER" or "REUSE" cast thereon depending on the application. Swing check valves shall be installed in an approved suitable vault for easy access by the District maintenance staff.

Valve boxes shall be installed on firmly compacted material at a level approximately equal to the elevation of the valve packing plate. No contact between the valve and the box shall be permitted. On plug valves, the positioner on the operating mechanism shall be kept free of rocks, debris, etc.

Where valves are installed with over six feet of cover, or where the ground water table is within three feet of the ground level, an extension stem shall be provided to bring an operating nut within two feet of the finished grade. This extension, stem shall be satisfactorily pinned to the valve operation nut to prevent dislodging during operation of the valve.

**END OF SECTION 130**

## **SECTION 140**

### **PIPELINE INTEGRITY TESTS**

#### **140.01      General**

The District shall inspect all sewer facilities prior to acceptance and again just prior to the expiration of the 1-year guarantee.

When a section of pipe of a length deemed adequate by the Design Engineer is ready for testing, the pipe shall be flushed and then tested in accordance with the applicable testing method as described herein. Suitable temporary testing plugs or caps shall be installed. All necessary pressure pumps, pipe connections, meters, gauges, water, weirs, bulkheads, and other necessary equipment and all labor required for carrying out these tests shall be furnished. The Design Engineer shall notify the District at least 48 hours prior to any testing so that it may, at its option, have a representative present during the testing.

Gravity sewers shall be tested in accordance with the Hydraulic Infiltration/Exfiltration Test as described herein. Additionally, PVC Gravity sewers shall be tested for deflection as described herein. Force mains shall be tested in accordance with the Pressure and Leakage Test for Force Mains as described herein.

If the District Engineer so desires, the first section of any line between two manholes shall be tested as soon as possible after backfilling has been completed. If such tests appear to be satisfactory and acceptable, progressive testing of completed sections of the lines may be deferred at the option of the District's Engineer, and at the request of the Contractor, until all pipe has been laid and before final acceptance. However, if permitted, this will not constitute a waiver of any of the tests or the leakage requirements.

Sections of pipe tested for infiltration and exfiltration prior to completion of the project shall be subject to a final inspection at completion of the project, and also subject to additional leakage tests, if warranted in the opinion of the District Engineer.

If the section fails to pass the applicable tests, the Contractor shall locate, uncover and repair or replace the defective pipe, fitting or joint, at his own expense. Additional testing will be required after the deficiency is corrected.

#### **140.02      Hydraulic Infiltration/Exfiltration Tests**

Upon completion of a section of the sewer, the pipe shall be dewatered and tested to measure the infiltration for at least three (3) consecutive days. Test section shall be from manhole to manhole. Longer test sections may be used with the approval of the District Engineer.

For making the infiltration tests, underdrains, if used, shall be plugged, well points and other groundwater drainage shall be stopped to permit the groundwater to return to its normal level. Infiltration shall be measured by the use of weirs designed specifically for this purpose or other acceptable means approved by the District Engineer.

As required, suitable bulkheads shall be installed to permit the test of the sewer.

Where the crown of the pipe is below the natural groundwater table at the time and place of testing, the pipe shall be tested for infiltration. Suitable watertight plugs shall be installed and section of pipe to be tested shall be pumped dry before start of test. Where the crown of the pipe is above the natural water table, the pipe shall be tested for exfiltration by installing necessary plugs and filling pipes and manholes with water and maintaining a static head of water of a minimum of two feet above the crown of the pipe during the test. Exfiltration tests shall be conducted on main lines and lateral lines, unless waived by the District Engineer. The water level of internal pressure to be used for exfiltration test shall be determined by the Design Engineer.

The sewers shall pass the applicable test before any connections are made to buildings or to active sewers.

The maximum allowed infiltration/exfiltration shall not exceed 25 gallons per inch of diameter per mile per 24 hours for pipe lines and 4 gallons per 24 hours for manholes. Once systems are stabilized a 2 hour test shall be performed and the appropriate fraction of maximum allowed infiltration/exfiltration applied.

#### 140.03      Pressure and Leakage Test for Force Mains (HDPE)

After fusing, prior to placement, the HDPE piping shall be filled with potable water and pressure tested at 100 psi or 1.5 times design operating pressure for 2 hours, whichever is greater. Each joint shall be visibly inspected for leakage at the end of 2 hours. Any sections showing visible leakage shall be cut out and the remaining pipe fused together and retested. After placement the HDPE pipe shall be pressurized to a minimum 1.65 times pipeline design pressure for 4 hours, with make up water added as necessary to maintain 1.65 times pipeline design pressure. At the end of 4 hours, pressure is reduced to 1.5 times design pressure and pressure monitored for 1 hour. Deviation in pressure > 5% during the 1 hour test indicate a failed test. All testing shall be in compliance with ASTM F2164.

#### 140.04      Pressure and Leakage Test for Force Mains (PVC and DI)

Except as otherwise directed by the District, all pipelines shall be given combined pressure and leakage tests in sections of length approved by the District's Engineer. The Contractor shall furnish and install suitable temporary plugs or caps; all necessary pressure pumps, pipe connections, meters, gauges, and other necessary equipment; and all labor required. The Design Engineer shall witness all tests.

Subject to approval of the Design Engineer and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when he desires.

The section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe.

The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.

Two pressure and leakage tests shall be conducted for each pipeline segment. The first test shall be conducted at the average working pressure of the pipeline segment. The second test shall be conducted at a test pressure of 100 pounds per square inch or 1.5 times the pipeline design operating pressure, whichever is greater.

The pressure and leakage test shall consist of first raising the water pressure (based on the elevation of the lowest point of the section under test and corrected to the gauge location) to the specified pressure. If the Contractor cannot achieve the specified pressure and maintain it for a period of one hour with no loss of pressure and no additional pumping, the section shall be considered as having failed to pass the pressure test. The District may require that the pressure and leakage test be run in accordance with AWWA C-600 Standards, latest revision (Four Hour Test).

Allowable leakage shall not exceed the following where L = allowable leakage (gallons), N = number of joints, D = nominal diameter of pipe (inches), P = average test pressure (psi).

$$L = \frac{ND\sqrt{P}}{7400}$$

#### 140.05      Pressure and Leakage Test for Low Pressure Force Mains

Low pressure force mains shall be filled with potable water, bled of air and pressurized to 70 psi. Pressure shall be maintained constant for 1 hour without adding water. Any loss of pressure indicates a failed test.

#### 140.06      Deflection Testing

Pipe deflection shall not exceed 5% measured by a go/no-go gauge or mandrel. The District may confirm the pipe deflection at the end of the job prior to acceptance. Additionally, the District may confirm the pipe deflection just prior to end of the one year guarantee period. Pipe sections exceeding 5% long term deflection will be relaid by the Contractor or the Developer at his own cost and expense and retested until the District's go/no-go gauge passes through the pipe section.

The District's mandrel will be considered the "official" gauge used for deflection testing. The standard District gauge is manufactured by "HURCO" Technologies, Inc., Harrisburg, S.D. The outside diameter of the District's mandrel is as follows:

Pipe Diameter (Inches)	Mandrel Diameter (Inches)
8	7.28
10	9.08
12	10.79

**END OF SECTION 140**

## **SECTION 150**

### **SUBMERSIBLE LIFT STATIONS**

#### **150.01      Scope**

It is the intent of this standard is to provide component requirements and general design guidelines for submersible wastewater lift stations. This standard shall be used in conjunction with Standard Details SD-31 through 35 and referenced standards for complete submersible wastewater lift station requirements.

This specification typically defines requirements for 20HP and smaller lift stations. Lift stations greater than 20 HP, serving critical infrastructure or performing as a repump station may require alternate design criteria including variable speed, tri-plex configuration, permanent standby emergency power and PLC control. These additional design criteria will be defined by Engineering Services during the design.

#### **150.02      Site**

Lift station sites shall be provided with a minimum 40' x 40 lift station easement. Variations on the easement shall be considered on a case by case basis where access, maintenance and bypass operations can be accommodated with alternate configurations acceptable to the District and approved by Engineering Services.

The lift station site and access shall be set at proper elevations and configurations such that access and maintenance to the station will not be impaired by flooding, excessive road grades, swales, walls or landscaping. A lift station site plan indicating all topographical features, rights-of-way, easements and adjoining contiguous areas shall be submitted to the District for approval.

All above or at grade facilities shall be above the 1% Annual Chance Flood (100-year flood) zone, as shown on Flood Insurance Rate Maps (FIRMs). Site and lift station plans shall include the 100-year flood elevation.

#### **150.03      Power**

The Contractor shall coordinate with and pay all fees, deposits, and service costs to Florida Power and Light Corp. to provide a three phase, 480V or 240V underground power service to the new lift station site. The transformer for the station shall be located not further than 25 feet from the nearest station easement line.

The power meter for the lift station shall be located on the lift station site, installed on the District's standard control panel rack.



#### 150.04      Lift Station Standard Equipment

A list of standard lift station equipment is given below. This list is not all inclusive and the Contractor shall supply all other equipment necessary for complete working installations. The lift station shall include:

Two (2) explosion proof submersible type sewage pumps with 316 stainless steel guide rails, base plates and all accessories.

Two (2) discharge lines with swing check valves and plug valves and emergency tap connection

Instrumentation/control system, (requirements vary on station size)..

One (1) electrical control panel, NEMA 4X, to house electrical equipment, pump controls, alarms and protection.

One (1) wet well.

One (1) valve vault.

Concrete covers with aluminum access hatches and safety grates

Influent drop assemblies

Permanent standby generator and ATS, (requirements vary on station size).

Radio or Cellular Telemetry System

Coatings

Concrete pads

Landscaping/site screening

The wet well structure shall receive a minimum 1.0-inch thick calcium aluminate corrosion barrier such as Sewper Coat, Strong Seal, Refratta HAC 100 or approved equal, and installed per the manufacturers recommendations.

One (1) influent (collection) manhole structure with piping connecting to the wet well structure. The distance between the collection manhole and the wet well shall be no more than 50 feet.

The pumps shall be capable of handling grit and raw unscreened sewage. The design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place on its mating discharge connection, permanently installed in the wet well. The pump shall be easily removable for inspection or service requiring no bolts, nuts, or other fastenings to be disconnected.

All major parts, such as the stator casing, oil casing, sliding bracket, volute, and impeller shall be of gray iron. All surfaces coming into contact with sewage shall be protected by a coating resistant to sewage. All exposed bolts and nuts shall be of stainless steel.

Pump faces shall be machined to accept a sacrificial plate between the pump face and seat. The sacrificial plate shall be manufactured from 1/4" brass plate, bolted to the pump face and removable/replaceable.

A wear ring system shall be installed to provide efficient sealing between the volute and impeller.

The impeller shall be hard alloy gray cast iron of non-clogging design capable of handling solids, fibrous material, heavy sludge, and other matter found in normal sewage applications. The impeller shall be constructed with a long throughout without acute turns. The impeller shall be dynamically balanced. The impeller shall be a slip fit to the shaft and key driven. Non-corroding fasteners shall be used.

Each pump shall be provided with a mechanical rotating shaft seal system running in an oil reservoir having separate, constantly hydro-dynamically lubricated and lapped seal faces.

The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring.

The upper seal unit between the oil pump and motor housing shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall be easily inspected and replaceable.

The shaft sealing system shall be capable of operating submerged to depths of, or pressure equivalent to, 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

A sliding guide bracket shall be an integral part of the pump unit. The volute casing shall have a machined discharge flange to automatically and firmly connect with the cast iron discharge connection, which when bolted to the floor of the sump and discharge line, will receive the pump discharge connection flange without the need of adjustment, fasteners, clamps or similar devices.

Installation of the pump unit to the discharge connection shall be the result of a simple linear downward motion of the pump unit guided by no less than two guide bars. No other motion of the pump unit, such as tilting or rotating, shall be acceptable. Sealing of the discharge interface by means of a diaphragm, O-ring, or other device will not be considered acceptable or equal to a metal to metal contact of the pump discharge flange and mating discharge connection specified and required. No portion of the pump unit shall bear directly on the floor of the wet well. There shall be no more than a 90-degree bend allowed between the volute discharge flanges and station piping.

The pump motor shall be housed in an air or oil filled watertight casing and shall have moisture resistant Class "F" 155-degree C insulation. Oil filled casing shall be filled with transformer oil, quality BP Energol JSO, or Shell Diala D or DX. The motor shall be a minimum of 5 BHP, rated for operation at 1700 or 1750 rpm, on a 230V, 3-phase, 60 hertz power supply. The cable entry water seal design shall be such that precludes specific torque requirements to insure a watertight and submersible seal. Epoxies, silicones or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top.

Pump motor cable installed shall be suitable for submersible pump applications and this shall be indicated by a code or legend permanently marked on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be of adequate size for the motor rating. Pump motor cable shall be ample length to reach the rack mounted panel. Cable length to be determined by the site plans.

The pump cable shall have 90 degree C rated insulated material based on 40 degree ambient and shall have anti-ropeing and anti-wicking design. All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fittings shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of specific torque to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate.

Tolerances of all parts shall be such that allows replacement of any parts without additional machining required to insure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in on unit, are acceptable. Where water jackets along or in conjunction with radiators are used, separate circulation shall be provided. Cooling media channels and ports shall be no-clogging by virtue of their dimensions. Provisions for external cooling and flushing shall be provided.

Pump and motor assemblies shall meet NEC and NFPA requirements for explosion proof installations in Class 1, Division 1, Group D environments.

The pumps and motors shall be manufactured by FLYGT Corporation.

## 150.06        Control Panel

This section is specific to single speed, duplex lift stations with float control, for variable speed, PLC controlled stations see Section 161.

The Contractor shall furnish and install a heavy duty type District Standard control panel as shown on the plans and specified here, as manufactured by Sta-Con Incorporated, QCI, or approved equal, and in accordance with the detail sheets SD-31 through 35.

The control panel shall contain all the remote electrical equipment necessary to provide for the operation of the pumps. The panel shall start and stop the pumps in the wet well.

The control panel shall start the “lead” pump when the liquid level rises to a preselected elevation “D”. If the influent rate exceeds the capacity of the “lead” pump, the lag pump shall be started when the liquid level rises to a preselected elevation “C” (higher than “D”). If the liquid level rises to a preselected elevation “B” (higher than “C”), the high level alarm shall be activated. When the liquid level falls to a persecuted elevation “E” (lower than “D”), both pumps shall be stopped.

The control panel shall be contained in a single enclosure, fabricated of not less than 14-gauge 316 stainless steel, NEMA 4X construction. The door shall be formed with minimum lip of 3/4” and full height hinged. Closure mechanisms shall be No. 3 S.S. fasteners with No. 3 keepers as manufactured by Simmons Fasteners, or approved equal.

The interior door shall be constructed of .080-inch thick 6061-T6 aluminum. The interior and exterior doors shall be provided with a stop mechanism to hold the doors open which working in the panel. A rain shield shall be provided.

The control panel shall include the following items plus any other items shown on the plans or required for a complete, operational installation.

Circuit breakers with combination full voltage motor Starters for each pump.

“Hand-Off-Auto” selector switch for each pump, heavy duty oil tight type (toggle switches will not be acceptable).

Automatic pump alternator with test switch.

Duplex receptacle with 15-amp circuit breaker 115V GFI.

Control power circuit breaker.

Main circuit breaker.

Emergency power minimum 100-amp circuit breaker and 100-amp, 4 wire, 3 pole, reverse service generator receptacle. Emergency power to match main breaker size.

Lightning arrestor, 3-phase.

Surge capacitor.

Phase monitor, to prevent energization of pump motors in the event of phase failure or reversal or low voltage.

Indicating light for each level regulator (float switch).

“Running” indicating light for each pump.

Elapsed time meter for each pump, 2-1/2”, 6-digit non-reset.

Emergency/High level alarm light and horn, 12 VDC with battery back-up.

The panel shall include back-up circuitry to permit one pump to operate with a normal drawdown in the event of failure (open circuit) of the “stop” level regulator.

Spare parts to be furnished with the panel include:

- 2 - 120V Relays
- 1 - Alternator
- 1 - Phase Monitor
- 12 - Lamps
- 12 - Fuse Links
- 1 – Intrinsically Safe Barrier
- 1 – Alarm Controller

A copy of the panel wiring diagram shall be attached to the inside of the outer panel door. An extra copy shall be given to the District.

The basic components and layout of the control panel are shown on Standard Details 31, 32, 33 and 34.

Substitutions of these components will be permitted for approved equal, interchangeable products upon obtaining specific written approval from the District.

150.07      Telemetry

Lift stations shall be provided with a District standard radio telemetry system by Data Flow Systems. Telemetry systems shall provide monitoring and control for the following signals:

1. Digital
  - a. Power Fail
  - b. Auxiliary Power
  - c. High Level
  - d. Pump # 1 Fail
  - e. Pump # 2 Fail
  - f. Pump Run # 1
  - g. Pump Run # 2
  - h. Pump On # 1
  - i. Pump On # 2
  - j. Pump Off # 1
  - k. Pump Off # 2
  - l. Spare
  - m. Spare
2. Analog
  - a. Wet Well Level
  - b. Spare
  - c. Spare

An alternative cellular telemetry system may be available. Coordinate with the District's Director of Engineering Services for specifics.

150.08      Access Hatches & Fall Through Safety Prevention Systems

The wetwell and valve vault access hatch shall be single leaf design with a minimum clear opening at 36" x 48", but must also meet the minimum clear opening as required by the pump manufacturer. The frame shall be a minimum: 3" x 3" x 1/4" aluminum angles and the cover shall be 1/4" aluminum angles and the cover shall be 1/4" aluminum diamond pattern. The hatch shall be completed with anchor straps, automatic hold open arm and cover release, forged brass or stainless steel hinges with stainless steel pins, hasp and staple lock, flush type handles, upper guide holders and sensor cable holder. The cover shall be reinforced to withstand a live load of 300 lbs./sq. ft. unless in areas that may experience traffic. Hatches in traffic areas shall meet H-20 design loading criteria, at a minimum. Hinges shall be of the interior type.

All stations 6' in diameter or larger, shall be provided with fall through safety prevention systems. All systems will be of the grate type as manufactured by U.S.F. Fabrication, Inc., or approved equal able to withstand a pedestrian load of 300 lbs/sq. ft.. The safety grate shall be constructed of aluminum. All hardware must be of 316 stainless steel.

The configuration of the hatch and safety grate shall be such that opposing sides of the wetwell opening are protected when the safety grate is in the upright position. Safety chains shall be provided from the safety grate to the hatch to protect adjacent sides.

10' diameter and larger wetwells and tri-plex stations will require custom hatch and safety grate designs to be determined in coordination with the District's Engineering Services .

#### 150.09        Floats

Float switches with internal single pole mercury switch shall be installed in the wet well to control the operation of the pumps with variations of liquid level in the wet well. The float switches shall be sealed in a polypropylene casing with a firmly bonded electrical cable protruding. Floats shall be Roto-Float type S as manufactured by Anchor Scientific Inc..

#### 150.10        Valves

See Section 130

#### 150.11        Pipe and Fittings

See Section 110 for pipe and fittings.

#### 150.12        Wetwell and Valve Vault

See Section 121 and standard details SD-31

#### 150.13        Wet Well via Caisson Construction

Wet wells installed via the caisson method are allowed only with prior approval by the Loxahatchee River District. Final acceptance of the wet well by caisson method will only occur when it is determined that:

- Wet well has no structural damage, deep gouges and and/or cracks.
- Wet well has been installed at the design depths indicated.
- Wet well is plumb. The maximum deviation shall be 1/8" per foot of each precast section.
- Wet well tremie seal is leak free and there are no continually damp areas prior to the installation of the secondary pour.
- Wet well sections show no evidence of separation and that the structure has not settled.
- Wet well walls, specifically at the joints, are flush and without overhang.
- Wet well was installed in proper sequence.

If any of the above items are not met to the satisfaction of the District, the wet well will be rejected and it will be the contractor's responsibility to remedy the problem at his own expense. The

contractor shall also provide a warrantee that the wet well will meet the above requirements for a 1-year period from the date of District acceptance.

#### 150.14        Submittals

The following submittals are required for approval prior to construction of the project.

1. Lift Station Calculations to include
  - a. Average Daily Flow
  - b. Peak Hour Flow
  - c. System Head Curves
  - d. Wetwell Cycle Time
  - e. Anti-Flotation
2. Lift Station Site Plan
3. Pump and Motor
4. Pipe and Fittings
5. Valves
6. Concrete Structures
7. Control Panel – complete detailed design including electrical schematic, panel layout, bill of materials
8. Panel Rack
9. Base Plates
10. Rails, Brackets and Adapters
11. Conduit and Cable
12. Aluminum Hatches and Safety Grates

Detailed wiring diagrams of the entire installation including main power supply, pump motors, control circuits, alarm circuits, and metering circuits shall be submitted. The diagrams shall include schematic and connection wiring diagrams.

Four (4) copies of detailed installation drawings including wiring diagrams, pump curves and maintenance and operating manuals shall be submitted to the District at the time of initial start-up.

#### 150.15        Services to be Furnished by Manufacturer of Equipment

The services of a factory-trained representative shall be furnished for the lift station start-up. The representative shall check all electrical components, wiring, and pump operations.

#### 150.16        Operation and Maintenance

Upon completion and successful startup of the lift station the District will be provided with two copies of the lift station operation and maintenance manual. The manual shall include operation and maintenance detail including service intervals for all equipment provided with the lift station. Operation and maintenance manuals shall also include AS-BUILT drawings for the lift station, control panel, wiring schematics and appurtenances.



150.17      Warranty

The pump manufacturer shall warrant the pumps for a period of five (5) years from the date of pump manufacturer's start-up. The warranty shall include a minimum 100% coverage of the manufacturer's shop labor and parts for the first eighteen months, then 50% coverage through the third year, and then 25% coverage through the fifth year.

**END OF SECTION 150**

## SECTION 160

### VARIABLE SPEED/PLC CONTROL PANELS

#### 161.01 General

This section provides for design, construction, installation and start-up of a custom power and control panel by a qualified panel manufacturer. The panel and components shall comply with the requirements of this specification and other sections and standard details of the District's Manual of Minimum Construction Standards and Technical Specifications.

This section is generally used for variable speed submersible wastewater lift stations greater than 20HP

#### 161.02 Submittals

Submittals for the power and control panel shall include but not be limited to the following:

1. Panel materials of construction, layout and dimensions.
2. Anchoring details to concrete slab
3. Wind load calculations (if required by permitting authority)
4. Scaled dead front layout
5. Scaled back plan layout
6. Scaled component layout
7. Power, Instrumentation, Radio Telemetry and Control wiring schematics

#### 161.03 Panel

The control panel shall be NEMA 4X ground mount enclosure with double doors and leg kit for floor standing. The panel shall be minimum thickness 12-gauge 316 stainless steel, enclosure and doors. The doors shall be formed with minimum lip of 3/4", full height concealed hinges, stainless steel door clamps on non-hinged sides and pad-lock hasps. The center post shall be removable for full access to the panel interior. A rain/drip ledge shall be provided over the doors. Sun shields shall be provided on top, east, west and south facing sides.

The interior doors/dead fronts shall be construction of minimum 0.080 inch 6061-T6 aluminum.

Both exterior and interior doors shall have a mechanism to hold the doors open.

The panel shall be manufactured by Hoffman or approved equal.

The control panel shall be designed and tested in conformance with UL 508.

The power and control panel shall provide for manual and automatic operation of the lift station pumps utilizing an ultrasonic level controller, programmable logic controller and variable speed drives. The station operating protocol shall be as follows.

1. Operating Protocol 1: Level Control

- a. ELEV A all pumps off
- b. ELEV  $\geq$  B lead pump on. speed adjust to maintain level
- c. ELEV  $\geq$  C lag 1 pump on. lead and lag 1 match speed and adjust to maintain level
- d. ELEV  $\geq$  D lag 2 pump on. lead, lag 1 and lag 2 match speed and adjust to maintain level
- e. ELEV E all pumps on 100% speed
- f. LEVEL DECREASING/MATCHED PUMP SPEED BELOW 50% for X seconds lag 2 off. Lead and lag 1 match speed adjust to maintain ELEV C.
- g. LEVEL DECREASING/MATCHED PUMP SPEED BELOW 50% for Y seconds lag 1 off. Lead adjusts speed to maintain ELEV D.

2. Operating protocol 2: Constant Speed

- a. ELEV INCREASING
  - i. ELEV  $\geq$  B lead pump on. N% speed.
  - ii. ELEV  $\geq$  C for X seconds. Lag 1 on. N% speed.
  - iii. ELEV  $\geq$  D for X seconds. Lag 2 on. N% speed.
- b. ELEV DECREASING
  - i. ELEV  $\leq$  C for X seconds. Lag 2 off.
  - ii. ELEV  $\leq$  B for X seconds. Lag 1 off.
  - iii. ELEV  $\leq$  A for X seconds. All pumps off.

3. Operating protocol 3: Manual/Hand

- a. With the HOA selector switch in Hand the selected pump shall turn on and speed be manually adjusted through the AFD. In Hand, all alarms shall function, but pump operation will not be prevented except for specific pump manufacturer alarms in place to prevent harm to the pump and/or motor.

4. Alarm Functions

- a. With the station in Hand, Off or Auto the alarm functions shall be fully operable.
- b. Alarms shall be available for the following
  - i. Pump Out of Service, each pump.
  - ii. Pump Fail to Run, each pump
  - iii. AFD Fault, each drive.

- iv. ATS Fault
- v. Generator Fault
- vi. UPS Fault
- vii. Communication Fault
- viii. Wetwell High Level
- c. The station shall have two high level alarm systems.
  - i. Alarm 1: PLC based alarm system using a preset high level as read from the pressure transmitter. This alarm will activate onsite and offsite audible and visual alarms including the following.
    - 1. Audible Alarm Horn
    - 2. Visual Alarm Light
    - 3. High Level indicator located on the dead front inside the panel.
    - 4. Alarm indication on the Panel PC
    - 5. Alarm indication in the PLC
    - 6. Alarm indication to the DFS Radio Telemetry System
    - 7. Alarm indication in the Plant VT SCADA system.
  - ii. Alarm 2: Back up to Alarm 1 using a high level float switch inside the wetwell. This alarm will activate onsite and offsite audible and visual alarms including the following.
    - 1. Audible Alarm Horn
    - 2. Visual Alarm Light
    - 3. High Level indicator located on the dead front inside the panel.
    - 4. Alarm indication on the Panel PC
    - 5. Alarm indication in the PLC
    - 6. Alarm indication to the DFS Radio Telemetry System
    - 7. Alarm indication in the Plant VT SCADA system.
- 5. Emergency Standby Generator Limited Operation – On emergency standby generator power station operation shall be limited to 2 pumps.
- 6. Pump Off – Back Up Float System
  - a. With the station in Auto a low level float in the wetwell will automatically shut off all pump operation until the high level float switch is activated.

Programming shall allow for operators to change all variables noted above through a simple interface via a laptop computer or the HMI.

#### 161.05 Adjustable Frequency Drive:

Adjustable frequency drives shall be Eaton PowerXL DG1 Series. Drives shall be rated for 480V, 3 PH, 60 HZ. Drives shall be variable torque, pulse width modulated. Drive horsepower rating shall equal or exceed maximum pump motor horsepower requirements at any point on the pump curve.

The drive shall include a keypad interface that provides the following functions and displays at a minimum; Output frequency, frequency reference, motor speed, motor current, motor torque, motor power and motor voltage.

The drive shall include the following protective features, at a minimum; over current, over voltage, inverter fault, under voltage, input phase loss, output phase loss and under/over temperature.

The drive shall include the following field programmable I/O, at a minimum; DIGITAL: eight 24VDC digital inputs and eight 24VDC digital outputs including local/remote, drive ready, fault, running, overload, set speed, current. ANALOG: two 4-20 mA analog outputs, two 4-20 mA analog inputs.

The drive manufacturer shall provide services of a field service technician to assist in installation, setup and training.

Drives shall come with a minimum 12 month warranty.

161.06        Programmable Logic Controller: See Section 169

161.07        Uninterruptible Power Source (UPS)

Power and control panels shall be provided with an UPS for the control and telemetry system. The UPS shall be Eaton 5P Tower UPS with an Eaton Network Card-MS. The UPS shall be sized by the Contractor based on control and radio telemetry loads and to provide a minimum 10 minutes of backup power to these systems in the event of power failure.

The UPS shall provide power through an APC 120V 10 outlet rack mounted automatic transfer switch model number AP7750A. In the event of UPS failure the ATS shall switch to commercial power, if available.

161.08        Operator Interface/Panel PC

Power and control panels shall be provided with an operator interface/panel PC. The panel PC shall be Phoenix Contact USA Panel PC – VL2 PPC 2000 – 2400334:

Order Key **2400334/D29/A20/I32/R26/M52/M00/OS64/T00/S00/EF00/PS01**

The panel PC shall come with the following specific options:

1. Passive cooling system and fanless design for industrial applications
2. Panel PC (PPC): IP65 rating in front panel and IP20 rating in back. The control panel design shall ensure only IP65 areas are exposed when the dead front is closed.
3. Display shall be 47.0 cm / 18.5" TFT (Thin Film Transistor)
4. Screen resolution 1366 x 768 Pixel(s) (WXGA)
5. LED Backlighting

6. Intel® Celeron® N2930 1.83 GHz/2.16 GHz processor
7. Operating system shall be Windows® 10 IoT Enterprise LTSC 2015 (32-bit), Multi-language
8. RAM 4 GB DDR3 SODIMM
9. Mass storage - 2,5" SSD (MLC), 160 GB
10. Network 2x Ethernet (10/100/1000 Mbps), RJ45
11. Interfaces 1x COM (RS-232/422/485)
12. 4x USB 2.0
13. Monitor output 1x DisplayPort
14. Service life of battery 5 years
15. Environmental Conditions
  - a. Degree of protection IP65 (front), IP30 (back)
  - b. Ambient temperature (operation) 0 °C ... 45 °C (with HDD)
  - c. Ambient temperature (storage/transport) -40 °C ... 70 °C
  - d. Permissible humidity (operation) 5 % ... 95 % (non-condensing)
  - e. Permissible humidity (storage/transport) 5 % ... 95 % (non-condensing)
  - f. Power supply unit 24 V DC  $\pm$ 20 %

#### 161.09      Ethernet Switch

Power and control panels shall be provided with an Ethernet switch to connect all networked devices including but not limited to the Panel PC, Uninterruptible Power Source and PLC. Ethernet switches shall be Allen Bradley Stratix 5700.

#### 161.10      Ventilation

The panel shall include forced ventilation sufficient to maintain panel interior temperatures and conditions within the ranges set by the manufacturers of equipment located within the panel. Ventilation shall include filtration to prevent the entrance of dust, debris and water from entering the panel.

#### 161.11      Level Transducer/Transmitter: See Section 169

#### 161.12      Circuit Breakers:

Circuit breakers shall be Square D H-Frame sized per panel and pump power requirements.

#### 161.13      Miscellaneous Materials and Requirements:

1. In general, except as specified otherwise in this section or the drawings, panel components shall comply with the Bill of Materials, on Sheet SD-34 of the District's Manual of Minimum Construction Standard and Technical Specifications.
2. One Duplex 15 amp 120 V GFCI receptacle with dedicated circuit breaker.
3. Two overhead fluorescent or LED lights with integral on/off switch mounted inside the panel behind each door in front of the dead front. The lights shall be 120V.

4. One “Hand-Off-Auto” selector switch for each pump, heavy duty oil tight type (toggle switches will not be acceptable).
5. One control power circuit breaker.
6. One main circuit breaker.
7. Secondary Backup Generator circuit breaker with Main Breaker Lockout.
8. Secondary Backup Generator receptacle.
9. Lightning arrestor, surge protector and phase monitor. The phase monitor shall lock out pump operation in the event of phase loss, reversal or low voltage.
10. One “RUN” indicator light for each pump.
11. One “FAIL” indicator light for each pump.
12. One Elapsed time meter for each pump, 2-1/2”, 6 digit non-resettable.
13. Independent 12VDC High Level Alarm System -
  - a. Alarm light, 12 VDC, with Flasher, outdoor type mounted on top of the control panel.
  - b. Alarm Horn, 12 VDC, outdoor type mounted on side of control panel.
  - c. High Level Alarm Circuitry to include high level float in the wetwell. Alarm circuit to match the District Standard, including the intrinsic safe circuit in the wetwell.
  - d. This alarm shall act independently from the PLC
14. A copy of the panel wiring diagram asbuilts and bill of materials shall be attached to the inside of the outer panel door. An extra copy shall be given to the District.

Spare parts to be furnished with the panel include:

- 2 - 120V Relays
- 1 - Alternator
- 1 - Phase Monitor
- 12 - Lamps
- 12 - Fuse Links
- 1 – Intrinsically Safe Barrier
- 1 – Alarm Controller

#### 161.14      System Integration

System integration shall be performed by

Frank Sczurek, Process Analyst  
Process Control Consultants  
PO Box 1174  
Loxahatchee, FL 33470

Phone: 561-791-1511  
Email: [proccon@comcast.net](mailto:proccon@comcast.net)

System integration shall include integration of the adjustable frequency drives, level transmitter, level transducer, programmable logic controller, uninterruptable power source, generator

controller, panel PC, automatic transfer switch, Data Flow Systems RTU and the District's VT Scada System for a fully functional system capable of implementing the required operating protocol and monitor/control functions as detailed in the specifications and the System Block Diagram.

System integration shall include screen development. At a minimum the following screens shall be provided at the Panel PC.

1. Overview – shows diagrammatic representation of the lift station pumps, drives, wetwell, generator and ATS and include equipment status and alarm and HOA functions. This screen shall also display, at a minimum, pump speed, pump hours, wetwell level, power source, voltage and current.
2. Setup Screen – allows setup of station parameters to include lead, lag, standby selection, time delays, tandem pump operation criteria, pump speed limits, operating levels and alarm levels,
3. Alarm/Fault Screen – displays a complete list of programmed alarms, indicates current/active alarm, allows alarm acknowledgment, allows setup of alarm parameters.
4. Trend Screen – Provide trending for lift station parameters including pump speed, wetwell level, estimated flow (based on correlation between pump speed, pump head and pump curve).

The following minimum screens shall be provided in the Plant VT SCADA system. Screens shall conform in style and function to the District's existing VT SCADA screens.

1. Station Status
2. Historical Trending

#### 161.15      Radio Telemetry

The power and control panel shall include dry contacts for the radio telemetry unit. Dry contacts shall be provided for all I/O listed below.

1. Pump Status
2. Pump Fail
3. Pump Call to Run/Off
4. Commercial Power
5. Auxiliary Power
6. High Alarm – back up float
7. Generator General Alarm
8. Generator Low Coolant
9. Generator Fuel Alarm
10. Generator Fail
11. Pump Speed
12. Pump Disable
13. Wetwell Level
14. 2 Spare Digital
15. 2 Spare Analog



**END OF SECTION 160**

## **SECTION 180**

### **INSTRUMENTATION**

#### **168.01      General**

Instrumentation as described in this specification and shown in the drawings shall be provided.

Instrumentation shall be incorporated into the design requirements of the Contractor utilizing the equipment and materials included in this specification.

All electrical components of the system shall operate on 120 volt, single-phase, 60 hertz or 24 VDC power, except as otherwise noted in the specifications.

All electrical components located within the wetwell and the wetwell side of any sealed conduit fitting shall be Intrinsically Safe.

All necessary fuses or switches required by the instrumentation manufacturer for his equipment shall be provided with the equipment.

#### **168.02      Submittals**

Detailed design drawings including product specification sheets, mounting hardware, location, conduit, cable and tag numbers shall be provided.

#### **168.03      Cable**

All electronic (4-20MADC) signal wire shall be two conductors, copper, twisted pair with tape foil shield and drain wire. The shield is to be grounded at the PLC I/O panel only for single point grounding, in accordance with manufacturer's instructions. Single triad shielded cables for potentiometer signal cables shall be three conductors, copper, twisted triad with tape foil shield and drain wire. The cables must be UL listed for wet locations as defined by the NEC.

#### **168.04      Instrument Mounts**

All instruments shall be mounted in readily accessible positions that do not require entry into the wetwell for removal or maintenance. Brackets shall be fabricated to hold instruments. All brackets shall be 304 or 316 stainless steel. All mounting hardware, screws, machine bolts with washers and nuts shall be 316 stainless steel.

#### **168.05      Conduits**

All low voltage signals shall be isolated from high level control or power signals in separate conduits. All instrumentation signal conduits below grade shall be SCH80 PVC or 304 stainless steel. All underground conduits shall have grounding bushings and a No. 8 AWG copper minimum cable run to a ground lug at the termination points.

#### **168.06      Lightning/Surge Protection**

All transmitters with 4-20 MADC outputs shall have a transmitter mounted surge protection unit. The surge protection unit shall be a EDCO SS65 or approved equal.

168.07      Intrinsically Safe Pressure Transducer

Pressure transducers shall be intrinsically safe and encased in a 316 stainless steel housing.

1.      Range: 0 – 15 PSI
2.      Cable: Minimum 50'
3.      Output: 4 – 20 mA
4.      Accuracy: +/-5%

Pressure transducers shall be Blue Ribbon Model 311Z or approved equal.

168.08      Intrinsically Safe Pressure Transmitter

Pressure transmitters shall be intrinsically safe, backlit and mounted in the power and control panel dead-front.

1.      Display: 5 Digit
2.      Input: 24 VDC
3.      Output: 4 – 20 mA
4.      Accuracy: +/- 0.03%

Pressure transmitters shall be Precision Digital model 688 or approved equal.

168.09      Power Supplies

All instruments shall be looped powered with an appropriately rated power supply. Each instrument shall have a dedicated power supply.

168.10      Field Calibration and Testing

All instruments shall be set up, calibrated and tested in the field. The Contractor shall provide calibration sheets and testing equipment for each instrument. When installation is complete all components shall be tested to confirm operation and compliance with the contract.

168.11      Installation

All equipment shall be installed per the manufacturers requirements.

**END OF SECTION 180**

## SECTION 181

### PROGRAMMABLE LOGIC CONTROLLERS

#### 169.01 General

This section describes the hardware and software requirements for a new Programmable Logic Controller (PLC) for a duplex or tri-plex lift submersible wastewater lift station with adjustable frequency drives, level control, emergency standby power, DFS radio telemetry unit (or) Cellular telemetry unit and appurtenances.

This section provides all labor and material required for the PLC system including the panels, equipment, software, screen development, programming, conduit, cable, tie-ins, checkout and start-up of the complete integrated system. This section shall be used in conjunction with the approved drawings and Section 161, Variable Speed/PLC Control Panels.

The latest version available at the time of installation of all PLC development software and communication driver software shall be provided.

All software and programming shall be required to perform the following functions in addition to the interlocking, monitoring and control functions indicated on the loop diagram drawings and developed in the PLC logic and OWS screen development meetings.

All enclosures shall be UL listed and NEMA rated to house the PLC, remote I/O, power supplies, and terminal blocks as shown in the drawings.

All panels shall be UL listed and labeled as a completed assembly. The panel fabricator shall furnish and install all items not specifically detailed in the drawings required to have the panels UL listed and labeled. All inspections, approvals and modifications required to have the completed panel labeled and listed by UL shall be furnished by, and the responsibility of the panel fabricator.

#### 169.02 Applicable Standards

NEC  
NEMA  
UL  
IEC

Temperature	IEC60068:
Relative Humidity	IEC60068:
Vibration	IEC 60068
Shock	IEC 60068
Emissions	IEC61000
ESD Immunity	IEC 61000
Radiated RF Immunity	IEC61000

EFT/B Immunity	IEC61000
Surge Immunity	IEC61000
Conducted RF Immunity	IEC61000

#### 169.03      Operation and Maintenance Manuals

All products shall be provided with operation and maintenance manuals complete with installation, troubleshooting and technical information on the equipment provided under this contract. Manuals shall be published by the equipment manufacturer.

#### 169.04      Training

Training and instruction shall be given by the manufacturer or representative. Training shall be 4-hours for personnel selected by the Owner in the operation and general maintenance of the PLC. This training is independent of operator training for lift station observation and operation associated with automated controls.

#### 169.05      Submittals

Submittals shall include installation drawings and manufacturer cutsheets clearly defining the products to be provided, their accessories/options and interconnectivity with all systems. Drawings shall also include single line system diagrams and detailed line diagrams for power, input/output and tag numbers.

#### 169.06      Spare Parts

- A. One CPU
- B. One of each Network Module
- C. One of each type of input/output and data link module
- D. One of each type of power supply

#### 169.07      Programmable Logic Controller

##### 1.      Approved Manufacturer

The PLC system shall be a Rockwell Automation 1756 ControlLogix L7\*\*\*\* .

##### 2.      General

The PLC system (memory, communications, input/output modules, processor, power supplies, software) shall be a modular chassis mounted system and come complete from one manufacturer to provide a complete functioning control system as depicted in the Control Block Diagram and described in the operating protocol and of sufficient capacity for future expansion as allowed for in this specification.

Products shall be provided with conformal coatings, factory applied, to extend product life in harsh, corrosive environments.

The PLC shall be programmable and configurable from a Windows 7 and Windows 10

3. Communication

The PLC system shall be Ethernet compatible or have an Ethernet module accessible by a laptop computer. Programming functions associated with the PLC system shall be accessible through the Ethernet connection.

The PLC shall have a compatible communication modules or ports for communicating with the emergency standby generator controller exclusive of input/output modules and dry contacts. This communication port shall allow for sharing of all monitoring and alarm data associated with the emergency generator controller.

4. Input/Output Modules

The PLC shall have analog and discrete input/output modules sufficient for all proposed and future nodes identified in the control block diagram associated with the DFS Radio Telemetry System.

The PLC shall have analog and discrete input/output modules sufficient for all proposed generator status and generator fail signals.

The PLC shall have analog and discrete input/output modules sufficient for all proposed ATS, commercial, generator power signals.

The PLC shall have analog and discrete input/output modules sufficient for variable speed pump control based on level. PLC control and monitoring of variable speed drives shall be through analog and discrete input/output modules. The use of proprietary communication protocols for variable speed drive control shall be allowed.

The PLC shall have the ability to accommodate 50% additional I/O modules.

5. Central Processing Unit

The PLC configuration shall be maintained through a power loss. The PLC shall continue with operations when power is reinstated without additional programming, uploads or resets.

The PLC system shall utilize a Secure Digital (SD) card for non-volatile memory to store a user program and tag data on the PLC. The PLC system shall be

configurable to trigger the controller to save to or load from the SD card and to load to the controller from the SD card on power up.

The minimum size CPU shall be an A-B Rockwell Automation ControlLogix Series 1756-L71 with 128 MBs of optional nonvolatile memory storage.

6. Power Supplies

Power supplies shall be surge and transient protected, and shall accept input voltages of 90 to 130 VAC. The power supplies shall be fused.

All PLC systems power supplies shall be modular, allowing the power supply to be removed for replacement without affecting input/output modules or wiring.

The PLC systems shall come with redundant power supply.

7. Wire and Cabling

All PLC specific cables shall be furnished by the PLC system manufacturer and be designed for the intended use.

All other wire shall be stranded copper type TFF or MTW, 18 GA for I/O and minimum 14 GA for power.

8. Programming

The CPU shall be capable of being programmed by an external IBM compatible host device via either a serial communication port or Ethernet port on the CPU, or a parallel communication port on an input/output chassis. Serial programming shall be possible without the use of a workstation interface board.

Software shall be Rockwell Automation RSLogix 5000 Professional Edition.

All software shall be registered to the Owner.

9. Terminal Blocks

Input/output modules shall utilize removable terminal blocks to connect all field side wiring.

10. Signal Isolators, Converters and Conditioners

Instrument signals shall be 4 – 20 mA DC. Signal isolators and converters shall be provided as necessary to comply with this requirement. The devices shall be mounted in the panel and such that field wiring may be changed/maintained without affecting the devices.

All communication circuitry shall include protection against lightning, spikes and other transient surges.

11.     Grounding

The grounding system of the PLC system shall be tied into the main ground system. The tie-in shall be made from the panel frames to the main ground system.

169.08     Execution

Start-up and testing services for the PLC system shall be provided. The PLC system shall be fully tested against the requirements outlined in this section and Section 161 and the operating protocol and equipment manufacturer requirements. Test procedures and checklists for approval shall be submitted prior to testing. Completed test checklists shall be submitted as part of the project record documentation.

**END OF SECTION 181**



## **SECTION 190**

### **REMOTE TERMINAL UNIT (RTU) – LIFT STATION**

#### **170.01      General**

The District has an existing Radio Telemetry System as manufactured by Data Flow Systems, Melbourne, Florida (321) 259-5009. For compatibility purposes, new remote terminal units will be required as specified herein from Data Flow Systems (DFS) 321-259-5009. The remote terminal unit shall include all materials, labor, tools, equipment, and appurtenances necessary for the proper completion of the work. The work covered by these specifications consists of providing all design, labor, tools, materials, and testing necessary for the supply of the RTU as described herein.

Physical location information shall be provided to DFS for radio communication study purposes. Information shall be provided in the form of GPS readings or street map with actual site location(s) clearly marked.

The RTU shall be housed in its own enclosure. The RTU enclosure shall be mounted on the antenna tower. The RTU shall be powered by 120 VAC commercial power, monitor local statuses and transmit those statuses to the existing central site when polled by the master radio. An Uninterruptible Power Source (UPS) shall be included with the RTU.

#### **170.02      Equipment Specification**

##### **170.02.1      Remote Terminal Unit (RTU204)**

The remote terminal unit shall be DFS Model RTU204. The RTU shall communicate with the central site via a two-way radio link and designed to accommodate the required plug-in function modules. Function module card connectors shall be gold-over-nickel plated to inhibit corrosion. The RTU shall be housed in a white color NEMA 4X 316 SS enclosure. All mounting hardware utilized shall be stainless steel. The enclosure shall be capable of being locked. The latches utilized to secure the door of each enclosure shall not require the use of a screwdriver to open or close.

##### **170.02.2      Power Supply Module (PSM003)**

The RTU shall include a Power Supply Module (PSM003). All function modules in the RTU shall run off DC voltage from +7.5 volts to +13 volts. The PSM shall supply +12 volts. A battery backup shall be provided in event of power failure. The power supply shall be surge protected. The power supply shall be short circuit protected by current limiting. Normal operation shall automatically resume when the short circuit overload is removed. The power supply shall be sized to operate the system with the battery removed. The power supply module shall provide a battery backed, isolated bias voltage source. The circuit breaker for the power supply module shall be part of the power supply module. Neither the use of tools nor the disconnection of any wires shall be required to replace the power supply module.

### 170.02.3 Backup Battery/Uninterruptable Power Supply (UPS)

The RTU shall have the uninterruptible power supply (UPS) function built in. The RTU's internal Power Supply Module shall keep the battery at a float charge. The battery shall not be damaged by deep discharges.

### 170.02.4 Telemetry Interface Module (TIM007)

- a) The Telemetry Interface Module (TIM) shall incorporate a synthesized programmable radio.
- b) A data buffer on the TIM shall enable it to query and store the I/O function module(s) status between radio polling loops until data is requested by the central site.
- c) The TIM shall feature a wake up/report/sleep mode to aid in battery conservation for solar-powered applications.
- d) The TIM shall support four levels of digipeating (store and forward), enabling radio messages from a different RTU to be routed to the central site.
- e) The TIM shall monitor AC power on the Power Supply Module and DC Bias to the RTU I/O function modules.
- f) The TIM shall incorporate a 2x8 character LCD display and 3-button user interface for field diagnostics and support data without the use of a portable computer.
- g) The TIM shall incorporate a test mode switch that places the radio into a service mode.
- h) The TIM shall incorporate LEDs for TX, RX, Power, CPU Fault.

### 170.02.5 Digital Monitor Module (DMM002)

The RTU shall include a Digital Monitor Module (DMM002). The DMM002 shall accept 12 on/off inputs of 12 to 30 volts AC or DC. Voltages from 100 to 300 volts AC or DC shall be accommodated with the use of an inline voltage converter device. Status reporting of these inputs shall have an accuracy of +/- 2 seconds, the accuracy being defined as time of an occurrence to actual time recorded by the central site computer. The DMM002 shall not require interfacing relays to monitor 24 VDC, 115 VAC, 220 VAC or 480 VAC. The DMM002 shall have LEDs to indicate: the status of each input point; receive communications; transmit communications; CPU fault; and power status. The configuration of the monitor points as alarm points or monitor points (pump run time monitors) shall be operator changeable. The configuration shall not require any software or firmware changes in the system.

### 170.02.6 Antenna Subsystem

DFS shall determine the antenna type and height required for reliable communications. A high gain directional or omni antenna shall be used to transmit and receive data. The antenna mast/pole shall be hot dipped galvanized for corrosion protection. All mounting hardware shall be made of stainless steel. The coax cable shall be the type that utilizes an inert semi-liquid compound to flood the copper braid. The coax cable shall be of the RG-8 construction type and have the RF-loss characteristic of foam flex. The coax cable shall be RTC 400 as supplied by DFS. Type N connectors shall be utilized at both ends of the coax and sealed with 3-inch sections of Alpha

FIT321-1-0 sealant shrink tubing. The coax cable shall be secured to the mast/pole with AE112 Bandit coated 316 stainless steel cable ties. The RTU shall be protected from electrical surge or transients entering through the coaxial cable by use of a IS-B50LN-C2 Polyphaser coaxial cable surge protector.

#### 170.02.7 RTU Monitor Points

The RTU shall accommodate the following I/O points.

##### RTU HARDWIRED I/O LIST:

DIGITAL INPUT (DI)	DIGITAL OUTPUT (DO)	ANALOG INPUT (AI)	ANALOG OUTPUT (AO)
COMMERCIAL POWER	PUMP 1 OVERRIDE	WET WELL LEVEL	NONE
AUXILIARY POWER	PUMP 2 OVERRIDE	(3) AI SPARE	
HIGH WET WELL LEVEL	*PUMP 3 OVERRIDE	PUMP 1 SPEED	
PUMP 1 RUN STATUS	PUMP 1 DISABLE	PUMP 2 SPEED	
PUMP 2 RUN STATUS	PUMP 2 DISABLE	PUMP 3 SPEED	
*PUMP 3 RUN STATUS	*PUMP 3 DISABLE		
PUMP 1 FAULT	(2) DO SPARE		
PUMP 2 FAULT			
* PUMP 3 FAULT			
GENERATOR GENERAL ALARM			
GENERATOR LOW COLLANT			
GENERATOR LOW FUEL			
GENERATOR FAIL TO START			
(7) DI SPARE			
* If applicable			

#### 170.03 Installation

In order to insure total system integration with the existing system, secure and provide the services of Data Flow Systems, Inc. for RTU hardware.

170.04        Programming

Antenna alignment fine-tuning procedure, configuration of RTU into the system, RTU point-by-point verification at the central computer, and RTU screen generation services shall be covered by the District.

170.05        Warranty

DFS shall warrant all hardware provided under this contract against all defects in material and workmanship for a period of one year. The RTU plug-in modules shall carry an additional 2-year return-to-manufacturer warranty and shall be covered against damage due to lightning and surge the entire 3-year period.

170.06        Spare Parts

Provide the following spare parts with the RTU:

- a.        (1) Telemetry Interface Module (TIM007)
- b.        (1) Power Supply Module (PSM003)
- c.        (1) Digital Control Module (DCM003)
- d.        (1) Digital Control Module (DCM004)
- e.        (1) Analog Monitor Module (AMM ---)
- f.        (1) Backup Battery
- g.        (1) RTU Antenna

**END OF SECTION 190**

## **DIVISION 1**

### **GENERAL REQUIREMENTS**

## **SECTION 01000**

### **SUMMARY OF WORK**

#### **PART I - GENERAL**

##### **1.01 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Furnish all equipment, materials, labor, and supervision necessary to convert existing Lift Station No. 82 from a dry pit pump station to a triplex submersible pump station. The converted lift station includes three (3) new submersible pumps, a new section of concrete wet well, HDPE, ductile iron, and PVC piping, concrete top slab, concrete lift station pad, and electrical and control equipment. CONTRACTOR will be responsible for necessary bypass of the existing station during construction.
- B. Project includes all demolition necessary to convert the existing station from a dry pit configuration to a submersible station. Demolition includes but is limited to existing pump station piping, chainlink fence, concrete driveway, dry can, pumps, top section of wet well, control panel, and all other items and appurtenances as shown on the Drawings and indicated within these Specifications.
- C. This Project includes, but is not limited to, all pipe, fittings, valves, pipe supports, manholes, precast concrete structures, concrete pad and supports, pumps, control panels, temporary sheeting, shoring, dewatering, support for existing structures and infrastructure, coatings, temporary bypass piping, demolition work, site work, maintenance of traffic, restoration, and other work as shown on the drawings and specified. The Work includes general conditions, bonds, indemnification, mobilization, demobilization, start-up, testing, record drawings, operation and maintenance manuals, OWNER training, and any all other necessary items to provide a complete and operating system.
- C. All Work shall be in accordance with the General Conditions.

##### **1.02 WORK BY OTHERS**

- A. The CONTRACTOR will diligently perform the scope of work independently of all others who may perform concurrent tasks during execution of the scope of work.
- B. The OWNER reserves the right to add to the work in accordance with the General Conditions.
- C. The ENGINEER or OWNER's representative reserves the right, throughout the construction process, to perform onsite inspections of the CONTRACTOR and construction process. Documentation of work may include, but not be limited to,

detailed documentation of daily work performed by the CONTRACTOR, and photographs and/or videos of critical phases of construction.

### **1.03 WORK SEQUENCE**

- A. The CONTRACTOR shall submit the sequence of work for review and approval by the OWNER and ENGINEER prior to commencement of work.
- B. CONTRACTOR must apply for and obtain all required permits for construction, including but not limited to building permits and dewatering permits, prior to commencement of construction activities.
- C. The CONTRACTOR is responsible to complete the work in the time as set forth by the General Conditions, which is 210 calendar days for substantial completion and 275 calendar days for final completion.

### **PART 2 – PRODUCTS**

NOT USED

### **PART 3 – EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01039**

### **COORDINATION AND MEETINGS**

#### **PART 1 – GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Coordination.
  - 2. Field engineering.
  - 3. Cutting and patching.
  - 4. Preconstruction conference.
  - 5. Progress meetings.

##### **1.02 COORDINATION**

- A. Coordinate scheduling, submittals, and work to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items to be installed later.
- B. Coordinate completion and clean up of Work of separate sections in preparation for Substantial and Final Completions.
- C. Coordinate any tie-ins to existing piping with Loxahatchee River District (LRD). Obtain written authorization prior to disconnecting or shutting down any pumps, equipment, meters, water mains, reclaimed mains, force mains, opening or closing valves, or performing tie-ins.
- D. Procure approval from LRD prior to operating any existing valve.

##### **1.03 FIELD ENGINEERING**

- A. Employ a Land Surveyor registered in the State of Florida and acceptable to the ENGINEER and OWNER to perform all field surveys.



- B. CONTRACTOR shall locate and protect survey control and reference points.
- C. Control datum for survey is Vertical Control NAVD 1988.
- D. Provide field engineering services. Utilize land surveyor to establish elevations, lines, and levels, utilizing recognized survey practices.
- E. Submit signed and sealed certification prepared by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

#### **1.04 CUTTING AND PATCHING**

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affects:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.
  - 3. Efficiency, maintenance, or safety of element.
  - 4. Visual qualities of sight-exposed elements.
  - 5. Work of OWNER or separate CONTRACTOR.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
  - 1. Fit the several parts of the Work together, to integrate with other Work.
  - 2. Uncover Work for exploration and identification of existing utilities or for installation of subsequent Work.
  - 3. Remove and replace defective and non-conforming Work.
  - 4. Remove samples of installed Work for testing.
  - 5. Provide openings in elements of Work for penetrations by mechanical and electrical Work.

- D. Execute Work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill, as required.
- F. Restore Work with new Products in accordance with requirements of the Task Order.
- G. Construct a tight fit between the Work and pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- I. Identify any hazardous substance or condition exposed during the Work to the ENGINEER.

#### **1.05 PRECONSTRUCTION CONFERENCE**

- A. ENGINEER will schedule a conference after Notice to Proceed.
- B. Attendance Required: OWNER, ENGINEER, and GENERAL CONTRACTOR
- C. Agenda:
  - 1. Designation of personnel representing the parties as defined in the General and Supplemental Conditions, and the ENGINEER.
  - 2. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
  - 3. Scheduling.

#### **1.06 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work as required.
- B. Attendance Required: Job superintendent, major Subcontractors and suppliers, OWNER, ENGINEER, as appropriate to agenda topics for each meeting.
- C. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress and updated schedule.
3. Field observations, problems, and decisions.
4. Identification of problems, which impede planned progress.

**PART 2 – PRODUCTS**

NOT USED

**PART 3 – EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01200**

### **MEASUREMENT AND PAYMENT**

#### **PART 1 - GENERAL**

##### **1.01 GENERAL REQUIREMENTS**

- A. The Unit prices stated in the Contract shall be considered payment in full for the completion of all work. Payment shall be made under each item only for work as it is not specifically included under other items.
- B. The CONTRACTOR shall furnish all labor, equipment and material required to complete the construction that will convert existing Lift Station No. 82 from a dry pit pump station to a triplex submersible pump station. The converted lift station includes three (3) new submersible pumps, a new section of concrete wet well, HDPE, ductile iron, and PVC piping, concrete top slab, concrete lift station pad, and electrical and control equipment.

##### **1.02 PERFORMANCE**

- A. Section generally defines unless otherwise indicated, the following:
  - 1. Payment item descriptions.
  - 2. Payment application descriptions.
- B. The cost of temporary facilities, bonds, insurance, attending project meetings, administration, record drawings, policing, and other general duties shall be considered incidental to all items.
- C. The OWNER may direct the CONTRACTOR to install certain portions of the work in advance of other portions without extra payment to the CONTRACTOR.

##### **1.03 RELATED SECTIONS**

- A. Notice to Contractors
- B. Article 1 - Instructions to Bidders.
- C. Article 2 - Bid Form.
- D. Article 4 – Contract.
- E. Article 10 - General Conditions.

#### **1.04 LUMP SUM ITEMS**

- A. The lump sum price shall be full compensation for all labor, materials and equipment to satisfactorily complete the installation of the items as shown on the plans and indicated in the details for lump sum bid items.

#### **1.05 UNIT PRICE ITEMS**

- A. The ENGINEER or his representative shall determine the number of units of each work item installed.

#### **1.06 SATISFACTORY COMPLETION**

- A. Satisfactory completion shall include dewatering, if any, and repair or replacement of damaged landscaping, irrigation systems, pavement or other existing improvements.

#### **1.07 PAYMENT ITEMS**

- A. Unit Price Bid
  - 1. Payment shall constitute summation of measured quantities multiplied by the respective unit price for items constructed as specified herein and shown on the engineering drawings; including installation and removal of all temporary facilities, piping; and supply of all incidental materials, equipment and labor necessary to complete the contemplated Work whether specifically identified herein or not.
  - 2. Partial progress payments will be made at monthly intervals and will be based upon the value of the Work completed on the date that a partial payment application is submitted less deductions for retainage as defined elsewhere. Signed and Sealed Record Drawings shall be submitted and approved with each partial and final pay request.

#### **1.08 PAYMENT APPLICATION DESCRIPTION**

- A. Preparation of Applications:
  - 1. Present required information in type written form, or equivalent.
  - 2. Execute certification by signature of authorized officer.
  - 3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.
  - 4. List each authorized Change Order as an extension on the Application for

Payment, listing Change Order number and dollar amount as for an original item of Work.

**B. Submittal Procedures**

1. Submit three (3) copies of each Application for Payment.

Payment Period: Submit monthly as directed by the OWNER.

Submit signed and sealed record drawings covering work for which payment is being requested.

Submit revised progress schedule accurately reflecting the work completed and the schedule of future work items.

**C. Substantiating Data**

1. When OWNER requires substantiating information, submit data justifying dollar amounts in question.
2. Provide one (1) copy of data with cover letter of each copy of application. Show Application number and date, and line item by number and description on each piece of data.

**PART 2 – PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

**3.01 BID ITEM DESCRIPTIONS**

**A. PAY ITEM NO. 1 – MOBILIZATION/DEMOBILIZATION**

The Contract Lump Sum for this item shall constitute full compensation for mobilization, demobilization, general conditions, insurances, monthly photos, shop drawings, permits, temporary facilities, and bonding in accordance with the contract documents. The first payment shall not include mobilization / demobilization if the CONTRACTOR has not started work at the project site. Payment for this item shall be by Lump Sum (LS). Total cost of this item shall not exceed 10% of the total contract value.

**B. PAY ITEM NO. 2 – MAINTENANCE OF TRAFFIC**

The Contract Lump Sum for this item shall constitute full compensation for providing all necessary permits and traffic devices to maintain traffic during construction and restoration. Traffic devices may be in the form of barricades, personnel, lights, signs, temporary rock roadways, etc. All work shall be in accordance with all applicable Florida Department of Transportation specifications, and in accordance with the governing municipalities and other governing agencies. Payment for this item shall be by Lump Sum (LS).

**C. PAY ITEM NO. 3 – RECORD DRAWINGS**

The Contract Lump Sum for this item shall constitute full compensation for providing a Professional Surveyor licensed in the State of Florida to perform as-built surveying including: signed and sealed record drawings; AUTOCAD record drawings and other items described in **Section 01720 - Record Documents**. Payment for record drawing information will be made upon completion of all required items in accordance with the requirements of the Contract Documents. Payment for record drawings will be processed after drawings are approved. No partial payments shall be made for record drawings. Payment for this item shall be by Lump Sum (LS).

**D. PAY ITEM NO. 4 – PRECONSTRUCTION VIDEO**

The Contract Unit Price for this item shall constitute full compensation for providing, prior to start of construction, a video of the project by a professional video-taping service acceptable to the OWNER. The video may include all driveways, landscaping area, etc. for each side of the streets. The video should extend from right-of-way to right-of-way and 10' beyond. A copy of the video shall be turned over to the OWNER and ENGINEER for their use. Payment for this item shall be by Lump Sum (LS).

**E. PAY ITEM NO. 5 – NPDES PERMIT/EROSION MEASURES**

The Contract Lump Sum for this item shall constitute full compensation for establishing, constructing and maintaining erosion and sediment control measures. The erosion control programs shall be maintained during the entire period of construction, including any extensions in Contract time. Temporary erosion and pollution control shall include construction work off-site where such work is necessary as a result of borrow pit operations, haul roads or equipment storage sites, etc. This work shall also include the preparation of any required Stormwater Pollution Prevention Plan (SWPPP), including modifications and updates. The CONTRACTOR shall obtain and comply with all provisions of the State of Florida, Department of Environmental Protection, Permit for Stormwater Discharge from Large and Small Construction Activities (NPDES Construction Site Permit Program). Payment for this item shall be by Lump Sum (LS).

**F. PAY ITEM NO. 6 – EXISTING PUMP STATION DEMOLITION**

The Contract Lump Sum for this item shall constitute full compensation for

demolition of the existing dry can pump station, including removal of all existing electrical equipment, conduits, pipes, pumps, wet well top slab with hatch, steel dry can and appurtenances, 4-foot diameter section of wet well, asphalt driveway, pump station concrete pad, chain link fence, air piping, and all other items as shown on the Contract Drawings. This item includes core drilling of holes in the base of the dry can, removal of concrete tank at north end of lift station sit, and all necessary fill required to match the area to existing grade. Payment for this item shall be on a lump sum (LS) basis.

**G. PAY ITEM NO. 7 – 11’ DIAMETER CONCRETE WET WELL**

The Contract Unit Price for this item shall constitute full compensation for the installation of a new section of concrete wet well on top of and existing section of concrete wet well. This item includes all necessary dewatering, excavation, including rock excavation, backfill, compaction, sheeting, removal of unsuitable material, furnishing and installing concrete fillet, factory installed liner, seals, installation of ramneck with retainer strap and any other necessary items to provide a complete seal between the new and existing wet well sections. Item includes testing and any and all other items necessary to complete this bid item. Measurement and Payment shall be per each (EA) 11’ diameter complete precast wet well structure furnished, installed and accepted.

**H. PAY ITEM NO. 8 – 11” DIAMETER CONCRETE WET WELL TOP SLAB, HATCH COVER FRAME, COVER, SAFETY GRATE, AND VENT PIPE**

The Contract Unit Price for this item shall constitute full compensation for labor, materials and equipment required for the installation of a new 11’ diameter wetwell top slab, hatch cover frame, cover, safety grate, vent pipe, approved corrosion system, clean fill dirt, sodding area as needed, compaction, testing and any and all other items necessary to complete the installation for acceptance by the OWNER. Measurement and Payment shall be lump sum for each wetwell concrete top slab, hatch cover frame, cover, safety grate, vent pipe and approved corrosion system.

**I. PAY ITEM NO. 9 – LIFT STATION CORROSION BARRIER SYSTEM**

The Contract Unit Price for this item shall constitute full compensation for application of a corrosion barrier system within the new/existing wet well structure, as indicated on the Contract Drawings. The unit price shall include, but is not limited to, pressure washing, manual cleaning, sludge removal, sludge disposal, pressure grouting leaks, sand blasting existing coating and application of an approved corrosion barrier system. Measurement and Payment shall be per square foot (SF) of wet well wall and floor.

**J. PAY ITEM NO. 10 – CONCRETE VALVE VAULT**

The Contract Unit Price for this item shall constitute full compensation for new concrete valve vault including, but not limited to, structure, aluminum hatch, dewatering, excavation, including rock excavation, backfill, compaction, removal of unsuitable material, furnishing and installing top slab, concrete bottom, factory installed liner, seals, testing and any and all other items necessary to complete this



item. Measurement and Payment shall be per each (EA) precast valve vault structure, furnished, installed, and accepted.

**K. PAY ITEM NO. 11 – 8” DIP EMERGENCY BYPASS ASSEMBLY WITH CAMLOK**

The Contract Unit Price for this item shall constitute full compensation for new emergency bypass assembly, including, but is not limited to, furnishing and installing all new DIP pipe, fittings, coatings, cam-lok, brackets, drilling, sealant, gaskets, hardware, excavation, dewatering, bedding and backfill, testing and other related and necessary materials, work and equipment required to complete this item. Measurement and Payment shall be per each (EA) bypass pipe assembly installed with Cam-Lok.

**L. PAY ITEM NO. 12 – 8” HDPE DR-11 WET WELL DISCHARGE PIPING**

The Contract Unit Price for this item shall constitute full compensation for new wet well discharge piping, including but not limited to, furnishing and installing all pipe, fittings, coatings, stainless steel pipe bracing, drilling, pipe through wetwell walls and/or valve vault walls, wall seals, sealant, gaskets, hardware, flange adapters to connect the at each end, excavation, removal and proper disposal of existing pipe, testing and other related and necessary materials, work and equipment required to complete this item. Measurement and Payment shall be per linear feet (LF) of pipe measured along the centerline of pipe through the fittings from the pump base elbow or flanged eccentric reducer to the check valve in the valve vault in place, completed and accepted.

**M. PAY ITEM NO. 13 – MECHANICAL JOINT DUCTILE IRON FITTINGS**

The Contract Unit Price for this item shall constitute full compensation for the furnishing of all materials, labor, equipment and tools for the complete installation of ductile iron fittings as shown on the Drawings and Specifications. The unit price for this item shall include, but not be limited to, excavation, disposal of excess materials, bracing, sheeting, rock removal, trench safety, furnishing and installing of ductile iron fittings, restraints, accessories, markers, backfilling, compaction, flushing, pressure testing and grading as shown on the Drawings. Measurement and Payment shall be based on the actual weight of the fittings installed per ton. The weight of glands, gaskets, nuts, washers, bolts, rods and other accessories shall not be measured for payment. Fittings shall include protective liner per the Loxahatchee River District's Technical Specifications.

**N. PAY ITEM NO. 14 – WET WELL DROP BOWL AND SDR 26 PVC DROP PIPE ASSEMBLY**

The Contract Unit Price for this item shall constitute full compensation for installation of drop bowl assembly and associated PVC drop piping in lift station wet well as shown on the Contract Drawings. The unit price shall include, but is not limited to furnishing and installing all new PVC pipe, fittings, coatings, fiberglass assemblies, drilling, sealant, gaskets, mounting straps, hardware, and other related and necessary materials, work and equipment required to complete this item.

Measurement and Payment shall be per each (EA) drop bowl assembly installed.

**O. PAY ITEM NO. 15 – WET WELL DROP ASSEMBLY FOR FORCE MAIN INFLUENT (8-12 INCH)**

The Contract Unit Price for this item shall constitute full compensation for installation of drop assembly and associated HDPE drop piping in lift station wet well as shown on the Contract Drawings. The unit price shall include, but is not limited to furnishing and installing all new butt-fused HDPE pipe, fittings, drilling, sealant, gaskets, mounting straps, hardware, and other related and necessary materials, work and equipment required to complete this item. Measurement and Payment shall be per each (EA) drop assembly installed.

**P. PAY ITEM NO. 16 – TEMPORARY BYPASS PUMPING AND PIPING ASSEMBLY**

The Contract Unit Price for this item shall constitute full compensation for bypass pumping of the station for the project duration. The unit price shall include, but is not limited to, temporary piping assemblies, bypass pump, bypass pump power/fuel, and all appurtenances required per the contract drawings and specifications. Measurement and Payment shall be per each lift station placed on temporary bypass pumping in order to construct the proposed improvements.

**Q. PAY ITEM NO. 17 – CONCRETE LIFT STATION PAD**

The Contract Unit Price for this item shall constitute full compensation for installation of a new concrete lift station pad. The unit price shall include, but is not limited to, all labor, materials and equipment, reinforcing, expansion joint, compacting, finishing, broom finish required, testing and incidentals necessary to complete this bid item. All necessary concrete and density testing for the pad shall be completed as part of this item and shall be at the expense of the Contractor. Measurement and Payment shall be per square yard (SY) of poured-in-place 6" thick concrete pad with No. 9 wire mesh (6" X 6").

**R. PAY ITEM NO. 18– CONNECTION TO EXISTING WASTEWATER FORCE MAIN**

The Contract Unit Price for this item shall constitute full compensation for connections to existing wastewater force main. The unit price shall include, but is not limited to, restraining the existing main, draining and proper disposal of force main residuals, and any other necessary work associated with the connection, in accordance with the requirements of the Contract Documents and/or Drawings. Measurement and Payment shall be per each (EA) connection furnished and installed.

**S. PAY ITEM NO. 19 – INSTALLATION OF 60-HP PUMP AND APPURTENANCES**

The Contract Unit Price for this item shall constitute full compensation for installation of new submersible lift station pumps. The unit bid price shall include, but is not limited to, installation of the submersible pump, base plates, base elbows,

guide rails, and other appurtenances necessary to provide a functioning and complete pump system. Pump, base elbows, base plates, guide rails shall be owner furnished. Contractor shall be responsible for miscellaneous hardware and labor required for complete and successful installation of the pumps and pump accessories. Measurement and Payment shall be a lump sum (LS) for installation of three (3) pumps and appurtenances.

**T. PAY ITEM NO. 20 – 8” PLUG VALVE**

The Contract Unit Price for this item shall constitute full compensation for installation of new 8” plug valves as shown on the Contract Drawings. The unit price shall include, but is not limited to, furnishing and installing the flanged or mechanical joint valve, restraints, and accessories as shown on the Construction Drawings. Valve collars and valve boxes shall be installed for below grade valves as necessary and as part of this item. Measurement and Payment shall be per each (EA) plug valve furnished and installed, in accordance with the requirements of the Contract Documents.

**U. PAY ITEM NO. 21 – 14” PLUG VALVE**

The Contract Unit Price for this item shall constitute full compensation for installation of new 14” plug valves as shown on the Contract Drawings. The unit price shall include, but is not limited to, furnishing and installing the flanged or mechanical joint valve, restraints, and accessories as shown on the Construction Drawings. Valve collars and valve boxes shall be installed for below grade valves as necessary and as part of this item. Measurement and Payment shall be per each (EA) plug valve furnished and installed, in accordance with the requirements of the Contract Documents.

**V. PAY ITEM NO. 22 – 8” SWING CHECK VALVE**

The Contract Unit Price for this item shall constitute full compensation for installation of new 8” swing check valve as shown on the Contract Drawings. The unit price shall include, but is not limited to, furnishing and installing the flanged or mechanical joint valve, restraints, and accessories as shown on the Construction Drawings. Measurement and Payment shall be per each (EA) check valve furnished and installed, in accordance with the requirements of the Contract Documents.

**W. PAY ITEM NO. 23 – CONCRETE DRIVEWAY**

The Contract Unit Price for this item shall constitute full compensation for installation of a new concrete driveway at the lift station site. The unit price shall include, but is not limited to, all labor, materials and equipment, reinforcing, expansion joint, compacting, finishing, broom finish required, testing and incidentals necessary to complete this bid item. All necessary concrete and density testing for the driveway shall be completed as part of this item and shall be at the expense of the Contractor. Measurement and Payment shall be per square yard (SY) of concrete driveway furnished and installed.

**X. PAY ITEM NO. 24 – LIFT STATION CONTROL PANEL AND ELECTRICAL APPURTENANCES**

The unit price shall include, but is not limited to, removal and proper disposal of existing control panel, conduit and wire connections to the wet well, reconnecting all ground wiring, connecting wiring from antenna tower, all conduit and wire connections required and all other related and necessary materials, labor and equipment required. This item shall include furnishing and installation of a new utility meter, main disconnect switch, motor junction box, and automatic transfer switch where shown on the Drawings and as indicated in the Specifications. Item includes furnishing and installation of a new lift station control panel including PLC, VFDs, junction boxes, and step-down transformer. Item shall include all conduits, cables, mounting hardware, seals, and grounding necessary to provide a fully functional electrical system. Measurement and Payment shall be a lump sum (LS) per each control panel furnished and installed.

**Y. PAY ITEM NO. 25 – LIFT STATION INSTRUMENTATION**

The Contract Unit Price for this item shall constitute full compensation for all necessary lift station instrumentation as shown on the contract drawings and indicated within these specifications. The unit price shall include, but is not limited to, furnishing and installation of mounting support, antenna and mast, RTU panel, wet well level transmitter and float, lift station pressure transducer and stilling well, programming of the PLC and RTU, and all other items included in the Drawings and Specifications and as necessary to provide a complete lift station instrumentation system. Measurement and Payment shall be a lump sum (LS) for each lift station instrumentation package.

**Z. PAY ITEM NO. 26 – LIFT STATION GENERATOR INSTALLATION (OWNER FURNISHED EQUIPMENT)**

The Contract Unit Price for this item shall constitute full compensation for installation of an emergency generator at the lift station site. The unit price shall include, but is not limited to, all labor, materials and equipment necessary for installation of a complete and functioning generator system, including electrical work. Generator equipment will be furnished by Owner. Measurement and Payment shall be a lump sum (LS) for cost of generator installation.

**AA. PAY ITEM NO. 27 – MISCELLANEOUS RESTORATION**

The Contract Unit Price for this item shall constitute full compensation for The unit price shall include, but is not limited to, furnishing and installing any necessary utility repairs, landscaping replacement, concrete sidewalk repairs, and any other restoration required to bring the lift station site to pre-construction condition or better. Measurement and Payment shall be a lump sum (LS) for miscellaneous restoration required at the lift station site, not covered in other bid items.

**END OF SECTION**

## **SECTION 01300**

### **SUBMITTALS**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Submittal procedures.
  - 2. Construction progress schedules.
  - 3. Dewatering plans.
  - 4. Temporary Trenching, Sheeting, and Shoring Plan.
  - 5. Proposed products list.
  - 6. Shop drawings.
  - 7. Product data.
  - 8. Manufacturers' instructions.
  - 9. Manufacturers' certificates.
  - 10. Standard Operating Procedure: System Shutdowns and Bypass.

##### **1.02 RELATED SECTIONS**

- A. **Section 01400** - Quality Control: Manufacturers' field services and reports.
- B. **Section 01780** - Contract Closeout: Contract warranty and manufacturer's certificates, closeout submittals.

### **1.03 SUBMITTAL PROCEDURES**

- A. Transmit each submittal with ENGINEER accepted form. All submittals shall be submitted electronically. Responses to submittals will also be performed electronically.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- D. Apply CONTRACTOR's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to ENGINEER at their business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for CONTRACTOR and ENGINEER review stamps on each submittal.
- H. Only complete submittals will be reviewed. Partial or incomplete submittals for a product will be returned to the CONTRACTOR without review.
- I. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- J. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

### **1.04 CONSTRUCTION PROGRESS SCHEDULES**

- A. Submit initial progress schedule as required in the "Special & General Conditions".
- B. Revise and resubmit as required in the "Special & General Conditions".

- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at submission of each Application for Payment.
- G. At the end of each week, CONTRACTOR shall submit a written 2-week look ahead describing the construction activities that will take place to allow for coordination with Engineer, OWNER, and other parties.

#### **1.05 DEWATERING PLANS**

- A. Submit dewatering plans to ENGINEER for review.
- B. After ENGINEER's review of dewatering plans, CONTRACTOR shall submit plans to proper governing authority and receive permits for dewatering prior to construction.
- C. CONTRACTOR is responsible for paying any dewatering permit fees.

#### **1.06 PROPOSED PRODUCTS LIST AND INFORMATION**

- A. Submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number or each product. These products should include as a minimum the following:
  - 1. Concrete Wet Well
  - 2. Concrete Valve Vault
  - 3. Lift Station Corrosion Barrier System
  - 4. Ductile Iron Pipe
  - 5. HDPE

6. Fittings and Pipe Restraints.
  7. Valves
  8. Drop Bowl Assembly
  9. CDR Boxes.
  10. EMS Markers.
  11. Temporary Bypass Pumping and Piping
  12. Transition Couplings.
  13. Concrete.
  14. Power and Control Panel.
  15. Wind Load Certification for Power and Control Panel.
  16. Others as required (Additional submittal requirements are provided in the individual specification sections).
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

#### **1.07 SHOP DRAWINGS**

- A. After review, distribute in accordance with Article on Procedures above and for Record Documents described in **Section 01780** - Contract Closeout.

#### **1.08 PRODUCT DATA**

- A. Submit the number of copies which the CONTRACTOR requires, plus one (1) electronic (pdf) copy, which will be retained by the ENGINEER.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.



- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in **Section 01780 - Contract Closeout**.

#### **1.09 MANUFACTURER'S INSTRUCTIONS**

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

#### **1.10 MANUFACTURER'S CERTIFICATES**

- A. When specified in individual specification Sections, submit manufacturers' certificate to ENGINEER for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- B. Certificates may be recent or previous test results on material or Product, but must be acceptable to ENGINEER.

### **PART 2 – PRODUCTS**

NOT USED

### **PART 3 – EXECUTION**

NOT USED

**END OF SECTION**

## SECTION 01360

### PRE-CONSTRUCTION AUDIO-VIDEO DOCUMENTATION

#### PART 1 - GENERAL

##### 1.01 PERFORMANCE

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise rated, for the following:
  - 1. Audio-Video Documentation.
  - 2. Equipment.
  - 3. Submittals.
  - 4. Technique.
  - 5. Quality Assurance.

##### 1.02 QUALITY ASSURANCE

- A. Documentation shall be performed by a responsible commercial firm known to be skilled and regularly engaged in the preparation of pre-construction color audio-video documentation. **Any Preconstruction video produced by the CONTRACTOR will be immediately rejected.** All preconstruction videos are to be completed by a firm with extensive amount of previous experience in producing preconstruction documentation.
- B. Completed documentation shall reproduce bright, sharp pictures with accurate colors and shall be free from distortion, tearing, rolling, or any other significant picture imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity, and be free of distortion.
- C. Construction shall not proceed until the OWNER and ENGINEER have reviewed the documentation and notified the CONTRACTOR of its acceptability.

##### 1.03 MEASUREMENT AND PAYMENT

- A. No separate payment item is provided for this work. The cost of performing this work shall be incorporated into the bid items or lump sum amount identified on the bid form.

## **PART 2 - PRODUCTS**

### **2.01 RECORDING EQUIPMENT**

- A. Utilize color video camera having:
  - 1. Horizontal Resolution of 350 lines at center.
  - 2. 8:1 Zoom, minimum.
- B. Utilize digital format recorder having:
  - 1. Minimum horizontal resolution of 540 lines, 60 fields.

### **2.02 RECORDING MEDIA**

- A. Utilize new, Digital Video Disc (DVD) having:
  - 1. DVD shall be DVD-R. DVD-RAM shall not be accepted.
  - 2. 4¾-inch diameter discs.
  - 2. High resolution.
  - 3. 4.7 gigabyte storage per layer with two (2) layers (minimum).

## **PART 3 - EXECUTION**

### **3.01 COVERAGE**

- A. Record coverage of all surface features located in the construction's zone of influence (including the proposed storage area(s)) including, but not limited to:
  - 1. Roadways, driveways, sidewalks.
  - 2. Treatment facilities, surrounding structures, sanitary facilities.
  - 3. Drainage structures, abovegrade utilities, drainage swales, canals.
  - 4. Landscaping, trees, shrubbery, fences, irrigation heads, meters.
- B. Record the individual features of each item with particular attention being focused upon the existence of any faults, fractures, or defects.
- C. Control pan rate, rate of travel, camera height and zoom rate to maintain a steady clear view at all times.

- D. Limit recorded coverage to one side of any street at any one time.
- E. Create a single, continuous, unedited recording that begins and ends within each portion of a particular construction area. The recording shall proceed in the direction of ascending baseline stationing.

### **3.02 AUDIO CONTENT**

- A. Simultaneously record audio content during videotaping.
- B. Audio recording shall assist in viewer orientation and in any needed identification, clarification, or description of features being recorded.
- C. Audio recording will only consist of camera operator commentary.

### **3.03 INDEXING**

- A. Permanently label each tape with a sequential tape number and the project name.
- B. Index each DVD with a digital record of the time and date of the recording that is continuously displayed as the DVD is played.
- C. Prepare a written log which describes the contents of each DVD including:
  - 1. Structure/location names.
  - 2. Coverage begin/end, station and location.
  - 3. Recording date.

### **3.04 CONDITIONS**

- A. Record coverage during dry, clear weather and during daylight hours only.
- B. Record coverage when the area to be covered is free of debris or obstructions.
- C. Record coverage no more than 15 days prior to the start of construction.

**END OF SECTION**

## **SECTION 01400**

### **QUALITY CONTROL**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Quality assurance and control of installation.
  - 2. References.
  - 3. Inspection and testing laboratory services.

##### **1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. Provide devices or utilize methods necessary for compliance with the "Trench Safety Act".

##### **1.03 REFERENCES**

- A. Conform to reference standard as identified in each individual technical specification section.

- B. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.
- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by any reference standard or document.

#### **1.04 INSPECTION AND TESTING LABORATORY SERVICES**

- A. CONTRACTOR will appoint, employ, and pay for services of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the ENGINEER.
- C. Reports will be submitted by the independent firm to the ENGINEER, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
  - 1. Notify ENGINEER and independent firm 24 hours prior to expected time for operations requiring services.
  - 2. Make arrangements with independent firm and pay for additional samples and tests required for CONTRACTOR's use.
- E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The cost for retesting shall be the CONTRACTOR's responsibility.
- F. Testing to be provided by the CONTRACTOR shall include, at a minimum:
  - 1. Density testing.
  - 2. Testing of the new force main and discharge piping.
  - 3. Testing of new pumps.

## **PART 2 PRODUCTS**

NOT USED

**PART 3 EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01500**

### **CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

#### **PART 1- GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Temporary Utilities: Electricity, water, and sanitary facilities.
  - 2. Temporary Controls: Barriers, enclosures and fencing, protection of the Work.
  - 3. Construction Facilities: Parking, progress cleaning, and project signage.

##### **1.02 RELATED SECTIONS**

- A. **Section 01700** – Contract Closeout.

##### **1.03 TEMPORARY WATER SERVICE**

- A. CONTRACTOR shall be responsible for obtaining construction water and construction meter and for all hauling or conveyance of water to the site.

##### **1.04 TEMPORARY SANITARY FACILITIES**

- A. CONTRACTOR shall provide and maintain required facilities.

##### **1.05 BARRIERS AND TRAFFIC CONTROL**

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage due to construction operations and demolition.
- B. Provide protection for natural vegetation designated to remain. Replace protected vegetation, if damaged.
- C. Protect all landscaping and decorative vegetation. Restore damaged landscaping and vegetation to its original condition.
- D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.



- E. Provide signs, signals, cones, barricades and trained flagmen to direct traffic in and around the construction site in accordance with Florida Department of Transportation Work Zone Traffic Control Standards.
  - 1. Prepare a WORK ZONE TRAFFIC CONTROL PLAN and submit that plan to the appropriate officials in all municipalities and jurisdictions where the Work will impact the flow of traffic.
  - 2. Obtain written approval of that plan from all municipalities and jurisdictions, and then provide copies of the plan and all approvals to the OWNER and ENGINEER prior to the start of construction. All approvals must be obtained prior to construction.
  - 3. Keep specified areas open and accessible at all times.

#### **1.06 PROTECTION OF INSTALLED WORK**

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for existing and installed Products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings as needed.
- D. Protect finished floors, stairs, roadways, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

#### **1.07 SECURITY**

- A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

#### **1.08 ACCESS ROADS**

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow. Coordinate interruptions in normal public vehicular traffic flow with those governmental agencies having authority over each roadway.

#### **1.09 PARKING**

- A. Provide temporary parking areas to accommodate construction personnel.

- B. Temporary parking areas must not interfere with normal traffic flow or designated parking for others.
- C. Temporary parking areas must be approved by the ENGINEER and OWNER.

#### **1.10 PROGRESS CLEANING**

- A. Maintain all construction areas free of waste materials, debris, and rubbish. Maintain all sites in a clean and orderly condition.
- B. Broom and vacuum clean areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- C. Remove waste materials, debris, and rubbish from site daily and dispose of at approved location.
- D. Always keep roadways, sidewalks and bicycle paths clear of construction debris and trash.
- E. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent airborne dust from dispersing into the atmosphere. CONTRACTOR shall immediately mitigate dust upon complaint.

#### **1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of three (3) feet. Existing dry can shall be removed to a minimum depth of six (6) feet.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

### **PART 2 - PRODUCTS**

NOT USED

### **PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01600**

### **MATERIAL AND EQUIPMENT**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Products.
  - 2. Transportation and handling.
  - 3. Storage and protection.
  - 4. Product options.
  - 5. Substitutions.

##### **1.02 RELATED SECTIONS**

- A. Instructions to Bidders: Product options and substitution procedures.
- B. **Section 01400** - Quality Control.

##### **1.03 PRODUCTS**

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

##### **1.04 TRANSPORTATION AND HANDLING**

- A. Transport and handle Products in accordance with manufacturer's instructions.

- B. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods which prevent soiling, disfigurement, or damage.

#### **1.05 STORAGE AND PROTECTION**

- A. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated Products, place on secure supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection. On-site storage of products must be approved by the OWNER and ENGINEER prior to delivery.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Arrange storage of Products to permit access for inspection. Periodically inspect to assure Products are undamaged and are maintained under specified conditions.

#### **1.06 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## **1.07 SUBSTITUTIONS**

- A. Substitutions may be considered when a Product becomes unavailable through no fault of the CONTRACTOR.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- C. A request constitutes a representation that the Bidder:
  - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
  - 2. Will provide the same warranty for the Substitution as for the specified Product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to OWNER.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Will reimburse OWNER for review or redesign services associated with re-approval by the ENGINEER or governing authorities.
- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
  - 1. Submit three copies of request for Substitution for consideration. Limit each request to one (1) proposed Substitution.
  - 2. Submit shop drawings, Product data, and certified test results attesting to the proposed Product equivalence.
- F. The ENGINEER will notify CONTRACTOR, in writing, of decision to accept or reject request.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01700**

### **CONTRACT CLOSEOUT**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:
  - 1. Closeout Procedures.
  - 2. Final Cleaning.
  - 3. Adjusting.
  - 4. Warranties.

##### **1.02 RELATED SECTIONS**

- A. **Section 01500** - Construction Facilities and Temporary Controls.
- B. **Section 01720** – Record Documents.
- C. **Section 01780** – Closeout Submittals.
- D. **Section 01810** – Equipment Testing and Facility Startup.

##### **1.03 CLOSEOUT PROCEDURES**

- A. Submit written certification that the Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for ENGINEER's inspection.
- B. Provide submittals to ENGINEER that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Purchase Order Sum, previous payments, and sum remaining due. Submit final releases of liens

from all suppliers and subcontractors as required in **Section 01780 – Closeout Submittals**.

- E. Submit final record drawings in accordance with **Section 01720 – Record Documents and LRD requirements**. In addition, the CONTRACTOR is to provide the required number of sets of signed and sealed Record Drawings in order to assist the ENGINEER in closing out all necessary permits.

#### **1.04 FINAL CLEANING**

- A. At completion of the Work or of a part thereof and immediately prior to CONTRACTOR's request for certificate of Substantial Completion or immediately prior to CONTRACTOR's notice of completion, clean entire site or parts thereof, as applicable.
  - 1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to OWNER.
  - 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
  - 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
  - 4. Broom clean exterior paved driveways and parking areas.
  - 5. Hose clean sidewalks, loading areas, and other areas contiguous with principal structures.
  - 6. Rake clean all other surfaces.
  - 7. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

#### **1.05 ADJUSTING**

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.



## **1.06 WARRANTIES**

- A. Provide duplicate copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and Manufacturers.
- C. Provide Table of Contents and assemble in binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
- F. Provide operation and maintenance documentation.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 01720**

### **RECORD DOCUMENTS**

#### **PART 1 - GENERAL**

##### **1.1 REQUIREMENTS**

- A. The CONTRACTOR shall keep and maintain, at the job site, one record copy of all Drawings, Technical Specifications, addenda, change orders, and other modifications to the Contract, approved shop drawings, and field test records.
- B. The CONTRACTOR shall provide record drawings to indicate all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented in the Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the work as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the work.
- C. Record drawings shall be accessible to the ENGINEER at all times during the construction period.
- D. Periodic payments must be accompanied by an updated copy of the record drawings. Pay Applications submitted without record drawings will not be processed by the ENGINEER until the drawings are received. The CONTRACTOR shall provide the following:
  - 1. One (1) set of hard copy record drawings (11"x17" drawings, to scale) and an electronic CAD file on CD.
  - 2. The record drawings for the lift stations shall show accurate locations of fence and gate(s), access driveway(s), wet well, valve vault, terminal manhole, valve/pipe fittings, emergency pump out, RPZ backflow preventer and water service back to existing water main, electrical panel, discharge force main length to furthest isolation valve or to fence or connection point to existing main, and gravity pipes connecting to existing wet well.

3. Record drawings for the gravity collection system shall show the pipe material type, size, length of pipe and slope between pipe manholes, and invert and rim elevations.
  4. Record drawings for the force main shall show the pipe material type, size, and top of pipe elevation.
  5. Provide GPS coordinates of the corners of pump station fences and center of wet well, the locations of manholes, valves, clean-outs, fire hydrants, meters, etc.
- E. Final payment will not be processed until the CONTRACTOR has prepared and delivered record as-built drawings, signed and sealed by a licensed surveyor, to the ENGINEER.
- F. Upon substantial completion of the work and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of signed and sealed record drawings to the ENGINEER for transmittal to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected drawings showing the reported location of the work. The information submitted by the CONTRACTOR and incorporated by the ENGINEER into the Record Drawings will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data furnished to the ENGINEER and the OWNER.

## **1.2 RELATED REQUIREMENTS**

- A. **Section 01300:** Submittals.
- B. **Section 01700:** Project Close Out.

## **1.3 RECORDING**

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with the progress of construction.
- C. Legibly mark drawings to record actual construction.
1. For pipelines, provide horizontal location of pipes any time the pipe passes a permanent surface reference point. Permanent reference points are as defined herein. Any deviations from the alignment shown on the Drawings must be noted.

2. For pressure pipelines, provide vertical locations at 100-foot intervals. Vertical location will be depth of cover or pipe elevation, whichever is called for on the Drawings.
  3. All fittings, including sleeves, valves, and services are to be located by two measurements to permanent surface reference points and by GPS.
  4. Permanent surface reference points are manholes, catch basins, power poles, concrete sidewalk, or concrete curbs. Edge of pavement and road intersections may not be used without the ENGINEER's approval. GPS coordinates shall also be provided.
  5. Field changes of dimension and detail.
  6. Changes made by Field Order, Change Order, or Construction Change Directive.
  7. Details not shown on the original Drawings (i.e. fire hydrants, water meters, water main, etc.).
- D. Legibly mark each Section of the Technical Specifications and Addenda to record:
1. Manufacturer, trade name, catalog number, and supplier of each item actually installed.
  2. Changes made by Field Order, Change Order, or Work Directive.

#### **1.4 SUBMITTAL**

- A. Prior to Substantial Completion, submit Record Documents to the ENGINEER for delivery to the OWNER.
- B. Accompany submittal with a transmittal letter in duplicate, containing:
1. Date.
  2. Project title and number.
  3. CONTRACTOR's name and address.
  4. Title and number of each record document.
  5. Signature of CONTRACTOR or its authorized representative.

- C. Computer generated as-built drawings shall be submitted. Data in tabular form will not be accepted. Following review by the ENGINEER and OWNER, any comments are to be addressed. On final submission, the following items shall be provided.
1. Two (2) signed and sealed sets of prints (24" x 36").
  2. The electronic drawing files must be AutoCAD and PDF format or compatible (DWG file or DXF file) submitted on compact disc (CD or DVD). All fonts and line types shall be from the standard AutoCAD library or be AutoCAD compatible. Reference files and blocks are to be bound to drawings prior to submittal. Layers and drawings created by turning on and off layers are to be documented and submitted in MS Word. As a minimum requirement, electronic files must include all features that were shown on the Drawings.
- D. Record drawings for pump stations provided by the CONTRACTOR shall address the following information:
1. Manufacturer, model number, serial numbers for each piece of equipment.
  2. For each new pump: pump type, design capacity and TDH, shutoff head, impeller size, manufacturer's pump curve reference number, horsepower, efficiency, motor speed, discharge pipe size, and discharge flange pressure rating.

## **PART 2 – PRODUCTS**

Not Used

## **PART 3 – EXECUTION**

Not Used

**END OF SECTION**

## **SECTION 01730**

### **OPERATION & MAINTENANCE MANUALS**

#### **PART 1 - GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Detailed information for the preparation, submission, and ENGINEER's review of Operation and Maintenance (O&M) Data, as required by individual specification sections. The O&M information shall be prepared specifically for this project, and shall include all sections and organization as specified herein.

##### **1.02 DEFINITIONS**

- A. Preliminary Data: Initial and subsequent submissions for ENGINEER's review.
- B. Final Data: ENGINEER-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

##### **1.03 SEQUENCING AND SCHEDULING**

- A. Equipment and System Data.
  - 1. Preliminary Data:
    - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by ENGINEER and OWNER.
    - b. Submit prior to shipment date.
  - 2. Materials and Finished Data
    - a. Preliminary Data: Submit at least fifteen (15) days prior to request for start-up.

- b. Final Data: Submit within ten (10) days after final inspection.

#### **1.04 DATA FORMAT**

- A. Prepare preliminary data in the form of an instructional manual. Prepare final data in data compilation format in electronic media.

- B. Instructional Manual Format:

- 1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
- 2. Size: 8½ inches by 11 inches, minimum.
- 3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE MANUAL” and list:
  - a. Project title.
  - b. Designate Applicable system, equipment, material, or finish.
  - c. Identity of separate structure as applicable.
  - d. Identity of general subject matter covered in the manual.
- 4. Title Page
  - a. CONTRACTOR name, address, and telephone number.
  - b. Subcontractor, supplier, installer, or maintenance CONTRACTOR’s name address, and telephone number, as appropriate.
    - i. Identify area of responsibility of each.
    - ii. Provide name and telephone number of local source of supply for parts and replacement.
- 5. Table of Contents:
  - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
  - b. Identify each product by product name and other identifying numbers or symbols set forth in the Contract Documents.

6. Paper: 20 pound minimum, white for typed pages.
7. Text: manufacturer's printed data, or neatly typewritten.
8. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of materials will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all ENGINEER-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
  - a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
  - b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE MANUAL, VOLUME NO. \_\_\_\_ OF \_\_\_\_", and list:
    - i. Project title
    - ii. CONTRACTOR's name, address, and telephone number.
    - iii. If entire volume covers equipment or system provided by one supplier include the following:
      - a) Identity of general subject matter covered in the manual.
      - b) Identity of equipment number and specification section.
  - c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place content of entire set, identified by volume number in each binder.
  - d. Table of contents neatly typewritten, arranged in systematic order:
    - i. Include list of each product, indexed to content of each volume.
    - ii. Designate system or equipment for which it is intended.



- iii. Identify each product by product name and other identifying numbers or symbols set forth in the Contract Documents.
- e. Section Dividers:
  - i. Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
  - ii. Fly-leaf:
    - a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
    - b) List with each product:
      - 1) Name address, and telephone of subcontractor, suppliers, installer and maintenance CONTRACTOR as applicable.
      - 2) Identity area of responsibility of each.
      - 3) Provide local source of supply for parts and replacement.
  - iii. Identity of separate structure as applicable.
- f. Assemble and bind material, as much as possible, in the same order as specified in the Contract Documents.
- g. Include a data sheet listing specific information for each piece of equipment including:
  - i. Capacity and/or rating (flow and head ratings, speed, etc.)
  - ii. Serial number and/or model number(s)

D. Electronic Media Format:

- 1. Portable Document Format (PDF):
  - a. After all preliminary data has been found to be acceptable to the ENGINEER, submit O&M data in PDF format on CD or DVD.
  - b. Files to be exact duplicates of ENGINEER-accepted preliminary data. Arrange by specification number and name.

- c. Files to be fully functional and viewable in the most recent version of Adobe Acrobat.

## **1.05 SUBMITTALS**

### **A. Informational**

1. Data outline: submit two (2) copies of a detailed outline of the proposed organization and content of the Final Manuals prior to preparation of the preliminary manuals.
2. Preliminary Data:
  - a. Submit two (2) copies for ENGINEER's review.
  - b. If data meets conditions of the Contract:
    - i. One (1) copy will be returned to the CONTRACTOR.
    - ii. One (1) copy will be forwarded to the project representative.
  - c. If data does not meet conditions of the Contract:
    - i. All copies will be returned to the CONTRACTOR with the ENGINEER's comments for revision.
    - ii. ENGINEER's comments will be retained in ENGINEER's file.
    - iii. Resubmit two (2) copies revised in accordance with the ENGINEER's comments.
3. Final Data: Submit two (2) copies in format specified herein.

## **1.06 DATA FOR EQUIPMENT AND SYSTEMS**

### **A. Content for each unit (or common Units) and system:**

1. Product Data:
  - a. Include only those sheets that are pertinent to specific product.
  - b. Clearly annotate each sheet to:
    - i. Identify specific product or part installed.
    - ii. Identify data applicable to installation.
    - iii. Delete references to inapplicable information.

- iv. For data listed in tables, highlight the appropriate data with pointer marking “USE -->”.
  - c. Function, normal operating characteristics, and limiting conditions.
  - d. Performance curves, engineering data, nameplate data, and tests.
  - e. Complete nomenclature and commercial number of replaceable parts.
  - f. Original manufacturer’s part list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered part list, and diagrams required for maintenance.
  - g. Spare parts ordering instructions.
  - h. Where applicable, identify installed spares and other provisions for future work (e.g. reserved panel space, unused components, wiring, terminals)
2. As-installed, color coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
- a. Format:
    - i. Provide reinforced, punched, binder tab: bind in with text.
    - ii. Reduced to 8½ inches by 11 inches, or 11 inches by 17 inches folded to 8½ inches by 11 inches.
    - iii. Where reduction is impractical, fold and place in 8½ inches by 11 inches envelopes bound in text.
    - iv. Identify specification section and product on drawings and envelopes.
  - b. Relations of component parts of equipment and systems.
  - c. Control and flow diagrams.

- d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
- 5. Instructions and procedures: Within text, as required to supplement product data.
  - a. Format:
    - i. Organize in consistent format under separate heading for each different procedure.
    - ii. Provide logical sequence of instructions for each procedure.
    - iii. Provide information sheet for OWNER's personnel, including:
      - a) Proper procedures in the event of failure.
      - b) Instances that might affect validity of guarantee or bond.
  - b. Installation instructions: Including alignment, adjusting, calibrating, and checking.
  - c. Operating procedures:
    - i. Startup, break-in, routine, and normal operating instructions.
    - ii. Test procedures and results of factory tests where required.
    - iii. Regulation, control, stopping, and emergency instructions.
    - iv. Description of operating sequence by control manufacturer.
    - v. Shutdown instructions for both short and extended duration.
    - vi. Summer and winter operating instructions, as applicable.
    - vii. Safety precautions.
    - viii. Special operating instructions.
  - d. Maintenance and Overhaul procedures:
    - i. Routine maintenance.
    - ii. Guide to troubleshooting.
    - iii. Disassembly, removal, repair, reinstallation, and reassembly.
- 6. Start-up information and test reports.
- 7. Guarantee, bond, and service agreement: in accordance with **Section 01780 - Closeout Submittals**.

- B. Content for each electronic item or system:
1. Description of unit and component parts:
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data, nameplate data, and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
    - d. Interconnection wiring diagrams, including control and lighting systems.
  2. Circuit directories of panelboard:
    - a. Electrical service.
    - b. Controls.
    - c. Communication.
  3. List of electrical relay settings, and control and alarm contact settings.
  4. Electrical interconnection wiring diagram, including control and lighting systems.
  5. As-installed control diagrams by control manufacturer.
  6. Operating procedures:
    - a. Routine and normal operating instructions.
    - b. Sequences required.
    - c. Safety precautions.
    - d. Special operating instructions.
  7. Maintenance procedures:
    - a. Routine maintenance.

- b. Guide to troubleshooting.
  - c. Adjustment and checking.
  - d. List of relay settings, control, and alarm contact settings.
- 8. Manufacturer's printed operating and maintenance instructions
  - 9. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  - 10. Start-up information and test reports.

C. Maintenance summary

- 1. Compile individual maintenance summary for each applicable equipment item, respective unit or system, and for components of subunits.
- 2. Format:
  - a. Use maintenance summary form bound with this section.
  - b. Each maintenance summary may take as many pages as needed.
  - c. Use only 8½ inch by 11 inch paper.
  - d. Complete using typewriter or electronic printing.
- 3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommended type, grade, and temperature range of lubricants and frequency of lubrication.
- 4. Recommended spare parts:
  - a. Data to be consistent with manufacturer's bill of materials / parts list furnished in the O&M Manuals.
  - b. "Unit" is the unit of measure for ordering the part
  - c. "Quantity" is the number of units recommended.
  - d. "Unit Cost" is the current purchase price.

## **1.07 DATA FOR MATERIALS AND FINISHES**

- A. Content for architectural products, applied materials and finishes:
  - 1. Manufacturer's data, giving full information on products:
    - a. Catalog number, size, and composition.
    - b. Color and texture designations.
    - c. Information required for reordering special manufactured products
  - 2. Instructions for care and maintenance
    - a. Manufacturer's recommendation for types of cleaning agents and methods.
    - b. Cautions against cleaning agents and methods that are detrimental to product.
    - c. Recommended schedule for cleaning and maintenance.
- B. Content for moisture protection and weather exposed products.
  - 1. Manufacturer's data, giving full information on products:
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Details of installation.
  - 2. Instructions for inspection, maintenance and repair.

## **1.08 SUPPLEMENTS**

- A. The supplement listed below, following "END OF SECTION," are part of this specification.
  - 1. Form: Maintenance Summary Form.

## **PART 2 - PRODUCTS** **NOT USED**

**PART 3 - EXECUTION**  
NOT USED

**END OF SECTION**



## **MAINTENANCE SUMMARY FORM**

PROJECT: \_\_\_\_\_ CONTRACT NO.: \_\_\_\_\_

1. EQUIPMENT ITEM \_\_\_\_\_

2. MANUFACTURER \_\_\_\_\_

3. EQUIPMENT/TAG NUMBER \_\_\_\_\_

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) \_\_\_\_\_

5. NAMEPLATE DATA (hp, voltage, speed, etc.) \_\_\_\_\_

6. MANUFACTURER'S LOCAL REPRESENTATIVE \_\_\_\_\_

a. Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

b. Address \_\_\_\_\_

### 7. MAINTENANCE REQUIREMENTS

<b>Maintenance Operation Comments</b>	<b>Frequency</b>	<b>Lubricant (If Applicable)</b>
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

## 8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobil	Chevron Texaco	BP Amoco	Or Equal
List Symbols used in No. 7 above	List equivalent lubricants as distributed by each manufacture for the specific use recommended.				

## 9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

## **SECTION 01750**

### **GENERAL REQUIREMENTS**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated, for the following:

1. Preservation of Property.
2. Siltation and Bank Erosion.
3. Utility Construction and Adjustment.
4. CONTRACTOR's Responsibility.
5. Use of Chemicals.
6. Progress of Work.
7. OSHA.
8. Utilities and Structures Shown on the Plans.
9. Drainage.
10. Restoration of Surface Improvements.
11. Hours of Operation.

##### **1.02 PRESERVATION OF PROPERTY**

- A. Preserve from damage all property along the line of the work, or which is in the vicinity of or is in any way affected by the work, the removal or destruction of which is not called for by the plans.
- B. Wherever such property is damaged due to the activities of the CONTRACTOR, it shall be immediately restored to its original condition by the CONTRACTOR at no cost to the OWNER.

- C. In case of failure on the part of the CONTRACTOR to restore such property, or make good such damage or injury, the OWNER may, after 48 hours notice to the CONTRACTOR, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary and the cost thereof will be deducted from any monies due or which may become due the CONTRACTOR under this contract.

### **1.03 SILTATION AND BANK EROSION**

- A. Take adequate precautions to minimize siltation and bank erosion in the vicinity of canals or ditches, in discharging well point systems or during other construction activities.
- B. If well pointing, the CONTRACTOR shall notify the South Florida Water Management District and procure and necessary permits.

### **1.04 UTILITY CONSTRUCTION AND ADJUSTMENT**

- A. Bid items for pipe, pump stations, drainage structures, electrical, instrumentation, and appurtenances are for new work only.
- B. Bids for these items shall include all work incidental thereto, such as pavement repair, existing pond lining repair, sodding, landscape and irrigation repair, sidewalk, and all other required restoration work unless otherwise called for.
- C. Where it is necessary to relocate, lower or otherwise adjust existing mains and appurtenances as may be required to accomplish the new pipeline construction, the cost of work shall be included in the unit prices or lump sum price for such new pipeline.

### **1.05 CONTRACTOR'S RESPONSIBILITY**

- A. The CONTRACTOR shall be held strictly responsible for all parts of the work.
- B. If failures in the Work develop within one (1) year from the date of final acceptance, the CONTRACTOR shall be required to replace all faulty material at his full expense. A one (1) year warranty walkthrough shall be attended by the CONTRACTOR with the ENGINEER and South Martin Regional Utility.
- C. The CONTRACTOR is advised to purchase material under a guarantee from the Manufacturer, guaranteeing proper service under conditions that are established by the drawings, specifications and local conditions.

D. The CONTRACTOR shall also be responsible for the following:

1. Charges by others for assistance to the CONTRACTOR for such work as supporting, replacing, moving or providing protection for their facilities as necessitated by the CONTRACTOR's operation.
2. All costs of restoration of the work site to condition equal or better than prior to construction, including landscaping and irrigation systems.
3. All costs of restoration of pavements and structures damaged by the CONTRACTOR's operation. Likewise the CONTRACTOR shall pay all costs of restoring all work areas and all areas where construction materials are stored, whether new materials to be installed or materials removed from the work area incidental to the work solely to the satisfaction of the OWNER.
4. All public liability, property damage and contractual liability insurance required by others to permit the CONTRACTOR's operation.

#### **1.06 USE OF CHEMICALS**

- A. Any chemical used by the CONTRACTOR during the course of construction shall meet the regulatory requirements of either the Environmental Protection Agency (EPA) or the United States Department of Agriculture (USDA), and shall be approved by the ENGINEER prior to use.

#### **1.07 PROGRESS OF WORK**

- A. If at any time, the materials and appliances to be used appear to the ENGINEER as insufficient or improper for securing the quality of work or rate of progress required for the project, he may order the CONTRACTOR to increase his efficiency or improve the character of work.
- B. The failure of the ENGINEER to demand any increase of such efficiency or improvement shall not release the CONTRACTOR from his obligation to secure the quality of work or the rate of progress necessary to complete the work within the limits imposed by the Contract.

#### **1.08 OSHA**

- A. CONTRACTOR must comply with the Department of Labor, Safety and Health Regulations for construction promulgated under the Occupational Safety and

Health Act of 1970 (PL 91-956) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

#### **1.09 UTILITIES AND STRUCTURES SHOWN ON THE PLANS**

- A. Existing utilities and facilities are shown on the contract drawings only for the convenience of all parties concerned and were established without guarantee as to their accuracy or completeness of location.
- B. Because of conflicting and sometimes erroneous information, certain facilities may not be located precisely as shown, or may be omitted entirely.
- C. Prior to performing any work, the CONTRACTOR shall determine, by site inspection including soft digs by hand excavation or vacuum-assisted excavation, or otherwise, all pertinent data concerning the existing utilities, structures, and facilities, including the request of each utility agency to advise him of the location of their facilities in the work vicinity.
- D. The CONTRACTOR shall be completely responsible for the relocation, as required, of existing utilities and structures with such work accomplished at no additional cost to the OWNER.
- E. The OWNER and ENGINEER will assume no liability for damages sustained or costs incurred because of the CONTRACTOR's operations in the vicinity of the existing utilities or structures.
- F. The CONTRACTOR shall schedule his work in such a manner that he is not delayed by the utility companies relocating or supporting their utilities. No compensation shall be made for such loss of time.
- G. The position of certain structures and utilities directly affects the proposed construction. Therefore, in order to insure that the proposed work can actually be positioned as planned, the CONTRACTOR shall make any excavation necessary for location of structures and utilities prior to construction of that particular portion of the job.
- H. All overhead, surface or underground structures encountered in trenching, whether shown on the Plans or not shown on the Plans, are to be carefully protected from injury or displacement, and all damage to such structures is to be completely repaired within a reasonable time; otherwise, the ENGINEER may give twenty-four (24) hour notice to the CONTRACTOR, then repair the damage at the CONTRACTOR's expense.

- I. All such repairs made by the CONTRACTOR are to be made to the satisfaction of the ENGINEER; all damaged pipes must be replaced or prevented from leaking. Also, all such repairs are to be inspected by the ENGINEER prior to backfilling. The CONTRACTOR must carefully protect from disturbance or injury, all monuments, stakes and bench marks, and shall not excavate nearer than five feet (5') to any of them until they have been removed, witnessed or otherwise disposed of by the ENGINEER.

#### **1.10 DRAINAGE**

- A. Grading shall be controlled in the vicinity of excavations so that the surface of the ground will be properly sloped to prevent water from running into trenches or other excavated areas.
- B. Any water that accumulates in the excavations shall be removed promptly by well point or by other means satisfactory to the ENGINEER in such a manner as to not create a nuisance to adjacent property or public thoroughfare.
- C. Trenches shall be kept dry while pipe is being laid. Bridging of dewatering pipe shall be provided where necessary.
- D. Pumps and engines for well point systems shall be operated with mufflers, at a minimum noise level suitable to a residential area.
- E. The CONTRACTOR will not be allowed to discharge water into any storm drainage system without the written approval of the OWNER of that system.
- F. Approval will be subject to the conditions that the storm sewer be returned to its original conditions.
- G. The CONTRACTOR is responsible for carrying the water to the OWNER's onsite storm water management system or nearby body of water and for obtaining the necessary permission to use same.
- H. The CONTRACTOR shall be financially responsible for any nuisance or damage created due to carrying off water from his drainage system.

#### **1.11 RESTORATION OF SURFACE IMPROVEMENTS**

- A. Roadways, including shoulders, alleys and driveways of shell, limerock, asphalt, concrete, stabilized soil or gravel, grade plots, sod, shrubbery, ornamental trees, signs, mailboxes, fences, irrigation systems, or other surface improvements on public or private property which have been damaged or removed in excavating or

other construction operations, shall be restored to conditions equal to or better than conditions existing prior to beginning work.

- B. Turf restoration shall consist of sodding and not seed and mulching.
- C. CONTRACTOR is urged to investigate existing irrigation systems in order to minimize repair work necessary. No extra costs will be paid as a result of damage to existing irrigation systems.
- D. The cost of doing this work shall be included in the cost of the various applicable items or the lump sum priced proposal items unless a separate payment item has been established for specific restoration Work.
- E. Pre-Construction Audio Video DVDs - as specified will be used as an aid in determining conditions prior to construction.

#### **1.12 HOURS OF OPERATION**

- A. The CONTRACTOR is hereby informed and understands that certain noise between the hours of 6:00 PM and 8:00 AM is restricted. Therefore, the work is restricted during these hours, unless emergency conditions exist that are endangering life or property, as may be determined by the ENGINEER.
- B. If the CONTRACTOR is authorized to operate equipment twenty-four (24) hours per day, the engines shall be provided with residential type silencers approved by the ENGINEER.
- C. The CONTRACTOR will not be authorized to work Saturdays, Sundays or holidays unless the CONTRACTOR agrees to reimburse the OWNER for all expenses incurred and provided that such work is prior to the commencement of work.

#### **PART 2 - PRODUCTS**

NOT USED

#### **PART 3 - EXECUTION**

NOT USED

**END OF SECTION**



## **SECTION 01780**

### **CLOSEOUT SUBMITTALS**

#### **PART 1 - GENERAL**

##### **1.01 SUBMITTALS**

A. Informational Submittals:

1. Submit prior to application for final payment.
  - a. Record Documents: As required in **Section 01720** – Record Documents.
  - b. Operation and Maintenance Manuals: As required in **Section 1730** – O&M Manuals.
  - c. Approved Shop Drawings and Samples: As required in **Section 01300** – Submittals.
  - d. Special Bonds, Special Guarantees, and Service Agreements.
  - e. Consent of Surety to Final Payment: As required in General Conditions.
  - f. Releases of Waivers of Liens and Claims: As required in General Conditions.
  - g. Releases from Agreements.
  - h. Final Application for Payment: Submit in accordance with procedures and requirements stated in **Section 01200** - Measurement and Payment.
  - i. Extra Materials: As required by individual Specification Sections.

##### **1.02 RECORD DOCUMENTS**

A. Quality Assurance.

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.

2. Accuracy of Records:
  - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
  - b. Purpose of Project record documents is to document factual information regarding aspects of the Work. Both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within twenty-four (24) hours after receipt of information that a change in the Work has occurred.
4. CONTRACTOR shall maintain a red-lined set or record drawings throughout the duration of the project. ENGINEER may review and approval of current status of record documents along with each pay request. Failure to properly maintain and update record documents may result in a deferral by ENGINEER to recommend whole or any part of CONTRACTOR's Application for Payment, either partial or final.

**PART 2 – PRODUCTS**  
NOT USED

**PART 3 - EXECUTION**

**3.01 MAINTENANCE OF RECORD DOCUMENTS**

- A. General:
  1. Promptly following commencement of Contract Times, secure from ENGINEER at no cost to CONTRACTOR, one complete set of Contract Documents. Drawings will include a full-size and digital set.
  2. Delete ENGINEER title block and seal all documents.
  3. Label or stamp record document with title, "RECORD DOCUMENTS," in neat large printed letters.
  4. Record information concurrently with construction progress and within twenty-four (24) hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by ENGINEER.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
  - a. Color Coding:
    - i. Green when showing information deleted from Drawings.
    - ii. Red when showing information added to Drawings.
    - iii. Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including but not limited to:
  - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
  - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
  - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
  - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
  - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and ENGINEER’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
  - a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.
  - b. Show by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
  - c. Make identifications so descriptive that it may be related reliably to Specifications.

**END OF SECTION**

## **SECTION 01810**

### **EQUIPMENT TESTING AND FACILITY STARTUP**

#### **PART 1 – GENERAL**

##### **1.01 DEFINITIONS**

- A. Facility: Entire project, or an agreed-upon portion of the project, including its entire unit processes.
- B. Functional Test: Test or tests in presence of the ENGINEER and the OWNER to demonstrate that installed equipment meets Manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- C. Performance Test: Test or tests performed after any required functional tests and in the presence of the ENGINEER and the OWNER to demonstrate and confirm individual equipment meets performance requirements specified in the individual specification sections.
- D. Unit Process: as used in this section, a unit process is a portion of the facility that performs a specific process function, such as pumping or treatment.
- E. Facility Performance Demonstration:
  - 1. A demonstration, conducted by the CONTRACTOR, with assistance of the OWNER, to demonstrate and document the performance of the entire operating facility, both manually automatically, if required, based on criteria developed in conjunction with the OWNER and as accepted by the ENGINEER.
  - 2. Such a demonstration is for the purposes of (i) verifying to the OWNER the entire facility performs as a whole, and (ii) documenting performance characteristics of complete facility for OWNER's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of the CONTRACTOR, unless such performance is otherwise specified.

##### **1.02 SUBMITTALS**

- A. Information Submittals:
  - 1. Facility startup and performance demonstration plan.
  - 2. Functional and performance test results.

3. Start-up check-list and report for approval prior to start-up services are conducted.
4. Completed start-up check-list and report.

### **1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN**

- A. Develop a written plan, in conjunction with the OWNER's operating personnel, to include the following:
  1. Step-by-step instructions for startup of each unit process and the complete facility.
  2. Start-up form to minimally include the following:
    - a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
    - b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
    - c. Startup requirements for each unit process, including water, power, chemicals, etc.
    - d. Space for evaluation comments.
    - e. Sequence of unit process startup to achieve facility startup.
    - f. CONTRACTOR certification that the facility is capable of performing its intended function(s), including fully automatic operations.
    - g. Signature spaces for the CONTRACTOR and the ENGINEER.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

- B. Facility Startup Meetings: Schedule, in accordance with the requirements of **Section 01039 - Coordination and Meetings**, to discuss test schedules, test methods, materials, chemicals and liquids required, facilities operations interface, and OWNER involvement.
- C. CONTRACTOR's Testing and Startup Representative:
  - 1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
  - 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.
- D. Provide temporary valves, gauges, piping, test equipment, water, power, chemicals, laboratory analysis, and other materials and equipment required for testing and startup.
- E. Testing and startup of the pumps and associated electrical and control equipment may require phasing. The testing and startup may have to occur in stages at varying intervals. The CONTRACTOR's testing and startup representative and essential Manufacturer's representative must be present at all startups.
- F. Provide adequate subcontract and equipment Manufacturer's staff to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
- G. OWNER will:
  - 1. Operate process units and facility with support of CONTRACTOR.

### **3.02 EQUIPMENT TESTING**

- A. Preparation:
  - 1. Complete installation before testing.
  - 2. Furnish qualified Manufacturer's representatives, when required by individual specification sections.
  - 3. Obtain and submit from equipment Manufacturer's representative Manufacturer's Certification of Proper Installation Form.
    - a. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:

- b. OWNER/Project name
  - c. Equipment or item tested.
  - d. Date and time of test.
  - e. Type of test performed (functional or performance)
  - f. Test method.
  - g. Test conditions.
  - h. Test results.
  - i. Signature spaces for CONTRACTOR and ENGINEER as witness.
4. Cleaning and Checking: Prior to beginning functional testing:
- a. Calibrate testing equipment in accordance with Manufacturer's instructions.
  - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
  - c. Lubricate equipment in accordance with Manufacturer's instructions.
  - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
  - e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
  - f. Check power supply to electric-powered equipment for correct voltage.
  - g. Adjust clearances and torque.
  - h. Pressure test force main for leaks.
5. Ready-to-test determination will be by ENGINEER based at least on the following:
- a. Acceptable Operation and Maintenance Data.



- b. Notification by CONTRACTOR of equipment readiness for testing.
- c. Receipt of Manufacturer's Certificate of Proper Installation.
- d. Receipt and approval of start-up check-list and from.
- e. Adequate completion of work adjacent to, or interfacing with, equipment to be tested, including items to be furnished by the OWNER, if any.
- f. Availability and acceptability of Manufacturer's representative, when specified, to assist in testing of respective equipment.
- g. Satisfactory fulfillment of other specified Manufacturer's responsibilities.
- h. Equipment and electrical tagging complete.
- i. Delivery of all spare parts and special tools.

B. Functional Testing:

- 1. Conduct as specified in individual Specification sections.
- 2. Notify OWNER and ENGINEER in writing at least ten (10) days prior to scheduled date of testing.
- 3. Prepare Equipment Test Report summarizing test method and results.
- 4. When, in ENGINEER's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by ENGINEER/OWNER's signature as witness on Equipment Test Report.

C. Performance Testing:

- 1. Conduct as specified in individual Specification sections.
- 2. Notify ENGINEER and OWNER in writing at least ten (10) days prior to scheduled test date.
- 3. Performance testing shall not commence until equipment has been accepted by ENGINEER as having satisfied functional test requirements specified.

4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
6. Prepare Equipment Test Report summarizing test method and results.
7. When, in ENGINEER's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by ENGINEER's signature on Equipment Test Report.

**END OF SECTION**

## MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER\_\_\_\_\_

EQPT SERIAL NO.\_\_\_\_\_

EQPT TAG NO.\_\_\_\_\_

EQPT/SYSTEM \_\_\_\_\_

PROJECT NO.\_\_\_\_\_

SPEC. SECTION \_\_\_\_\_

I hereby certify that the above - referenced equipment/system has been:

(Circle Applicable)

- Y     Installed in accordance with Manufacturer's recommendations.
- Y     Inspected, checked, and adjusted.
- Y     Serviced with proper initial lubricants.
- Y     Electrical and mechanical connections meet quality and safety standards.
- Y     All applicable safety equipment has been properly installed.
- Y     System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Comments:

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I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the Manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date:\_\_\_\_\_, 20\_\_\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_

(Authorized Signature)

## **DIVISION 2**

## **SITEWORK**

## **SECTION 02000**

### **UTILITY CONSTRUCTION**

#### **PART 1 - GENERAL**

##### **1.01 WORK INCLUDED**

- A. This specification governs the construction of all Loxahatchee River District gravity sewers, sewer services, force mains, low pressure sewer services, low pressure force mains, lift stations, reclaimed water mains, and all appurtenant devices associated therewith.

##### **1.02 LOXAHATCHEE RIVER DISTRICT MINIMUM CONSTRUCTION STANDARDS**

- A. Construction of the facilities identified herein shall be in accordance with the latest edition of the "Loxahatchee River Environmental Control District Manual of Minimum Construction Standards and Technical Specifications" (LRDMCS), which are presented within this document as Appendix A.
- B. Construction of the facilities identified herein will also be in accordance with the applicable portions of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition, all referenced specifications, and the ENGINEER's project manual.
- C. In the event of a conflict between any governing specifications, the more stringent requirement shall govern construction of this project.

##### **1.03 RESTORATION**

- A. Full and complete restoration of all existing facilities will be accomplished to the sole satisfaction of the OWNER without additional compensation to the CONTRACTOR. The cost of all restoration will be included in the lump sum or unit bid price and no separate payment item for restoration will be established in the schedule of values developed subsequent to bidding.

#### **PART 2 - MATERIALS**

##### **2.01 GENERAL**

- A. All construction materials shall comply with the requirements of the LRDMCS as outlined therein. All parts of the LRDMCS that are applicable shall govern unless a more stringent standard is listed in the Contract Documents or required by other permitting agencies.

## **PART 3 - EXECUTION**

### **3.01 CONSTRUCTION**

- A. All phases of construction, including but not limited to, trenching, pipe laying, backfilling, pipeline flushing, and surface restoration shall comply with the requirements of Part 1.02 as noted in this section.
- B. Pipeline backfill not beneath paved surfaces shall be compacted to a minimum density of 98 percent of AASHTO T-180 or as required by governmental agencies having jurisdiction over the Work.

### **3.02 TESTING**

- A. All testing, including but not limited to, trench earthwork density testing, and pipeline pressure testing shall comply with the requirements of this specification, the LRDMCS, "Florida Department of Transportation Standard Specifications for Road and Bridge Construction", Latest Edition, and the Palm Beach County Health Department.
- B. Backfill density test locations will be examined in accordance with the requirements listed on the trenching details shown on the engineering drawings.
- C. The CONTRACTOR will use the OWNER's testing laboratory (GFA International) for all testing.
- D. The OWNER will pay for all passing tests and the CONTRACTOR will pay for any failed tests and wait time for any retesting made necessary by failure to perform in accordance with the project specifications.
- E. Retesting locations around all failing tests will be located at the original test location.
- F. Retest only after re-compaction of a failing test area.
- G. Hydrostatic Testing
  - 1. Hydrostatic testing shall be performed as stated in the Testing Procedure detail found in the details section of the drawings.

### **3.03 WARRANTY/PROJECT DOCUMENTATION**

- A. All warranties and project documentation, including but not limited to record

drawings and payment applications, shall comply with the requirements of this specification.

### **3.04 COORDINATION**

- A. All coordination of construction shall primarily occur between the CONTRACTOR and the ENGINEER. The Engineer of Record for design of this construction project is Holtz Consulting Engineers, Inc. The ENGINEER will aid the OWNER in evaluation of technical questions, coordination of the work, resolution of technical and payment disputes, and regulatory certification of the project. The ENGINEER's direct representative on this project will be:

Christine Miranda, PE, (561) 575-2005

- B. The OWNER's direct representative who will perform the coordination activities is:

Mr. Kris Dean, PE, Director of Engineering, (561) 747-5700

- C. The Utilities to coordinate with are, at a minimum:

1. Town of Jupiter.
2. Florida Power and Light.
3. AT&T.
4. Bellsouth.
5. Comcast Cable.
6. Florida Public Utilities.
7. Other applicable utilities.

### **3.05 PERMITS**

- A. The OWNER and ENGINEER will obtain construction permits from the Palm Beach County Health Department and the Town of Jupiter Right-of-Way Permit, where applicable. If applicable, license agreements and easements for construction on public and private property will also be obtained by the OWNER and ENGINEER.
- B. The CONTRACTOR will obtain and pay for any dewatering, building or other permits necessary to perform the Work, except as identified above.

**END OF SECTION**



## **SECTION 02140**

### **DEWATERING**

#### **PART 1 - GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Dewatering methods for utility and structural installation.

##### **1.02 RELATED SECTIONS**

- A. All of Division 1.
- B. Division 2 - Pipe and Structures (As Applicable).

##### **1.03 PAYMENT**

- A. Unless noted otherwise on the Bid Form, no separate payment will be made for Work covered under this Section. All costs in connection therewith or incidental thereto are to be included in the respective Contract price for the item or structure to which the Work pertains.

#### **PART 2 - PRODUCTS**

NOT USED

#### **PART 3 - EXECUTION**

##### **3.01 PUMPING AND DRAINAGE**

- A. The CONTRACTOR shall be responsible for determining all dewatering requirements and governmental regulations prior to commencement of work including, but not limited to, methods of drainage, removal of water, disposal of water and permitting.
- B. The CONTRACTOR shall bear all costs associated with dewatering including costs of damage to property caused by dewatering.
- C. The CONTRACTOR shall provide and maintain all necessary facilities and equipment to remove all water entering excavations and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to

be built thereon have been completed to such extent that they will not float or otherwise be damaged by allowing water levels to return to natural levels.

- D. Dewatering shall be conducted by a well point type system and in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and to preserve the integrity of adjacent structures. Well point system installation shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground. Sump installation, over excavation of trenches, and rocking shall not be allowed as a method of dewatering.
- E. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
- F. The CONTRACTOR shall take all additional precautions to prevent uplift of any structure during construction.
- G. The conveying of water in open ditches or trenches will not be allowed. Permission to use any storm sewers, or drains, for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the CONTRACTOR. However, the CONTRACTOR shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the OWNER or the authority having jurisdiction, at no cost to the OWNER.
- H. Flotation shall be prevented by the CONTRACTOR by maintaining a positive and continuous operation of the dewatering system. The CONTRACTOR shall be fully responsible and liable for all damages, which may result from failure of this system.
- I. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the CONTRACTOR. Well point holes shall be filled with a suitable material.
- J. The CONTRACTOR shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc., in order to prevent adverse effects on groundwater quality.
- K. CONTRACTOR shall provide for and be responsible for the prevention, control and abatement of erosion and water pollution until completion of the Project. CONTRACTOR shall provide all temporary erosion control features necessary to prevent, control and abate erosion and water pollution. During the construction of the project, the CONTRACTOR shall comply with the Water Quality Standards of the State of Florida and applicable provisions of any NPDES permits in effect.

### **3.02 DEWATERING PERMITS**

- A. The CONTRACTOR shall be responsible for obtaining all necessary dewatering permits and for paying all associated application and permit fees.

**END OF SECTION**

## **SECTION 02210**

### **GRADING**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities unless otherwise indicated, for the following:
  - 1. Finish grading of subsoil.
  - 2. Placing, leveling and compacting topsoil.

##### **1.02 RELATED SECTIONS**

- A. All of Division 1.
- B. **Section 02936** – Sodding.

##### **1.03 PROTECTION**

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, utility poles, fences, roads, paving, curbs, sidewalks, etc.

#### **PART 2 - PRODUCTS**

##### **2.01 MATERIALS**

- A. Reused top soil or subsoil organically enhanced with appropriate compost material shall be used to perform all final grading operations in preparation for establishment of a live and healthy grass cover.

#### **PART 3 - EXECUTION**

##### **3.01 INSPECTION**

- A. Verify site conditions and note irregularities affecting work of this Section.

##### **3.02 SUBSOIL PREPARATION AND COMPACTION**

- A. Eliminate uneven areas and low spots.
- B. Remove debris, roots, branches, stones, in excess of ½-inch in size and dispose of at

an approved site.

- C. Place and compact needed fill in lifts having a maximum unconsolidated thickness of twelve (12) inches.
- D. Compact fill to 98 percent of maximum density as determined by AASHTO Method T-180 using mechanical tamping equipment. Use a minimum amount of water to adjust fill moisture content if necessary.
- E. Restore the surface to the original grade wherever settlement occurs.

### **3.03 PLACING TOPSOIL**

- A. Place topsoil in areas where seeding, sodding, planting is scheduled.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- E. Manually spread topsoil around trees and plants to prevent damage.
- F. Lightly compact roll placed topsoil.
- G. Remove surplus subsoil and topsoil from site.
- H. Leave stockpile area and site clean and ready to receive landscaping.
- I. Top soil to match existing depth, or two inches, whichever is greater.

### **3.04 TOLERANCES**

- A. Top of topsoil: Plus or minus ½-inch.

### **3.05 SCHEDULE OF LOCATION**

- A. The following identifies compacted topsoil thicknesses for various locations.
  - 1. Sod: Two (2) inches.

**END OF SECTION**

## **SECTION 02270**

### **EROSION, SEDIMENTATION AND DUST CONTROL**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION OF WORK**

- A. Work consists of control measures as required during the life of the Contract to control erosion, sedimentation and dust.
- B. The CONTRACTOR shall establish, construct and maintain erosion and sediment control measures. The erosion control programs shall be maintained during the entire period of construction, including any extensions in Contract time.
- C. Temporary erosion and pollution control shall include construction work off-site where such work is necessary as a result of borrow pit operations, haul roads or equipment storage sites, etc.
- D. Preparation of the Stormwater Pollution Prevention Plan (SWPPP), including modifications and updates.
- E. Obtain and comply with all provisions of the State of Florida, Department of Environmental Protection, Permit for Stormwater Discharge from Large and Small Construction Activities (NPDES Construction Site Permit Program)

##### **1.02 REFERENCES**

- A. Rule 62-40.432, F.A.C.
- B. The Florida Development Manual: A Guide to Sound Land and Water Management (DEP, 1988) and any subsequent amendments.
- C. 40 CFR Part 122.
- D. Chapter 403.0885, F.S.
- E. FDOT Standard Specifications for Road and Bridge Construction, Section 104, Latest Edition.
- F. State of Florida Department of Environmental Protection Generic permit for Stormwater Discharge from Large and Small Construction Activities – Notice of Termination of Generic Permit Coverage immediately following this section.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

### **3.01 PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION**

- A. All work shall be in accordance with the requirements of the State of Florida Department of Environmental Protection under Chapter 62-621, F.A.C. or Chapter 62-620, F.A.C.
- B. The CONTRACTOR shall provide for and be responsible for the prevention, control and abatement of erosion and water pollution until completion and acceptance of the Project. The CONTRACTOR shall provide all temporary erosion control features necessary to prevent, control and abate erosion and water pollution, and shall prepare and submit as the operator and permittee, along with the applicable application fee, the "Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities" (NOI) prior to commencing construction and the "Notice of Termination" (NOT) upon final completion of construction. The CONTRACTOR, as required by the NPDES permit program, shall prepare a stormwater pollution prevention plan (SWPPP). This SWPPP shall be modified and updated by the CONTRACTOR as necessary, to meet the requirements of the NPDES permit issued, at no additional cost to the OWNER. The CONTRACTOR shall also comply with the inspections, maintenance, reporting and all other provisions of the NPDES permitting program, and the cost for the compliance with this program is to be included in the CONTRACTOR bid price for the work.
- C. During the construction of the Project, the CONTRACTOR shall comply with the Water Quality Standards of the EPA and the State of Florida.
- D. The CONTRACTOR shall meet and be responsible for the requirements of all applicable governing agencies regarding prevention, control and abatement of erosion and water pollution.

### **3.02 DAMAGE TO WATER DETENTION AND DRAINAGE AREAS**

- A. The CONTRACTOR shall be responsible for the prevention of damage to detention ponds, holding areas, drainage canals or natural waterways, and wetlands (both on and off site).

- B. The CONTRACTOR shall act as directed to correct said damage as quickly as possible and take necessary steps to prevent future damage. The CONTRACTOR shall notify the ENGINEER of said damage.
- C. The cost of correction of damage shall be at no cost to the OWNER or his agents.

### **3.03 DUST CONTROL**

- A. The CONTRACTOR shall exercise precautionary measures to minimize dust emissions as necessary, which may include, but shall not be limited to, periodic sprinkling or wetting of the site, and shall modify measures to be implemented, as necessary, to satisfy jurisdictional agency requirements including but not limited to Palm Beach County and the Florida Department of Environmental Protection (Air Pollution Division) at no additional expense to the OWNER.

**END OF SECTION**



## **SECTION 02936**

### **SODDING**

#### **PART 1 - GENERAL**

##### **1.01 PERFORMANCE**

- A. Section generally defines CONTRACTOR's responsibilities, unless otherwise indicated for the following:
  - 1. Preparation of subsoil.
  - 2. Placing topsoil.
  - 3. Fertilizing.
  - 4. Sod installation.
  - 5. Maintenance.

##### **1.02 RELATED SECTIONS**

- A. All of Division 1.
- B. **Section 02210** – Grading.

##### **1.03 REFERENCES**

- A. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge, Latest Edition.

##### **1.04 QUALITY ASSURANCE**

- A. Sod Producer: Company specializing in sod production and harvesting with a minimum five years of experience and certified by the State of Florida.
- B. Installer: Company approved by the sod producer.
- C. Sod: Minimum age of 18 months, with root development that will support its own weight, without tearing, when suspended vertically by holding the upper two (2) corners.
- D. Submit sod certification for grass species and location of sod source.
- E. The ENGINEER reserves the right to test, reject or approve all materials before

application.

## **1.05 REGULATORY REQUIREMENTS**

- A. Comply with regulatory agencies for fertilizer.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site under provisions of **Section 01600 – Material and Equipment**.
- B. Store and protect products under provisions of **Section 01600 – Material and Equipment**.
- C. Deliver sod on pallets. Protect exposed roots from dehydration.
- D. Do not deliver more sod than can be laid within 48 hours.
- E. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- F. The CONTRACTOR shall furnish the ENGINEER invoices of all materials received in order that the minimum application rate of materials may be determined.

## **1.07 MAINTENANCE SERVICE**

- A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

# **PART 2 - PRODUCTS**

## **2.01 MATERIALS**

- A. Sod:
  - 1. Sod shall be ASPA approved grade, Argentine Bahia, Tifton Bermuda, Floritam, or St. Augustine to match existing or better as directed, with firm texture having a compacted growth and good root development.
  - 2. Sod shall be absolutely true to varietal type, and free from weeds or other objectionable vegetation, fungus, insects and disease of any kind.
  - 3. Cut sod in area not exceeding 24 inches by 24 inches with minimum one (1) inch and maximum three inch of topsoil base.

4. The sod shall be planted as soon as possible after being harvested and shall be shaded and kept moist from the time of harvesting to the time it is planted.
- B. Topsoil:
1. Excavated from site and free of weeds.
  2. Topsoil to be minimum three (3) inches thick.
- C. Fertilizer:
1. In accordance with FDOT 982-1.
- D. Water:
1. Clean, fresh, and free of substances or matter, which could inhibit vigorous growth of grass.

## **PART 3 - EXECUTION**

### **3.01 INSPECTION**

- A. Verify that prepared subsoil is ready to receive the work of this Section.

### **3.02 FERTILIZING**

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper two (2) inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

### **3.03 LAYING SOD**

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

- C. Stake sod with 1x2 stakes on all areas with slopes greater than one (1) vertical to five (5) horizontal.
- D. Coordinate sod installation with irrigation system components.

#### **3.04 MAINTENANCE**

- A. Water to prevent grass and soil from drying out.
- B. Immediately replace sod in areas, which show deterioration or bare spots.

#### **3.05 APPROXIMATE AREA TO BE SODDED**

- A. All construction areas disturbed by construction of the project except those areas receiving pavement or rock. CONTRACTOR is to take into account his anticipated ditch width and pit sizes at the surface when accounting for the cost of this work.

**END OF SECTION**

**DIVISION 16**

**ELECTRICAL**

## **SECTION 16000**

### **ELECTRICAL GENERAL REQUIREMENTS**

#### **PART 1 - GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. The general provisions of the Contract, including General Conditions, apply to all the Work specified in the Electrical 16000 Sections.

##### **1.02 LAWS, PERMITS, FEES AND NOTICES**

- A. Secure and pay all permits, fees and licenses necessary for the proper execution of the Work. Submit all notices and comply with all laws, ordinances, rules and regulations of any public agency bearing on the Work. CONTRACTOR shall be licensed Electrical CONTRACTOR in the county of construction.

##### **1.03 DEPARTURES**

- A. If any departures from the Contract drawings or specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the ENGINEER for advance written approval, prior to departure.

##### **1.04 GUARANTEES**

- A. Furnish written guarantee covering all materials, workmanship, labor and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.
- B. The OWNER reserves the right to operate and use all materials and equipment failing to meet the requirements of the Contract documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the ENGINEER.

##### **1.05 AS-BUILT INFORMATION**

- A. A set of "red-lined" electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routes of cable trays, conduits, pull-boxes, circuit numbers, and other information required by the ENGINEER.

#### **1.06 JOB SITE VISIT**

- A. Visit the project site before submitting a bid. Verify all dimensions shown and determine the characteristics of existing facilities which will affect performance of the Work, but which may not be shown on drawings or described within these specifications.

#### **1.07 CLEANUP**

- A. Maintain a continuous cleanup during the progress of the Work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

#### **1.08 CUTTING AND PATCHING**

- A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the ENGINEER for any alterations to structural members before proceeding.

#### **1.09 MAINTENANCE**

- A. Render all necessary measures to ensure complete protection and maintenance of all systems, materials and equipment prior to final acceptance. Any materials or equipment not properly maintained or protected to assure a factory new condition at the time of final acceptance shall be replaced immediately at no additional cost to the OWNER.

#### **1.10 WATERPROOFING**

- A. Whenever any Work penetrates any waterproofing, seal and render the Work waterproof. All Work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.

#### **1.11 TESTS**

- A. Conduct an operating test of equipment prior to the ENGINEER's approval. The equipment shall be demonstrated to operate in accordance with the requirements of these specifications. The tests shall be performed in the presence of the ENGINEER or an authorized representative. The electrical CONTRACTOR shall furnish all instruments, electricity and personnel required for the tests.

#### **1.12 SUMMARY OF ELECTRICAL WORK**

- A. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the Work shown on the drawings and specified herein. All systems are to be completely installed and fully operational. Specifically, the Work includes, but is not necessarily limited to:
1. Provide demolition of existing sewage pump station equipment, raceways, pipe stand, control panel, service, disconnect, meter and the like, see drawings and other specifications for other information. Demolition is to occur before the installation, installation, testing and acceptance of the new pump station.
  2. Provide new power service as indicated; include coordination with power company.
  3. Provide and install all the electrical equipment, equipment racks, panels, raceways, control panels, terminal boxes, power and control wiring, pumps, wetwell instruments, including relocation of existing RTU equipment, reuse Rohm tower, and the like.
  4. Provide and install an outdoor generator and the ATS equipment (OWNER purchased; CONTRACTOR installed)
  5. Provide grounding of the equipment.
  6. Provide and install a new lift station control panel with PLC and HMI operator interface, see drawings and other specification sections.
  7. Coordinate status and alarm points from control panel, VFD equipment, and ATS switch and generator to upgraded existing RTU equipment
  8. Provide testing and startup of the pump station equipment, generator, DFS RTU, and ATS switch.
  9. Provide training of OWNER's personnel.
  10. Provide all as-built to the drawings and closing documents.

### **1.13 CODES AND STANDARDS**

- A. General Applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):



1. U.L.: Electrical materials shall be approved by Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
2. National Electrical Code.
3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers and fuses.
5. ANSI: America National Standards Institute
6. NESC: National Electrical Safety Code
7. Any and all local codes.

#### **1.14 ELECTRICAL TEMPORARY FACILITIES**

- A. The electrical CONTRACTOR shall include in his bid the cost of furnishing, installing, maintaining and removing all materials and equipment required to provide temporary light and power to perform his Work during construction and until Work is completed.
- B. Safety
  1. All reasonable safety requirements shall be observed to protect workers and the public from shock and fire hazards. Ground fault interrupters shall be employed in accordance with codes.
  2. Ground wires are required in all circuits. Ground poles are required on all outlets. All metallic cases shall be grounded.
  3. Raintight cabinets shall be used for all equipment employed in wet areas.

#### **1.15 EXCAVATING FOR ELECTRICAL WORK**

- A. General – Not needed

#### **1.16 ELECTRICAL SUBMITTALS**

A. Submittals for Approval

1. Refer to Contract General Conditions for additional instructions on the General Conditions and this section, the more stringent requirements shall apply.
2. Shop Drawings and Manufacturer's data sheets are required for all electrical materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the ENGINEER.
5. The following numbers of copies are required:

Shop drawings	6 sets
Samples	1 each
Manufacturer's data	6 sets
Certifications	6 sets
Test reports	6 sets
Warranties/Guarantees	6 sets

6. Submit shop drawings, Manufacturer's data and certifications on all items of electrical Work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the ENGINEER. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the ENGINEER's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to OWNER or time extensions. CONTRACTOR shall be responsible for investigating existing systems or shop drawings in order to fully integrate the new equipment into the system. Adequate shop drawings may or may not exist for all existing systems.

B. Operation and Maintenance Manuals

1. Submit to the ENGINEER five (5) copies of all Manufacturer's service installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the ENGINEER. If acceptable they shall be forwarded to the OWNER. If not acceptable they shall be returned to the CONTRACTOR for revision and resubmittal. Manuals shall contain, but not be limited to, the following:
  - a. Brief description of system and basic features.
  - b. Manufacturer's name and model number for all components in the system.
  - c. List of local factory authorized service companies.
  - d. Operating instructions.
  - e. Maintenance instructions
  - f. Trouble shooting instructions
  - g. Manufacturer's literature describing each piece of equipment.
  - h. Power and control wiring diagrams
  - i. Parts lists

## **1.17 ELECTRICAL PRODUCTS**

### **A. Standards Products**

1. Unless otherwise indicated in writing by the ENGINEER, the products to be furnished under this specification shall be the Manufacturer's latest design. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the ENGINEER at no additional expense to the OWNER.

### **B. Delivery, Storage and Handling**

1. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment,

storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the Manufacturer specifically for exterior instructions for storage locations.

C. Substitutions

1. Comply with instructions in the Contract General Conditions and Special Conditions and obtain pre-approval of the ENGINEER regarding substitutions.

**1.18 SKILLED ELECTRICAL CRAFTSMEN**

- A. CONTRACTOR shall employ and staff the project with skilled Craftsmen experienced in the project requirements.
- B. As a minimum, a Licensed Journeyman Electrician shall be present on the project at all times.
- C. Other skilled persons shall be present as the project requirements dictate including Manufacturers representatives, start-up technicians, ENGINEERS, etc.

**1.19 DRAWINGS AND SPECIFICATIONS**

- A. Refer to the drawings for additional requirements. There are requirements indicated on the drawings which are not indicated in the specification.
- B. Bidders, suppliers, equipment vendors, General CONTRACTOR, Sub Contractors and other similar entities are required to read all the Contract documents including drawings and specifications.

**1.20 SCHEMATIC NATURE**

- A. Plan views are schematic in nature and meant to show the schematic arrangement of equipment and conduit.
- B. CONTRACTOR shall provide the OWNER/ENGINEER with an 11 x 17 (min) drawing (to scale) of the final layout of the equipment and conduit routing for approval. This drawing shall include measurements for all NEC required clearances and separations for equipment and conduit. Refer to other spec sections for conduit routing requirements.

**1.21 APPROVED SHOP DRAWINGS**

- A. Use approved shop drawings for lay out of equipment. The Contract documents will vary from the shop drawings. Inform the ENGINEER immediately if there are lay out issues or inadequate space for

equipment or clearances. Land conduits in openings of enclosures per the approved shop drawings, do not use the Contract drawings.

- B. Housekeeping pads, equipment racks and the like shall be based on the approved shop drawings.

## **1.22 CLEARANCES**

- A. It shall be the CONTRACTOR's responsibility to meet N.E.C. clearances about equipment.

## **1.23 ROUTING**

- A. Conduit routing is schematic in nature. Conduit routing is shown for clarity on the Contract drawings. See other spec sections for additional conduit routing requirements.

## **1.24 FUTURE FACILITIES**

- A. Where future facilities are indicated, conduit routing shall account for such facilities.
- B. Where conduits are installed as spares or for future equipment, these conduits shall include pull string, any conduits installed exposed along a concrete pad or slab, shall be capped .

## **1.25 DRAWINGS FURNISHED BY CONTRACTOR**

- A. OWNER shall be provided all CONTRACTOR furnished drawings. Such drawings include, but are not limited to: Control panels, MCC.s, switch boards, instrumentation details, redline mark-up of the Contract drawing and the like.
- B. Drawings shall be furnished for review and approval. No materials shall be provided without the ENGINEER's approval.
- C. Final drawings shall be furnished or as field modified accounting for any changes made during start up.

## **1.26 HOMERUNS**

- A. CONTRACTOR shall coordinate home runs between plan views. Where any conduit is shown in any plan view it shall be installed the entire length may be required.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 16001**

### **ELECTRICAL DEMOLITION**

#### **PART 1 - GENERAL**

##### **1.01 GENERAL REQUIREMENTS**

- A. CONTRACTOR shall take precautionary and safety measures to assure the safety of his personnel. All wires shall be identified and disconnected from power sources before removal.
- B. CONTRACTOR shall coordinate with the OWNER, ENGINEER, and FPL
- C. The general demolition scope shall also include the following minimum requirements whether indicated on drawings or not.
  - 1. Before demolition, CONTRACTOR shall verify that the equipment is no longer needed or that the demolition will not adversely effect plant operation.
  - 2. Removal of all exposed conduit. Removal of all wire within raceways, cabinets, outlet boxes, trenches and the like associated with equipment shown to be removed on plans.
  - 3. Removal of all hangers and support systems which are not needed as a result of the demolition.
  - 4. CONTRACTOR shall cover all openings as a result of demolition and removals including but not limited to the following:
    - a. Cabinets and enclosures
    - b. Wall and masonry openings.
    - c. Cut conduit, instrumentation line, etc. flush with slab, fill with concrete, patch and paint holes in walls.
- D. Operational Systems
  - 1. To the fullest extent possible, all required systems shall remain operational. CONTRACTOR shall replace and/or repair existing facilities which may be damaged due to equipment removals.

2. Where required wiring passes through or uses enclosures or raceways shown for demolition. CONTRACTOR shall provide raceways and wire as required to keep those systems operational.
  3. CONTRACTOR shall remove existing equipment in an orderly, planned and coordinated fashion. All replacement equipment shall be on site and ready to install immediately after the removal of existing equipment.
  4. Where demolition interrupts the normal automatic control of the station, CONTRACTOR shall provide full time manual control until automatic control is restored unless otherwise directed by the OWNER. CONTRACTOR shall obtain permission of the OWNER before removing automatic control.
- E. CONTRACTOR shall be required to visit the site before bid to ascertain the magnitude of the Work. The drawings indicate the minimal effort. Any electrical raceway associated with any equipment shall be demolished. The drawings do not call out every item of Work. All the building electrical equipment shall be replaced with new, unless otherwise indicated by the drawings or noted elsewhere by the specifications.
- F. The OWNER shall select equipment to be salvaged to the OWNER. Salvaged equipment shall be provided to the OWNER onsite.
- G. Provide demolition in support of any civil or mechanical Work as may be required. See civil and mechanical documents.

## **1.02 INCLUDED WORK**

- A. Contractor shall coordinate with the OWNER and demolish the existing pump station equipment including the electrical equipment inside the can station below grade.
- B. CONTRACTOR shall demo the existing service and provide a new electrical service as indicated on the drawings.
- C. Demo all existing raceways, wiring, grounding, existing meter, main disconnect, and control panel and equipment rack.
- D. CONTRACTOR shall coordinate with FPL for the demolition and disconnect of existing service and installation and re-connection of the new service.

## **1.03 DISPOSITION OF EQUIPMENT**

- A. Provide removed equipment and/or materials to OWNER as may be required by Owner, coordinate before disposing of all equipment.



- B. Except as otherwise indicated, all removed or demolished electrical equipment shall become the property of the CONTRACTOR. All rubble shall be disposed of by the CONTRACTOR.
- C. CONTRACTOR shall load, transport, and dispose of all or demolished equipment including all enclosed gear, panels, jboxes, disconnects, raceways, wire and cable, supports, step-down transformers, control panels, light fixtures, equipment racks and the like.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

NOT USED

**END OF SECTION**

## **SECTION 16050**

### **BASIC MATERIALS AND METHODS**

#### **PART 1 - GENERAL**

##### **1.01 SUBMITTALS**

- A. Submit data sheets on all items per **Section 16000** – Electrical General Requirements.

##### **1.02 CODES AND STANDARDS**

- A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical Work (in addition to specific applications specified by individual Work sections of these specifications):
  - 1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
  - 2. NEC: National Electrical Code
  - 3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
  - 4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
  - 5. ANSI: American National Standards Institute
  - 6. NESC: National Electrical Safety Code

#### **PART 2 - PRODUCTS**

##### **2.01 GROUNDING MATERIALS**

- A. All ground rods shall be 20 foot 5/8" copperclad, unless otherwise indicated.
- B. Around wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

## **2.02 CONDUIT**

- A. PVC Conduit
  - 1. PVC conduit shall be Schedule 80 or Schedule 40 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.
- B. Flexible Conduit
  - 1. All flexible conduits shall be liquidtight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.
- C. Refer to schedule in drawing for location requirements.

## **2.03 CABLE, WIRE AND CONNECTORS**

- A. 600 Volt Power Wiring
  - 1. Individual conductors shall be rated for 600 volts and shall meet the requirements below:
    - a. Conductors shall be stranded.
    - b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
    - c. Type of wire shall be THWN except where required otherwise by the Contract drawings.
    - d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
    - e. Conductor metal shall be copper.
    - f. All conductors shall be meggered after installation. Megger testing shall exceed 50 mega ohms.

2. Multi-conductor cables shall be type TC UL 1277 THWN, PVC jacketed 600V with conductor and quantities as indicated.

**B. Instrumentation and Control Cable**

1. Process instrumentation wire shall be 16 gauge twisted pair, 600 V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal. Multiconductor cables with individually shielded twisted pairs shall be installed where indicated.
2. Multiconductor control cable shall be stranded 14 gauge, 600 V. THWN insulated overall shielded with PVC jacket, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal.

**2.04 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)**

- A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.
- B. Terminate all control and instrumentation cable with screw-clamp type terminal blocks.
- C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the ENGINEER. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

**2.05 BOXES**

- A. Boxes for wiring devices, switches and receptacles installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates, or stainless steel 316.

**2.06 PULL BOXES AND SPLICE BOXES**

- A. Location
  1. Units used outdoor or in a damp or corrosive environment shall be 316 ss or fiberglass unless otherwise indicated on plans.
  2. Units used indoors in dry and clean A/C environments shall be NEMA 1.

B. Size

1. Units shall be sized per NEC as minimum.

C. Required Units

1. Plans depict minimum requirements. Additional units shall be provided as may be required to complete raceway systems.

**2.07 MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT**

- A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.
- B. Support system used indoors in clean, dry and air conditioned areas shall be galvanized steel. All other areas shall be 316 ss with ss fasteners.
- C. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
- D. All supports, hangers, hardware, etc. used outdoors or in in non-air-conditioned indoor areas or in hazardous areas shall be non-ferrous, corrosion resistant or 316 stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.
- E. Provide trapeze, bridge systems or wall bracketed cantilevered system to support the raceway system.
- F. Spacing of support systems shall be per NEC. Provide spacing of conduits according to the NEC and the materials used. For PVC conduit, refer to NEC table 347-8.
- G. Plans depict minimum requirements. Provide additional units as required to complete raceway system.

**2.08 DUCT SEAL**

- A. Provide Garvin Industries' duct seal or an approved equal
- B. Provide and install duct seal at all conduit ends for all new conduit installations, including wetwell and valve vault.
- C. Duct seal shall be used to seal all penetrations at junction boxes, control panels, RTU enclosures, terminal boxes, starter enclosures, timers, MCC equipment, panelboards and the like, It shall be a permanently soft, non

toxic compound. It shall also not affect other plastic materials or corrode metals.

### **PART 3 - EXECUTION**

#### **3.01 GROUNDING**

- A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.
- B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. THESE GROUND CONDUCTORS ARE REQUIRED THROUGHOUT THE PROJEC REGARDLESS OF WHETHER CONDUIT RUNS SHOW GROUND CONDUCTORS ON THE DRAWINGS.
- C. All connections made below grade shall be of the exothermic type.
- D. The grounding system test shall not exceed a 48 hour span dry resistance of 10 ohms. Additional grounding to meet this requirement shall be installed at no extra cost. Grounding and bonding connections shall not be painted.

#### **3.02 CONDUIT**

- A. Locations:

Conduits shall be used as follows:

- 1. Refer to schedule on drawings.

- B. Installation

- 1. Conduits subjected to rough handling or usage shall be removed from the premises.
- 2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
- 3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight.

4. Infurred ceilings, conduit runs shall be supported from structure, not furring.
5. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
6. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.
7. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
8. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends. No attempts are made in plans to show required pull boxes, gutters, etc. necessary for the construction of the raceway system but the CONTRACTOR shall provide these raceways as may be required.
9. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
10. Conduit runs shall always be concealed except where indicated on plans.
11. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood

construction. The use of perforated straps or wires will not be permitted.

13. Wire shall not be installed until all Work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
14. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under traffic areas, conduits are to be buried at least three (3) feet below finished grade.
15. All conduits shall be cleaned by pulling a brush swab through before installing cables.
16. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment. Approved backing gauze is required prior to the installation of conduit putty.
17. A maximum of two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments and other items of equipment where vibration is present. It shall be supported where required with stainless steel bands.
20. PVC conduit shall be supported to walls and slabs using carlon snap strap conduit wall hangers. Two hole PVC conduit clamps shall not be permitted.

### **3.03 WIRES, CABLES AND CONNECTIONS**

- A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
- B. Shields shall be grounded at only one termination point.

### **3.04 BOXES**

- A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
- B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall



be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

### **3.05 WIRING DEVICES**

- A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals. Wiring devices shall be Leviton or approved equal.
- B. Wire devices on UPS systems shall be isolated ground, colored orange.
- C. Cover plates shall be provided as follows except as otherwise noted.
  - 1. Interior finished area – brushed aluminum
  - 2. Wet areas – gasketed plastic with flip cover.
- D. Receptacles installed outdoors, below grade, or in areas other than clean and dry environments shall be GFI and weatherproof. Receptacles shall be weatherproof with cords plugged in.
- E. All receptacles shall be GFI protected.

### **3.06 SUPPORTING DEVICES**

- A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices may be supported from ceiling system where permitted by the ENGINEER. However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.
- B. All floor-mounted devices (switchboards, large control panels, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by Manufacturer, these recommendations shall be followed.

### **3.07 CLEANING**

- A. All electrical equipment enclosures shall be thoroughly cleaned before acceptable by the OWNER. As a minimum, CONTRACTOR shall remove all debris including stripped wire insulation, dirt, and debris.

**END OF SECTION**

## **SECTION 16900**

### **CONTROL PANELS**

#### **PART 1 – GENERAL**

##### **1.01 SCOPE OF WORK**

- A. The CONTRACTOR shall furnish, install and place into service operating process instrumentation, control systems, field instruments, PLC, RTU equipment, and control panel accessories, related to wastewater controls as shown on plans and specified herein.
- B. Coordinate with the pump vendor. The I&C Vendor/CONTRACTOR shall be responsible for the controls hardware, field instruments, PLC, HMI OI, the VFD equipment included with the Control Panel with HVAC cooling.
- C. Provide the existing radio RTU/SCADA I/O equipment upgrade as required, including the configuration and programming of the existing RTU equipment and the OWNER's SCADA system to reflect the I/O elements on the waste water pumping station controls specified herein and depicted on the drawings.
- D. The RTU Sub-contractor shall be a sub to the I&C CONTRACTOR, the I&C CONTRACTOR is ultimately responsible to provide a fully operational and working system.
- E. The Instrumentation and Controls CONTRACTOR is ultimately responsible to make the control panels operate per the Contract Documents and the OWNER's latest standards; at minimum this shall include for the I&C CONTRACTOR to provide all additional hardware, materials, field modifications, and labor as required.
- F. Drawings depict the best available data from the OWNER's latest standards; the control panel schematics reflect the OWNER's intent of the pump operation, the I&C CONTRACTOR shall provide all additional relay logic, pilot devices and labor to properly implement the OWNER's intent of the pump operation.
- G. The I&C CONTRACTOR shall coordinate with the City personnel the proper depth for the floats and level transmitter.
- H. Provide VFD system with keypad selector on panel deadfront.
- I. Provide all VFD configuration and setup.

## **1.02 SINGLE INSTRUMENT SUPPLIER**

- A. The CONTRACTOR shall assign to the Single Instrument and Control (I&C) supplier full responsibility for the functional operation of all new instrumentation systems. The CONTRACTOR shall have said supplier perform all engineering necessary to select, to furnish, to supervise installation, connection, to calibrate, to place into operation all sensors, instruments, alarm equipment, control panels, accessories and all other equipment as specified herein.
- B. The foregoing shall enable the CONTRACTOR and the OWNER to be assured that the full responsibility for the requirements of this section shall reside in an organization which is qualified and experienced in the waste water treatment field and its process technology on a functional system basis.
- C. The I&C supplier shall be a UL 508, UL 698A listed manufacturer. acceptable named manufacturers shall be limited to the following:
  - 1. C.C. Control
  - 2. DCR Engineering
  - 3. C2I Controls.
- D. CONTRACTOR shall review all specifications and drawings.
  - 1. The following are the suggested division of responsibilities. The CONTRACTOR shall have the freedom and responsibility to complete the work in any fashion he sees fit as long as the following minimum features are included.
  - 2. The I&C CONTRACTOR shall provide all system integration, configuration, calibration, and coordination. The RTU upgrade and programming, including the OWNER's central SCADA system shall be by Data Flow Systems of Melbourne FL. This CONTRACTOR shall work under the I&C CONTRACTOR.
  - 3. The control panel manufacturer shall provide all of the control panel equipment including soft starters, pilot lights, switches, relays, pump bubbler compressor and controller, terminal strips field instruments, and the like. The control panel manufacturer shall coordinate with the pump vendor and include the pump protective relays and components as recommended by the pump vendor.

5. All field located instrumentation and control equipment shall be provided by the I&C CONTRACTOR. Such equipment shall include floats, pressure transmitters, bubbler system, and the like.
6. Detailed shop drawings shall be prepared and submitted by the control panel manufacturer to the ENGINEER. Before the submittal is made to the ENGINEER, the I&C CONTRACTOR shall work out all the details with the other system vendors.
7. Float system shall be used as a backup to level sensing probe level control system.
8. Pumping Station status, running of pumps, faults, wetwell level, Generator running, Generator fault, ATS switch positions shall be collected on an Allen Bradley PLC I/O, and these points shall be made available to the RTU and then via radio to the central RTU/SCADA, see other specification sections and the drawings.
9. Provide pump logic via level sensor probe as main means of controlling pumps and sensing wetwell level. Floats shall act as a backup with relay logic and relay alternator so pump cycle through the lead and lag pump levels. Station is to operate two pumps at a time, staggered starting, third pump is a backup, but it is used in the relay logic for alternator to run eventually all pumps.

### **1.03 INSTALLATION WORK**

- A. Nothing in this part of the specifications shall be construed as requiring the CONTRACTOR to utilize personnel supplied by his assigned instrument manufacturer's organization or any division thereof, to accomplish the physical installation of any elements, instruments, accessories or assemblies specified herein. However, the CONTRACTOR shall employ installers who are skilled and experienced in the installation and connection of all elements, instruments, accessories and assemblies; portions of their work shall be supervised or checked as specified herein.

### **1.04 PREPARATION OF SUBMITTAL OF DRAWINGS AND DATA**

- A. It is incumbent upon the CONTRACTOR to coordinate the work specified in these Sections so that a complete instrumentation and control will be provided and will be supported by accurate shop and record drawings. As part of the responsibility as assigned by the CONTRACTOR, the Single I&C supplier shall prepare and submit through the CONTRACTOR, complete and organized shop drawings, as specified herein. Interface

between instruments, motor starters, flow meters, and existing instruments shall be included in his shop drawing submittal.

- B. In order to provide a fully coordinated system, shop drawings by other equipment vendors associated with the I&C control panel systems shall be reviewed and approved by the CONTRACTOR before submittal to the ENGINEER for approval.
- C. During the period of preparation of this submittal, the CONTRACTOR shall authorize direct informal liaison between his single I&C Supplier and the ENGINEER for exchange of technical information. As a result of this liaison certain minor refinements and revisions in the systems as specified may be authorized informally by the ENGINEER, but these shall not alter the scope of the work or cause increase or decrease in the contract price. During this informal exchange no oral statement by the ENGINEER shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to, or variation from these specifications.
- D. Operation and Maintenance Manual
  - 1. Submit one preliminary O&M for review and comment by the ENGINEER. Provide five final O&M.s, bound in a three ring binder. O&M shall include the requirements of I&C materials and minimally include the following: approved submittal data, start-up corrected as built shop drawings. O&M shall be neatly and logically arranged with a contents page followed by tabbed sections.

#### **1.05 ADDITIONAL TECHNICAL SERVICES**

- A. At no additional cost to the OWNER, the CONTRACTOR shall provide the services of qualified technical representatives of the Single I&C supplier:
  - 1. To supervise installation and connection of all instruments, elements and components of every system, including connection of instrument signals to primary measurement elements and to final control elements such as pumps.
  - 2. To make all necessary adjustments, calibrations, field modifications, and tests;
  - 3. To instruct plant operating and maintenance personnel on instrumentation. This time shall be in addition to whatever time is

required for other facets of work at the site and shall be during the OWNER's normal working days and hours.

#### **1.06 GUARANTEE**

- A. The CONTRACTOR shall guarantee all equipment and installation, as specified herein, for a period of one (1) year following the date of completion of the work. To fulfill this obligation, the CONTRACTOR shall utilize technical service personnel designated by the Single I&C supplier to which the CONTRACTOR originally assigned project responsibility for instrumentation.

#### **1.07 ADDITIONAL PROVISIONS**

- A. The applicable provisions of the following sections under Electrical Work shall apply the work and equipment specified herein, the same as if stated in full herein:
  - 1. Codes and Standards
  - 2. Equipment Materials and Workmanship
  - 3. Testing
  - 4. Grounding
  - 5. Equipment Anchoring
  - 6. Conductor and Equipment Identification
  - 7. Terminal Cabinets and Control Compartments
  - 8. Process Control Devices

#### **1.08 NEWEST MODEL COMPONENTS**

- A. All meters, instruments and other components shall be the most recent field proven models marketed by their manufacturers at the time of the submittal of shop drawings unless otherwise specified to match existing equipment. All technical data publications included with the submittal shall be the most recent issue.

#### **1.09 COORDINATION**

- A. I&C supplier shall coordinate with his supplier and other CONTRACTORS on the project. Where large subsystems are provided,

the I&C supplier shall coordinate before the bid to be certain all equipment, engineering and labor are provided. Coordination item minimally includes: equipment dimensions, heat rejection, power requirements, control and signal requirements, and interconnection requirements.

- B. The I&C Supplier is responsible to coordinate with City personnel and make adjustments to the equipment listed herein and called out on the drawings. Final equipment selection like changes on equipment models and types may be different from these documents – the I&C CONTRACTOR is responsible to provide auxiliary equipment or other equipment changes that may occur as changing of one piece of equipment.

#### **1.10 TEST PROCEDURE DEVELOPMENT AND DOCUMENTATION**

- A. I&C subcontractor shall prepare and submit to the ENGINEER for review a detailed description of the test procedures that he proposed to perform to demonstrate conformance of the complete system of instrumentation and controls to this Specification.
- B. It is recommended that the I&C subcontractor develop the test procedures in two steps by first submitting general descriptions and outlines of the tests and then, upon receipt of approval, submit the required detailed procedures and forms.
- C. Operational Acceptance Tests
  - 1. The I&C subcontractor shall prepare check-off sheet(s) for each loop and an instrument calibration sheet for each active I&C element (except simple hand switches, lights, etc.). These check-off and data sheets shall form the basis for these operational tests and this documentation.
  - 2. Each loop check-off sheet shall cite the following information and shall provide spaces for sign-off on individual items and on the completed loop by the I&C subcontractor.
    - a. Project name
    - b. Loop number
    - c. For each elements: Tag number, description, manufacturer and model number, installation bulletin, and Specification sheet number.
    - d. Loop description

- e. Installation check
  - f. Termination check
  - g. Calibration check
  - h. Adjustment check
  - i. Space for comments
  - j. Space for loop sign-off I&C subcontractor and date.
3. Each instrument calibration sheet shall provide the following information and a space for sign-off on individual items and on the completed unit by OWNER Representative and the I&C subcontractor.
- a. Project name
  - b. Loop number
  - c. Tag number
  - d. Manufacturer
  - e. Model number
  - f. Serial number
  - g. Calibration range
  - h. Calibration data: Input, output and error at 0, 25, 50, 75, and 100% of span.
  - i. Switch setting, contact action and dead band for discrete elements.
  - j. Space for comments
  - k. Space for sign-off by I&C subcontractor and date.

D. Functional Acceptance Tests

The I&C subcontractor shall prepare two types of test forms as follows:



1. For those functions that can be demonstrated on a loop-by-loop basis, the form shall include:
  - a. Project name
  - b. Loop number
  - c. Loop description
  - d. Test procedure description
  - e. For each component: Tag number, description, manufacturer and data sheet number.
  - f. Space for sign-off and date by both I&C subcontractor and OWNER Representative.
2. For those functions that cannot be demonstrated on a loop-by-loop basis, the test form shall be a listing of the specific tests to be conducted. With each test description, the following information shall be included:
  - a. Spec page and paragraph of function demonstrated
  - b. Description of function
  - c. Space for sign-off and date by both I&C subcontractor and ENGINEER.

## **PART 2 – PRODUCTS**

### **2.01 INSTRUMENTATION CRITERIA**

#### **A. Designation of Components**

1. In these specifications and on the drawings, all systems, meters, instruments and other elements are represented schematically, and are designated by numbers, as derived from criteria in Instrument Society of America Standard ANSI/ISA S5.1-1973. The nomenclature and numbers designated herein and on the drawings shall be employed exclusively throughout shop drawing, data sheets and similar materials. Any other symbols, nomenclature unique to the manufacturer's standard methods shall not replace these prescribed above, used herein and on the Drawings.

#### **B. Signal Characteristics**

1. Signals shall be electrical, as indicated herein, and shall vary in direct linear proportion to the measured variable, except as noted. Electrical signals outside control panels shall be 4-20MADC, except as noted.

C. Matching Style, Appearance and Type

1. All instruments to be panel mounted at the control panels shall have matching style and general appearance. Instruments performing similar functions shall be of the same type, model, or class and shall be one (1) manufacturer.

D. Accuracy and Repeatability

1. The overall accuracy of each instrumentation system or loop shall be as prescribed in the specifications for that system or loop. Each system's accuracy shall be determined as a probable maximum error; this shall be the square root of the sum of the squares of the certified "accuracies" of certain designated components in each system, expressed as a percentage of the actual span or value of the measured variable. Each individual electronic instrument shall have a minimum accuracy of +0.7 percent of full scale and a minimum repeatability of +0.4 percent of full scale unless otherwise specified. Instruments which do not conform or improve upon these criteria are not acceptable.

E. Signal Isolators, Converters and Power Supplies

1. Signal isolators shall be furnished and installed in each measurement and control loop, wherever required, to assure adjacent component impedance match or where feedback paths may be generated. Signal converters shall be included where required to resolve any signal level incompatibilities. Signal power supplies shall be included, as required by the manufacturer's instrument load characteristics, to insure sufficient power to each loop component.

F. Alternative Equipment or Methods

1. Equipment or methods requiring redesign of any project details are not acceptable without prior written approval of the ENGINEER. Any changes inherent to a proposal alternative shall be at no additional cost to the OWNER. The required approval shall be obtained in writing by the I&C subcontractor through the CONTRACTOR prior to submittal of shop drawings and data.

Any proposal for approval of alternative equipment or method specified, shall include evidence of improved performance, operational advantage and maintenance enhancement over the equipment or method specified, or shall include evidences that a specified component is not available. Otherwise, alternative equipment (other than direct, equivalent substitutions) and alternative methods shall not be proposed.

G. Special Equipment

1. The I&C Supplier shall provide all necessary equipment to properly interface his system with equipment provided by others. Such equipment shall include but not be limited to special sensing relays for seal failures and the like.

**2.02 DETAILED SYSTEMS DRAWINGS AND DATA**

A. Content

The CONTRACTOR shall submit detailed shop drawings and data prepared and organized by the Single I&C supplier designated at the time of bidding. The quantity of submitted sets shall be no less than 6 sets. These drawings and data shall be submitted as a complete bound package at one time within 30 calendar days after date of notice to proceed.

1. Drawings showing definite diagrams for every instrumentation loop system shall be provided. These diagrams shall show and identify each component of each loop or system using legend and symbols from ISA standard S5.4, each having the format of ISA Standard S5.1 as used on the project drawings.
2. Coordinate all equipment and instrument tags with the OWNER's existing waste water pump station on their central RTU/SCADA – meet the OWNER's current standards for color and representation of equipment status and alarms. All tags shall agree with the standards.
3. Data sheets for each component, together with a technical product brochure or bulletin shall be provided. The data sheets shall show:
  - a. Component function description used herein and on the drawings;
  - b. Manufacturer's model number or other product designation;

- c. Project tag number used herein and, on the drawings’;
  - d. Project system loop of which the component is a part;
  - e. Project location or assembly at which the component is to be installed;
  - f. Input and output characteristics;
  - g. Scale range, units and multiplier;
  - h. Requirements for electrical supply;
  - i. Materials of component parts to be in contact with, or otherwise exposed to process media;
  - j. Special requirements or features.
4. A complete index shall appear in the front of each bound submittal volume. A separate technical brochure or bulleting shall be included with each instrument data sheet. The data sheet shall be indexed in the submittal by systems or loops, as a separate group for each system or loop. If, within a single system or loop, a single instrument is employed more than once, one data sheet with one brochure may cover all identical uses of that instrument in that system. Each brochure shall include a list of tag numbers for which it applies. System groups shall be separated by labeled tags.
5. Drawings shall show both schematic and wiring diagrams for control circuits. Complete details on the circuit interrelationship of all devices within and outside each control panel shall be submitted. Control devices and pertinent mechanical relationships including mechanical parameters shall be included on these diagrams. These parameters as a minimum shall include instrument ranges, sizes, setpoints and the like. The diagrams shall consist of component layout drawings to scale, showing numbered terminals on components together with the unique number of the wire to be connected to each terminal. Piping and wiring diagrams shall show terminal assignments from all primary measurement devices, such as flow meters, and to all final control devices, such as pumps. The CONTRACTOR shall furnish all necessary equipment supplier’s shop drawings to facilitate inclusion of this information by the I&C system supplier.
6. Assembly and construction drawings for each control panel and for other special enclosed control assemblies for field installation shall

be provided. These drawings shall include dimensions, identification of all components, surface preparation and finish data, name plates and the like. These drawings also shall define exactly the style and overall appearance of the assembly; a final treatment sample shall be provided when requested.

7. Installation anchoring and mounting details for all components and assemblies to be field-mounted, including conduit connection or entry details shall be provided.
8. Complete detailed bill of materials including a master bill of materials listing all field mounted devices, control panels and other equipment that will be shipped to the job site and a bill of materials for each control panel listing all devices within the panel.

B. Organization and Binding

1. The organization of the original shop drawing submittal shall be compatible to the eventual inclusion with the technical manuals submittal and shall include final alternations reflecting “as built” conditions. Accordingly, the initial multiple copy shop drawing shall be separately bound in 3-ring binders.

## **2.03 TECHNICAL MANUALS**

- A. One preliminary O&M manual shall be submitted to the ENGINEER for review and comment. Assuming a favorable review the I&C supplier shall incorporate comments and forward the five final copies to the ENGINEER. If the preliminary O&M is not acceptable, the I&C supplier shall resubmit.
- B. Five (5) final sets of technical manuals shall be supplied for the OWNER as a condition for final acceptance of the project. Each set shall consist of one (1) or more volumes, each of which shall be bound in a standard size, 3-ring, loose leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 3 inches.
- C. In addition to updated shop drawing information to reflect actual existing conditions, each set of technical manuals shall include installation, connection, operating, trouble-shooting, maintenance and overhaul instructions in complete detail. This shall provide the OWNER with comprehensive information on all systems and components to enable operation, service, maintenance and repair. Exploded or other detailed views of all instruments, assemblies, and accessory components shall be included together with the complete parts lists and ordering instructions.

- D. Shop drawing files shall be provided in the latest version of Autocad with each O&M manual. Provide electronic copy of the files on CD ROM disk.

#### **2.04 SPARE PARTS**

- A. The CONTRACTOR shall include, as part of the bid package, a list of recommended spare parts covering items required under these specifications.
- B. Minimum spare parts shall be provided boxed and identified including the following:
  - 1. 3-control relays of each type used.
  - 2. 3-timing relays of each type used.
  - 3. 3-fuses of each size and type used.
  - 4. 3-pilot lights of each size and type use.
  - 5. 3-signal field surge arrester of each type used.
  - 6. 3-signal panel surge arrester of each type used.
  - 7. 3-incoming power lightning arrester of each type used.
  - 8. 3-surge capacitor of each type used.

Also provide other spares as noted by the particular sections and paragraphs of other- specifications.

#### **2.05 CONTROL PANELS**

- A. General
  - 1. I&C supplier shall construct the control panel to properly control internal and external equipment. No attempt is made to specify or indicate on plans, all required equipment but rather to set forth the minimum requirements.
- B. Engineering
  - 1. I&C supplier shall provide system engineering and produce detailed fully engineered, coordinated and completed drawings.

C. Construction

1. Control panel construction shall be per these specification and plans.

D. Signal and Control Circuit Wiring

1. Wire Type and Sizes: Conductors shall be flexible stranded copper wire; these shall be UL listed TFFN, THWN, THHN and shall be rated 600v. Wire for control signal circuits shall be #16 AWG unless otherwise noted. All instrumentation cables shall be shielded #18 AWG with a copper drain wire unless otherwise noted. All special instrumentation cable such as between sensor and transmitter shall be supplied by the I&C supplier. CONTRACTOR shall increase wire size per load or impedance requirements.

E. Wiring Instrumentation

1. All wires shall be run in plastic wireways except (1) field wiring, (2) wiring between mating blocks in adjacent sections, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, (4) wiring run to panel mounted components on the door and the like. Wiring run on a swing out panel to other components on a fixed panel shall be made up in nylon wire ties bundles and secured so that bundles are not strained at the terminals.
2. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon ties and secured to the inside face of the panel using adhesive mounts and adhesive strips.
3. Wiring to rear terminals on panel mounted instruments shall be run in plastic wares secured to horizontal brackets run above or below the instruments in the same plane as the rear of the instruments.
4. Shields of instrument cable shall only be grounded on one side of each circuit. The side to be grounded shall be nearest the source of excitation.
5. Care shall be exercised to properly insulate the ungrounded side of the loop to prevent ground loops from occurring.
6. Conformance to the above wiring installation requirements shall be reflected by details shown on the shop drawings for the ENGINEER's review.

F. Wire Marking

1. Each signal, alarm, control, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all shop drawings. These numbers shall be marked on all conductors using white plastic heatshrink sleeves with typewritten characters. Instrument signal conductors shall be tagged with unique multiple digit numbers. Wires from the circuit breaker panelboard shall be tagged indicating the branch circuit breaker number.

G. Terminal Blocks

1. Compression type terminal blocks shall be molded plastic with barriers and box lug terminals, and shall be rated 15 amps at 600v and mounted securely to DIN rails. White marking strips fastened to the molded sections shall be provided and wire numbers and circuit identifications shall be marked thereon with machine printed marker on top. Terminal blocks shall be IEC style by Entrelec M4/6 or an approved equal.

H. Wire Color

1. Wire color shall be, Line Power – Black; Neutral or common – White; AC Control – Red; DC Control – Blue; Equipment or Chassis Ground – Green; specified externally powered circuits – Orange.

I. Enclosures

1. Unless otherwise indicated, all enclosures L 24” x W 24” and larger shall be provided with the following.
  - a. NEMA 4X, all materials 316 ss, freestanding or rack mounted, bolted to concrete base outside door stop, drip shield, provide cut in bottom for conduit penetration.
  - b. Subplate for mounting equipment.
  - c. Padlockable, pocketed exterior doors.
  - d. Where required, provide stainless steel piano hinged dead fronts with quarter turn latches.

J. Identification



1. All components shall be identified using Lamicoid labels or an approved equal.

## **2.06 CONTROL PANEL EQUIPMENT**

### **A. General Purpose Relays**

1. General purpose relays in the control panel shall be the plug in type with contacts rated 10 amps at 120 vac as a minimum. The quantity and type of contacts shall be as required to accomplish the desired control task. Each relay shall be enclosed in a clear plastic heat and shock resistant dust cover. Relays shall be Potter and Brumfield or an approved equal. Differing mounting sockets shall be used to prohibit improper relay installations. Provide tube type base, 8 PIN or 11 PIN. Blade type relays shall not be used.

### **B. Time Delay Relays**

1. Time delay relay shall be Diversified with digital settings or an approved equal. Timers shall be time delay on, interval on or time delay off relays, as required and shall be Diversified or an approved equal. Instantaneous contacts or auxiliary slave relays shall be provided as required. Provide tube type base, 8 PIN or 11 PIN. Blade type relays shall not be used.
2. Provide a triplexor alternator relay, Diversified or equal to cycle the three pumps; based on float level, only two pumps will operate, third pump is a backup. Third pump will be cycled into the mix of two pumps running via the alternator. Provide all hardwired logic, relays as required for proper pump alternation with max of two pumps running in auto mode. In Auto mode the pump VFD shall start based on float level or level from analog level probe via a PLC start command.

### **C. Signal Isolators**

1. Additional slave or interposing relays and signal isolators and signal converters shall be installed as required.

### **D. Circuit Breakers**

1. Circuit breakers shall be single pole, 120vac, 15 amp rating or as required to protect wires and equipment; mounted on the inside of the enclosure or equipment remote from the enclosure.

E. Name Plates

1. Name plates shall be supplied for identification of control panels and all field mounted elements, including flowmeters and their transmitters. These name plates shall identify the instrument or meter, descriptively as to the function of the system. Nameplates shall be fabricated from black faced, white centered, laminated engraving plastic. A nameplate shall be provided for each signal transducer, signal converter, signal isolator, each electronic trip, and the like, mounted inside the control panels. These shall uniquely identify each control component. Adhesives shall be acceptable for attaching nameplates. Painted surfaces must be prepared to allow permanent bonding of adhesives. Nameplates shall be provided for instruments, function titles for each group of instruments and other components mounted on the front of the control panels as shown. Proposed colors, styles, height and text shall be submitted for approval.

F. Fluorescent Light

1. Provide fluorescent panel light mounted to sub plate. Provide sub plate mounted switch and handy boy.

G. Vapor Guard

1. Moisture absorbing vapor guard shall be provided in each control panel.

H. Power Supplies

1. Power supplies shall be provided as required for loop power or other requirements for special equipment. Loop power supplies shall be Square D or an approved equal.

I. Circuit Breakers

1. Square D
2. Amperage ratings shall be indicated on drawings.

J. Fuses

1. Fuses and fuse holders 5x 20mm, IEC style, with blown fuse indicating light.

K. Ground Fault Interrupting Receptacle

1. Leviton Duplex Receptacle or equal.
2. AC receptacle box shall be Steel City 58351-1/2 or equal.
3. Covers shall be Steel City 58-C-5, or equal.

L. Selector Switches and Push Buttons

1. Square D, Class 9001, Type K, or equal.
2. Operators shall be black knob type or key switch, 3-position or 2-position, push button or as noted.
3. Selector switches shall be spring return where noted.
4. Pushbuttons inserts

	<u>Label</u>	<u>Color</u>
a.	On	Green
b.	Off	White
c.	Start	Green
d.	Stop	White
e.	Reset	Black
f.	Acknowledge	Yellow

5. Selector Switch Operator

	<u>Label</u>	<u>Color</u>	<u>Text</u>
a.	All	Black	White

M. Indicator Lights

1. Square D, Class 9001, type K. Units shall not be press to test or transformer type.
2. Lens color shall be as noted (I&C Vendor to confirm with City standards and provide colors based on latest city standards).

	<u>Label</u>	<u>Color</u>
a.	On	Green
b.	Off	White
c.	Open	Green
d.	Closed	White

- |    |        |        |
|----|--------|--------|
| e. | Hand   | Yellow |
| f. | Auto   | Green  |
| g. | Local  | White  |
| h. | Remote | Green  |
| i. | Alarm  | Red    |

N. Surge and Lightning Arrestors

1. All control panels shall be provided with surge and lightning arrestors as specified.
2. TVSS
  - a. Lightning surge suppressors shall be SQ D.
3. Signal
  - a. Panel surge arrestors shall be Edco, HSP Series.
  - b. Field surge arrestors shall be Edco, TC642C Series.

O. Intrinsically Safe Relays

1. Units shall be Gems Safe Paks or equal.

P. Motor Ground Fault Monitors

1. Control Panel shall be provided with ground fault monitor at each pump motor power feeder. Monitor shall be capable of disabling each motor starting logic. Provide all additional logic and pilot devices required to stop motor starter in event of a ground fault in pump motor/pump motor cable. Refer to control panel schematic for details.

Q. Pump Protection Devices

1. Provide Flygt MiniCAS pump protective relays or equivalent for pump leakage and high temperature pump sensors.
2. Furnish additional wiring and pilot devices as required to implement MiniCAS protection relays into control panel logic.

R. Intrusion Alarm

1. Provide a panel intrusion alarm for the Control Panel doors.

S. Motor Starter

1. Provide SQ D, Eaton VFD Drive, minimum size for the pump vendor's submersible pump motor amps.
2. Provide input line reactor and DV/DT output filter, see electrical oneline diagram.
3. Provide auxiliary contacts as required for status.

T. PLC

1. Provide Allen Bradley PLC equipment inside 120V control section of control panel, see specs and drawings.

U. Control Panel Air Conditioner

1. Provide a side mounted control panel air conditioner sized for the control panel and equipment shown on drawings.
2. HVAC unit shall be manufactured by Pfannenberg USA DTS 3000 series. Unit shall be powered off 480V 3 phase with a 15 Amp breaker, and thermostat for the control panel, see drawings

**2.07 FIELD INSTRUMENTATION AND CONTROL EQUIPMENT SPECIFICATIONS**

A. General

1. The materials specified below shall establish the type and quality of materials used.
2. Refer to Civil, Mechanical, and Electrical drawings for additional requirements.

B. Floats

1. Provide non-mercury form "C" floats with cable lengths as required.
2. Anchor Scientific or equal.
3. Provide J-boxes for connection to conduit and wire systems.

C. Pressure Sensing level sensor w/Transmitter

1. Provide a bird cage level sensing probe, as manufactured by Blue Ribbon, model pressure type sensing transmitter
2. Provide unit made of materials compatible for waste water operation

## **2.08 CONTROL PANEL PLC, ETHERNET SWITCH, UPS AND INTERFACING WITH DFS RTU RADIO SYSTEM**

### **A. PLC and Ethernet Equipment**

1. I&C CONTRACTOR shall provide an Allen Bradley MicroLogix 1756 Family of PLC, include CPU module, I/O modules as outlined on the drawings, power supply module and the like.
2. Provide a SOLA 1000VA UPS system with a UPS relay card, and interconnection 12VDC power and RS232 cable.
3. Provide a Hirschmann Ethernet 5 port switch, 100MBPS speed, Spider EEC rail series 5TX or equal
4. Provide an Ethernet to Modbus interface converter for the interface with the Generac generator controls and the PLC.
5. Provide I/O to the DFS RTU for status and signals from the PLC and field instruments to the RTU.

## **2.09 NAMEPLATES, NAME TAGS AND SERVICE LEGENDS**

- A. All components provided under this section, both field and panel mounted, shall be provided with permanently mounted name tags bearing the entire IA tag number of the components. Panel mounted tags shall be plastic; field mounted tags shall be stamped stainless steel.
- B. The panel drawings refer to nameplates and service legends: nameplates are defined as inscribed laminated plastic plates mounted under or near a panel face mounted instrument. Service legends are defined as inscribed laminated plastic integrally mounted on a panel face mounted instrument.
- C. Service legends and nameplates shall be engraved, rigid, laminated plastic. Service legends and nameplates shall be fastened to the panel by screws or with a specially applied adhesive. Fastening shall not depend only on the adhesive.

## PART 3 – EXECUTION

### 3.01 INSTALLATION, CALIBRATION, TESTING, START UP AND INSTRUCTION

#### A. General

1. Under the supervision of a Single I&C supplier, all systems specified in this section shall be installed, connected, calibrated and tested and in coordination with the OWNER and ENGINEER shall be started to place the process in operation. This shall include final calibration in concert with equipment specified elsewhere in these specifications as well as equipment provided by the OWNER.

#### B. Installation and Connection

1. The CONTRACTOR shall install and connect all field mounted components and assemblies under the criteria imposed in 1.3, herein. The installation personnel shall be provided with a final reviewed copy of the shop drawings and data.
2. The instrument process lines, impulse piping lines and air signal tubing shall, in general, be installed in a similar manner to the installation of conduit specified under **Section 16000** – Electrical General Requirements.
3. Bends shall be formed with the proper tools and to uniform radii and shall be made without deforming or thinning the walls of the tubing.
  - a. Unless otherwise indicated, all fittings, adapters, impulse piping, valves, etc. shall be 316 stainless. Valves shall be Whitey Series 40 or an approved equal.
4. The CONTRACTOR shall have a technical field representative of the I&C supplier to instruct these installation personnel on any and all installation requirements; thereafter the technical field representatives shall be readily available by telephone to answer questions and to provide clarification when needed by installation personnel.
  - a. Where primary elements (supplied by the I&C supplier) will be part of a mechanical system, the I&C supplier shall

coordinate the installation of the primary elements with the mechanical system manufacturer.

5. After all installation and connection work has been completed, the technical field representatives shall check all for correctness, verifying polarity of electric power and signal connections making sure all process connections are free of leaks and all such similar details. The technical field representative shall certify in writing to the CONTRACTOR that for each loop or system he has completed such check out and that any discrepancies have been corrected by the installation personnel.
6. The field representative of the I&C supplier shall coordinate all work required to interface the new equipment, including all required modifications to the existing equipment and related devices.

C. Calibration

1. All new instruments shall be calibrated.
  - a. All instruments and systems shall be calibrated after installation, in accordance with the component manufacturer's written instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and/or systems are within the specified limits of accuracy. Defective elements which cannot achieve proper calibration or accuracy, either individually or within the system shall be replaced. This calibration work shall be accomplished by the I&C Supplier.
  - b. Proof of Conformance – The burden of proof of conformance to the specified accuracy and performance is on the CONTRACTOR using his designated I&C supplier. The CONTRACTOR shall supply necessary test equipment and technical personnel if called upon to prove accuracy and performance at no additional cost to the OWNER, wherever reasonable doubt or evidence of malfunction or poor performance may appear within the guarantee period.

D. Testing

1. All systems shall be exercised through operational tests in the presence of the ENGINEER in order to demonstrate achievement



of the specified performance. Operational tests depend upon completion of work specified elsewhere in these specifications. The scheduling of the test shall be coordinated by the CONTRACTOR among all parties involved so that the tests may proceed without delays or disruption by incomplete work.

2. All functional/loop tests shall be witnessed and signed off by the OWNER's representative and the I&C subcontractor.
3. CONTRACTOR shall provide testing service in conjunction with the programming of the OWNER's Centra Terminal Unit/ SCADA. CONTRACTOR shall include a maximum of 8 man hours for this service. If problems are found as a result of I&C equipment additional time shall be provided as may be required at no cost to the OWNER

E. Training

1. Plant operating personnel shall be provided with training prior to start-up.
2. One 8 hour training sessions shall be provided. Training shall be at a time convenient to the OWNER.
3. Operating and maintenance personnel shall be instructed in the functions and operation of each system and shall be shown the various adjustable and set point features which may require readjustment, resetting or checking, recalibration or maintenance by them from time to time. This instruction shall be scheduled at a time arranged with the OWNER at least two (2) weeks in advance. Instruction shall be given by qualified persons employed by the I&C supplier.

F. Start Up

1. When all systems are assessed by the CONTRACTOR to have been successfully carried through complete operational tests with a minimum of simulation, and the ENGINEER concurs in his assessment, startup may follow.
2. The CONTRACTOR shall demonstrate to the OWNER and the ENGINEER the pump down operation and the control panel operation during the startup phase.

**END OF SECTION**

## **SECTION 16913**

### **RTU AND SCADA PROGRAMMING**

#### **PART 1 – GENERAL**

##### **1.01 WORK INCLUDED**

- A. All configuration and programming at the lift station and the OWNER's central SCADA system is to remotely convey the status and operation of the waste water pump station, including receive on/off conditions of electrical equipment, wetwell level, and alarm conditions, ATS switch and generator status. Provide configuration to interface with the OWNER's main SCADA system. The RTU CONTRACTOR shall perform all necessary hardware upgrades, configuration and programming to the existing RTU equipment at LS 82. All work done by the RTU CONTRACTOR is as a Sub-contractor to the I&C CONTRACTOR, see other specification sections.
- B. No RTU or SCADA software shall be provided. The RTU Sub-Contractor shall provide its own software to provide all programming and configuration at the lift station RTU and at the OWNER's Central SCADA location.
- C. The approved RTU CONTRACTOR shall be DFS of Melbourne FL, no equal.

##### **1.02 SOFTWARE DEVELOPER**

- A. The software shall be developed by the I&C CONTRACTOR also providing the control systems hardware.
- B. Pump control panel shall house a PLC controller with an HMI operator interface. The controls shall be relayed back to the central radio system via a DFS radio system. See other specification sections.
- C. Provide interfacing between Pump control panel I/O from Pump controller, status and alarm points from controller and relays, including status and alarm point from VFD equipment to DFS RTU. These status and alarm signals are to be provided as hard-wired status signals to DFS equipment and to the OWNER's existing SCADA at central station via telemetry.
- D. DFS CONTRACTOR shall provide HMI graphics of the pump station operation, pumps, levels and alarms at the OWNER's central SCADA graphics display computer.

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. All RTU and Central SCADA programming and configuration software modifications shall be the responsibility the DFS Sub-Contractor.
- B. The I&C CONTRACTOR shall provide configuration and programming of the Pump PLC Controller and the VFD equipment at the lift station control panel, and field instruments.

## **PART 3 – EXECUTION**

### **3.01 CONVENTIONS**

- A. Coordinate with the OWNER regarding conventions. Tag names and the like.
  - a. Color dynamic screen displays shall be provided. All new and existing discrete and analog signal I/O as well as derived values and alarms shall be utilized and displayed on one or more screens. System developer shall use good judgment in developing logically oriented screens depicting the process. Dynamic bar graphs with text shall be used to represent analog values such as tank levels, alarm levels shall represent graphically and with text. Diagrams shall be developed to represent tanks, piping, valves and the like. Consistent conventions shall be used running/ non-running states for all equipment with I/O associated with it.
  - b. Provide HMI via on screen graphical icons and addressable graphics. Operator shall have the ability to monitor the equipment via radio telemetry. Operator shall have the ability on the SCADA computer screen to place equipment in an “OUT OF SERVICE”.
  - c. Color print outs of proposed screens shall be submitted for review and approval.
  - e. The following minimum I/O points shall be provided by the PLC in the LSCP, and available via the HMI OI on the panel, and also on SCADA screens via RTU:

1. Pump/VFD running status from each pump.
2. HOA in AUTO switch status for each pump.
3. Pump Fault status for each pump.
4. Pump VFD fault status for each device.
5. HWL alarm condition
6. Level transducer level monitoring from Level sensor probe.
7. Display Level in Feet elevation from wetwell (based on Level sensor)
8. Hi level (backup) float monitoring
9. Provide float status from off level, and lead and lag pump floats
10. Control Panel doors enclosure intrusion.
11. Phase A,B,C monitoring.
12. LEAD pump ON monitoring
13. LAG pump ON monitoring
14. LAG LAG (backup) pump ON monitoring
15. Pump1/VFD START
16. Pump2/VFD START
17. Pump3/VFD START
18. ATS normal and emergency position monitoring.
19. Generator Running and Generator fault status
20. Generator Low fuel level.
- 21-25 As required by ENGINEER/OWNER

f. Data Logging

- a. Provide data logging of all analog parameters including, but not limited to:
  - (i) Level Probe/Wetwell Level
  - (ii) Phase loss and Level Alarms
  - (iii) Generator and ATS status
  - (vi) Run time of each submersible pump motor

### 3.02 TESTING

- A. Plant operating personnel shall be provided with training prior to start-up.

- B. One 8 hour training session shall be provided at a time convenient to the OWNER.
- C. Operating and maintenance personnel shall be instructed in the functions and operation of each system and shall be shown the various adjustable and set point features which may require readjustment, resetting or checking, recalibration or maintenance by them from time to time. This instruction shall be scheduled at a time arranged with the OWNER at least two (2) weeks in advance. Instruction shall be given by qualified persons employed by the I&C supplier.

### **3.03 Start Up**

- A. When all systems are assessed by the CONTRACTOR to have been successfully carried through complete operational tests with a minimum of simulation, and the ENGINEER concurs in his assessment, system start up by the plant operating personnel can follow.

**END OF SECTION**

## **SECTION 16915**

### **REMOTE TERMINAL UNIT**

#### **PART 1 – GENERAL**

##### **1.01 WORK INCLUDED**

- A. The RTU supplier shall furnish all hardware, labor and materials to provide an upgrade to the existing remote terminal unit (RTU) including all hardware and programming for a complete and functional system.
- B. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation and maintenance.
- C. RTU Supplier shall provide all necessary upgrade components to the existing RTU equipment. This minimally shall include PLC, I/O discrete and analog cards, upgraded power supply, backplate rack if needed, radio if needed, and the like, along with all interfacing relay and pilot device equipment, all labor to interface and make available status and alarm signals of the equipment shown on the drawings.
- D. The RTU supplier or Sub-Contractor working for the I&C CONTRACTOR, and coordinating with the Control panel manufacturer in order to provide a coordinated, complete and functional system, see 16900 specifications.
- E. RTU Supplier shall reuse the existing RTU enclosure and its components and provide additional I/O cards for all the discrete and analog signals for this project; provide and install the following as a minimum
  - 1. Discrete I/O input and output cards for discrete signals.
  - 2. Analog I/O input and output cards for the analog signals.
  - 3. Reuse existing Tower and Yagi antenna, relocate existing and provide new foundation.
  - 4. Coax Cable, and RF TVSS.
  - 5. Configuration, programming and testing

##### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. **Section 16900** – Control Panels

**B. Section 16000 – Electrical General Provisions**

**1.03 SUBMITTALS**

- A. Submittals shall be made in accordance with the requirements of the general conditions.
  - 1. It is incumbent upon the CONTRACTOR to coordinate the work specified in these Sections so that a complete system will be provided.
  - 2. As part of the responsibility as assigned by the CONTRACTOR – the RTU supplier shall work with the I&C CONTRACTOR, and OWNER to provide a complete and organized shop drawings.

**1.04 QUALITY ASSURANCE**

- A. All equipment furnished under this specification shall be new and unused, shall be the product of a manufacturer having a successful record of manufacturing and servicing the equipment specified herein for a minimum of two (2) years.
- B. Assembly and system shall be U.L. 508 listed.

**1.05 WARRANTY**

- A. The CONTRACTOR shall warrant all equipment and programming for a period of one (1) year from the date of OWNER acceptance of the system.
- B. CONTRACTOR shall warrant the software through the service of his appointed RTU supplier for a period of one (1) year.

**1.06 NAMED RTU SUPPLIER**

- A. Data Flow Systems, Inc. (DFS) of Melbourne, Florida, no equal.

**PART 2 – PRODUCTS**

**2.01 GENERAL**

- A. All hardware, software, programming and configuration of the RTU and its I/O shall be provided by DFS personnel to upgrade the existing RTU and provide I/O status and alarms via radio telemetry to the OWNER's existing SCADA system. Unit shall be data flow TAC II or and approved equal.
- B. Provide digital monitor modules quantity as required. The digital monitor module shall accept 12 on/off inputs of 12 to 30 volts AC or DC. Voltages from 100 to 300 volts Ac or DC shall be accommodated with the use of an inline voltage



converter device. Status reporting of these inputs shall have an accuracy of +/-2 seconds, the accuracy being defined as time of an occurrence to actual time recorded by the central site computer. The digital monitor module shall not require interfacing relays to monitor 24 VDC, 115 VAC, 220 VAC or 480 VAC. The digital monitor module shall have LEDs to indicate: The status of each input point; receive communications; transmit communications; CPU fault; and power status. The configuration of the monitor points as alarm points or monitor points shall be operator changeable. The configuration shall not require any software or firmware changes in the system.

- C. Provide digital control modules, quantity as required. The digital control module shall provide for remote control of 8 independent 60 to 280 volt AC devices. The control relays shall be solid state devices with zero crossover detection. Each control point shall be capable of driving a .5 amp load @ 280 volts Ac (140 VA), with inrush current of 5 amps. The control module shall have the configurable capability to automatically shut down all outputs in the case of a power loss on any one of three phases. Operator intervention shall be required to restart a control point after a phase loss shutdown. Any discrete control point shall have the capability of being automatically controlled by any discrete monitor point, at the same RTU or at any other RTU. This shall be accomplished during configuration at the central site computer system and shall be available for an unlimited number of control points. The digital control module shall have LEDs to indicate the status of each output point, receive communications, transmit communications, CPU fault, and power status.
- D. Provide digital control/monitor modules quantity as required. The digital control/monitor module shall provide for remote control of four (4) independent 60 to 280 volt AC devices. The control relays shall be solid state devices with zero crossover detection. Each control point shall be current of being automatically controlled by any discrete monitor point, at the same RTU or any other RTU. This shall be accomplished during configuration at the central site computer system and shall be available for an unlimited number of control points. The digital control/monitor module shall also accept eight (8) ON/OFF inputs of 12 to 30 volts AC or DC. Voltages from 100 to 300 volts AC or DC shall be accommodated with the use of an inline voltage converter device. Status reporting of these use of an occurrence to actual time recorded by the central site computer. The module shall not require interfacing relays to monitor 24 VDC, 115 VAC, 220 VAC or 480 VAC. The configuration of the monitor points (pump run time monitors) shall be operator changeable. The configuration shall not require any software or firmware changes in the system. The digital control/monitor module shall have LEDs to indicate the status of each output point, the status of each input point, receive communications, transmit communications, CPU fault and power status.
- F. Provide an analog input and analog output modules to communicate with controls and the PLC inside the lift station control panel.

1. Local automatic control from level transducer or backup float.
  2. Local manual control provided by HOA switches. The HOA switches shall function with the floats or level controller to provide extra operational flexibility, (IE: one pump is taken out for maintenance).
  3. Remote control from the central site computer shall provide individual pump overrides, station and alarm disables.
  4. For triplex or duplex configuration – the controller shall automatically sense the type of station and alternate based on how many pumps.
  5. The control module shall monitor other I/O like loss of phase, phase Reversal and low leg phase problems.
  6. Provide monitoring of alarms and status operation coming from starter Or VFD equipment.
  7. Provide monitoring of HOA status, Pump running status, RTU and Control panel power status.
  8. See specification sections and the drawings.
- K. Coax Surge Protection
1. Provide polyphaser surge protection
  2. Units shall be provided at the antenna and radio locations.

### **PART 3 – EXECUTION**

#### **3.01 SYSTEM CONFIGURATION & MAIN SYSTEM MONITORING MODIFICATIONS**

- A. Provide all hardware configuration and programming to add the existing RTU system as well as modifications to the OWNER's main RTU monitoring the remote waste water pump station. The programmer shall implement the requirements of the plans and the specifications.
- B. Programming shall include, but not limited to the following:
  1. Pump running status from each pump.
  2. HOA switch status for each pump.

3. Pump Fault status for each pump.
4. Pump VFD fault status for each device.
5. Pump VFD running speed.
6. Pump VFD speed control.
5. Wetwell Level from Level sensor.
7. 120v control power on
8. Display level in Feet from level probe reading
9. Lift Station HOA status @ each pump.
10. Hi level (backup) float monitoring
11. Lift station control panel intrusion.
12. RTU enclosure intrusion.
13. Phase A,B,C monitoring.
14. LEAD pump ON monitoring
15. LAG pump ON monitoring
16. LAG LAG pump ON monitoring
17. Pump1/VFD START
18. Pump2/VFD START
19. Pump3/VFD START
20. 120V RTU power monitoring
21. ATS ON COMMERCIAL POWER
22. ATS ON GENERATOR POWER
23. GENERATOR COMMON FAULT
24. GENERATOR RUNNING
25. GENERATOR LOW FUEL LEVEL

- 26. GENERATOR LOW COOLANT
- 27 Lead Pump Backup Float on
- 28 Lag Pump Backup Float on
- 29 Lag Lag Pump Backup Float on
- 30 All Off Backup Float on
- 31-36 As required by ENGINEER/OWNER

### **3.02 DOCUMENTATION**

- A. Provide six sets of completely revised O&M documents.
- B. The RTU supplier shall describe all input and output elements.
- C. Provide details wiring and assembly drawings for review and approval.
- D. Provide details wiring and assembly drawings for the O&M manuals.

### **3.03 TESTING**

- A. PRE-STARTUP: All equipment shall be field tested. All elements of the system shall be checked prior to startup as part of a PRE-STARTUP by the DFS personnel, the I&C CONTRACTOR, and the electrician shall be present at the pre-startup check points, equipment functions, and to test and resolve issues prior to actual startup.
- B. STARTUP: At a planned and scheduled startup (after the successful pre-startup event) all equipment shall be field tested along with all the system elements in the presence of the ENGINEER, and the OWNER. All systems shall operate to the satisfaction of the ENGINEER and OWNER. The RTU supplier shall provide programmers on site with instrument technicians for the purpose of start up and testing of the system.
- C. Provide complete functional testing.

**END OF SECTION**

## **APPENDIX A**

### **LOXAHATCHEE RIVER DISTRICT ENVIRONMENTAL CONTROL DISTRICT MANUAL OF MINIMUM CONSTRUCTION STANDARDS AND TECHNICAL SPECIFICATIONS**

**CAN BE DOWNLOADED AT**

**[https://loxahatcheeriver.org/wp-content/uploads/2018/06/2018\\_LRECD-Construction-Standards-and-Technical-Specifications.pdf](https://loxahatcheeriver.org/wp-content/uploads/2018/06/2018_LRECD-Construction-Standards-and-Technical-Specifications.pdf)**

## **APPENDIX B**

### **CONTRACTOR PERFORMANCE EVALUATION REPORT**

	Loxahatchee River Environmental Control District	CONTRACT NO.		
ADDRESS	2500 Jupiter Park Drive	CONTRACTOR		
CITY / STATE/ ZIP	Jupiter, FL 33458	PERIOD OF PERFORMANCE	FROM	TO
CONTRACT PROJECT MANAGER		LOCATION OF PERFORMANCE		

**INSTRUCTIONS:** This form can be completed on the computer or printed and completed by hand. Use the mouse to navigate. To check or uncheck a box, **'double click' the box**. If further direction is required on how to complete this evaluation or where to submit it, please contact your Contracting Officer. Comment boxes are formatted to automatically wrap the entered text. Check the box that best describes the level in which the Contractor supported the area described. Comments are essential and must substantiate your rating selection. N/A = not applicable. If additional space is required, use page 2 of the form or attach additional page(s).

**SEE PAGE 3 FOR EVALUATION RATINGS DEFINITIONS**

**1. Quality. Contractor conformed to contract requirements. Was capable, efficient and effective in supporting the programs of this contract. Provided well maintained equipment and highly qualified personnel. Finished product meets the quality requirements set forth in the contract.**

☐ N/A                      ☐ Satisfactory                      ☐ Unsatisfactory

COMMENTS: 

**2. Schedule. Contractor was prepared and available to begin work on contract start date and provided daily coverage during the contract period with little to no disruption or unavailability. Contractor completed the work within the dates specified in the contract and any approved extensions of time.**

☐ N/A                      ☐ Satisfactory                      ☐ Unsatisfactory

COMMENTS: 

**3. Change Orders. Contractor conformed to contract requirements, providing complete documentation and was reasonable in the negotiations for time and costs. Contractor did not engage with frivolous or unsupported change order requests. Contractor met time requirements in the contract for identification and quantification of additional or deleted work.**

☐ N/A                      ☐ Satisfactory                      ☐ Unsatisfactory

COMMENTS: 

**4. Management.** Contractor and on-site representatives were professional, well qualified, and committed to customer satisfaction and safety of operations. Contractor provided necessary support for key personnel and if applicable, took necessary action to correct or replace any personnel. Contractor was timely and complete with shop drawings, pay applications, releases, schedules and other required submittals.

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

COMMENTS: 

**6. Regulatory Compliance.** How well does the contractor comply with governing regulations such as the FDEP, FDOH, SFWMD or others.

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

COMMENTS: 

**7. Safety.** Contractor and on-site representatives attitude and efforts, as well as actual application and general safety of operations?

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

COMMENTS: 

**9. Other Areas:**

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

**10. Other Areas:**

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

**11. Other Areas:**

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory

**12. Other Areas:**

☐ N/A      ☐ Satisfactory      ☐ Unsatisfactory



**12. Overall Contractor Rating:**

☐ N/A                      ☐ Satisfactory                      ☐ Unsatisfactory

Additional comments to support your response to any item above or other items.

Name, Title of Individual Completing this Form ( include agency, phone and electronic address )

Signature

**RATING****DEFINITION****NOTE**

Satisfactory

Performance meets contractual requirements. The contractual performance of the element being assessed may contain some minor problems for which corrective actions taken by the Contractor were satisfactory.

To justify a Satisfactory rating, there should have been only minor problems, or major problems the contractor recovered from without impact to the contract. There should have been NO significant weaknesses identified.

Unsatisfactory

Performance does not meet most contractual requirements and recovery is not likely in a timely manner. The contractual performance of the element contains a serious problem(s) for which the contractor's corrective actions appear or were ineffective.

To justify an Unsatisfactory rating, identify multiple significant events in each category that the Contractor had trouble overcoming and state how it impacted the Government. A singular problem, however, could be of such serious magnitude that it alone constitutes an unsatisfactory rating. An Unsatisfactory rating should be supported by referencing the management tools used to notify the contractor of the contractual deficiencies (e.g. management, quality, safety, etc.)

## **APPENDIX C**

### **STANDARD OPERATING PROCEDURE: SYSTEM SHUTDOWNS AND BYPASS**



Standard Operating Procedure: **System Shutdowns and Bypass**

Project Name: \_\_\_\_\_

Work Order #: \_\_\_\_\_

Shutdown Schedule Date: \_\_\_\_\_

Time Start: \_\_\_\_\_

Time Complete: \_\_\_\_\_

1. All work for the system shutdown shall be done under one work order specific to the system shutdown, not the work requiring the system shutdown. System Shutdown Work Order # to be noted above.
2. Scope: Develop a scope fully encompassing the work to be performed. The scope shall be attached as **Exhibit A**.
3. Map: Develop a system map overlaid on an aerial clearly showing the location of the work, relation of the work to other infrastructure, primary and secondary isolation points for the work. All infrastructure shown on the map shall be field located and GPS'd. The map shall be attached as **Exhibit B**.
4. Isolation Point Verification: All isolation points, primary and secondary, shall be field verified, if possible, prior to scheduling the work. Verification shall confirm isolation points are operable and **substantially** isolate the work area from the remainder of the collection/transmission system. Substantially isolate, at a minimum, shall mean all flows except those that can reasonably be managed with a vacuum truck are isolated from the work.
5. Upstream System Capacity: Upstream system capacity (holding time) shall be determined. Prior to scheduling the work adequate values for the following shall be agreed upon. The scheduled shutdown duration, staff, equipment and materials shall be planned around the Low Risk Holding Time.
  - a. Low Risk Holding Time: \_\_\_\_\_
  - b. Unacceptable Risk Holding Time: \_\_\_\_\_
6. Wastewater Management/Spill Response Plan: Prior to scheduling the work:
  - a. The Contractor shall have an approved wastewater management plan to address capture and disposal of wastewater. The Contractor's Wastewater Management/Spill Response Plan shall be attached as **Exhibit C**.
  - b. The District shall have an approved Wastewater Management Plan to address management of wastewater in the collection/transmission system. The Wastewater Management Plan shall include Emergency Operation Measures in the event the shutdown exceeds the Unacceptable Risk Holding Time. The District's Wastewater Management Plan shall be attached as **Exhibit D**.

7. Personnel: The Contractor and the District shall have adequate staff to manage the shutdown and work. The Contractor shall have one designated person in-charge of his employees and work. The District shall have one designated person in-charge of his employees and work.
- a. Contractor Representative In-Charge: \_\_\_\_\_ cell #: \_\_\_\_\_
    - i. # of Contractor's supporting staff: \_\_\_\_\_
  - b. District Representative In-Charge: \_\_\_\_\_ cell #: \_\_\_\_\_
    - i. # of District supporting staff: \_\_\_\_\_
8. Schedule: Prior to scheduling the work predetermined times to implement various steps, back-up plans, cancel the tie-in or failure response shall be agreed upon.
- a. Primary Isolation: \_\_\_\_\_
  - b. Secondary Isolation: \_\_\_\_\_
  - c. System Evacuation Deadline: \_\_\_\_\_
  - d. Low Risk Work Completion Deadline: \_\_\_\_\_
  - e. Unacceptable Risk Deadline: \_\_\_\_\_

If the system is not adequately isolated and evacuated by the System Evacuation Deadline. Work is CANCELLED, the force main secured and placed back in service.

Once the Work has commenced progress shall be monitored with direct communication between the Contractor Representative In-Charge and the District Representative In-Charge. At any time during the performance of the Work the projected completion time exceeds the Unacceptable Risk Deadline Emergency Operation Measures shall be implemented. See **Exhibit D**.

9. Equipment:
- a. The Contractor shall have adequate equipment on site by Close of Business preceding the scheduled shutdown. All equipment shall be on site by: \_\_\_\_\_. The list of equipment shall be attached as **Exhibit E**.
  - b. The District shall have adequate equipment on site by Close of Business preceding the scheduled shutdown. All equipment shall be on site by: \_\_\_\_\_. The list of equipment shall be attached as **Exhibit F**.
10. Materials: All materials required for the work shall be on site by Close of Business preceding the scheduled shutdown. All materials shall be on site by: \_\_\_\_\_. The approved Material List shall be attached as **Exhibit G**.
11. Vendors: All vendors required for the work shall be issued Purchase Orders by Close of Business preceding the scheduled shutdown. All vendor Purchase Orders shall be confirmed by \_\_\_\_\_. The Vendor list shall be attached as **Exhibit H**.

## System Shutdown Checklist

Description	Approved By	Scheduled Time	Scheduled Date
Work Order			
Exhibit A			
Exhibit B			
Exhibit C			
Exhibit D			
Exhibit E			
Exhibit F			
Exhibit G			
Exhibit H			
Low Risk Holding Time			
Unacceptable Risk Holding Time			
Primary Isolation Time			
Secondary Isolation Time			
System Evacuation Deadline			
Low Risk Work Completion Deadline			
Unacceptable Risk Deadline			
Contractor Equipment Onsite			
District Equipment Onsite			
Materials Onsite			
Vendor's Confirmed			

Contractor's Representative Name:

Cell:

District's Representative Name:

Cell:

## **APPENDIX D**

### **APPROVED SHOP DRAWING – SUBMERSIBLE PUMPS**



## TRANSMITTAL

**DATE:** June 30, 2020

**TO:** Loxahatchee River Environmental Control District

**REFERENCE:** Lift Station 82

**WE ARE SENDING YOU THE FOLLOWING:**

- ☒ Submittals (0) Hard Copies and (1) Electronic Copy
- ☒ For Approval
- ☐ For Record-signed terms & conditions
- ☐ Revised for Resubmission, ( ) copies each for submersible pumps
- ☐ Approved as Submitted
- ☐ Approved as Noted
- ☐ Rejected
- ☐ Revise and Resubmit ( ) copies for approval
- ☐ Operation and Maintenance Manuals
- ☒ Please return (1) copies of the reviewed submittal, stamped with approval to proceed as submitted; or noting any changes and/or discrepancies to the address listed below.

XYLEMWATER SOLUTIONS, INC.  
15132 Park Of Commerce Blvd. Ste. 102  
Jupiter, FL 33478  
Tel. (561) 848-1200  
Fax (561) 848-1299

*"Seller's submission of submittals shall not be construed as acceptance of Buyer's terms and conditions of sale while pending negotiation."*

# Submittal

## LRECD Lift Station #82



**Xylem Water Solutions, Inc.**  
**Flygt Products**

15132 Park Of Commerce Blvd. Ste. 102  
Jupiter, FL 33478  
Tel. (561) 848-1200  
Fax (561) 848-1299



"Seller's submission of submittals shall not be construed as acceptance of Buyer's terms and conditions of sale while pending negotiation."



**Please Confirm Voltage For This Station**

☐ 1 Phase 230 Volt

☐ 3 Phase 208 Volt

☐ 3 Phase 230 Volt

☐ 3 Phase 460 Volt

Voltage Confirmed By: \_\_\_\_\_

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

## Bill of Materials

To: Loxahatchee River Environmental Control District  
Subject: Lox – LS 82 Proposal

Date: June 26, 2020

### LS 82 Proposal

Qty	Part Number	Description
3	3202.095-0016	8" NP 3202/640 Flygt pumps with a 60HP 460V 3 phase motor, FM rated (explosion proof), 50' motor cable, and FLS leakage detector
3	374 76 06	8" Discharge connections
30	14-49 89 01	12" Anchor bolts 316SS
5	14-48 83 05	Anchor adhesive
3	661 54 01	3" Upper guide bar brackets 316SS
3	14-59 10 29	3" Intermediate guide bar brackets 316SS
180'	14-49 01 01	3" Guide rail 316SS
3	14-59 10 22	Cable holders 316SS
2	14-69 00 09A	Startup service provided by Flygt representative



Xylem Water Solutions USA, Inc.  
Flygt Products

# **Section 1**

## **General Information**

**Xylem Water Solutions USA, Inc.**

15132 Park of Commerce Bld/102  
Jupiter, FL 33478  
O: 561-848-1200

**Branch Manager:**

**Brian Stengle**

brian.stengle@xyleminc.com  
(561) 515-8708

**Sales:**

**Eric Johnson**

eric.johnson@xyelminc.com  
(561) 515-8710

**Clint Rueff**

clinton.rueff@xyelminc.com  
(561) 515-8714

**Service:**

**Brian Strickland**

brian.strickland@xyleminc.com  
(561) 248-3713



# WARRANTY

## Xylem Water Solutions USA, Inc.

For the period defined, Xylem Water Solutions USA, Inc. offers a commercial warranty to the original End Purchaser against defects in workmanship and material on Flygt Products. Warranty covers Flygt parts and labor as outlined in **ADDENDUM – A**.

### COVERAGE:

Xylem Water Solutions USA, Inc. will pay the cost of parts and labor during the warranty period, provided that the Flygt product, with cable attached, is returned prepaid to a Xylem Water Solutions USA, Inc. Authorized Service Facility for Flygt Product repairs. Coverage for Flygt parts and labor will be provided for the period shown in **ADDENDUM - A**. The warranty period will begin from date of shipment or date of a valid Start-up (For permanently installed pumps only). In cases where the Start-up date is used as the beginning of the warranty on a permanently installed Flygt pump, a Start-up Report completed by an approved service technician from a Xylem Water Solutions USA, Inc. Authorized Service Facility for Flygt products must be received by the Xylem Water Solutions USA, Inc. Area Service Manager for Flygt Products within thirty (30) days of the initial onset of the unit placed into service. If not received, the beginning of the warranty coverage will default to the Flygt product ship date. A Start-up for a permanently installed Flygt pump must occur within one (1) year from the date of shipment from a Xylem Water Solutions USA, Inc. authorized facility for Flygt Products or warranty will automatically default to ship date as start of warranty. (See **STORAGE** section) When using the start-up date as the beginning of the warranty, a copy of the Start-up Report will be required to support any Warranty Claims. Warranty on Flygt Dewatering pumps will begin with ship date only. No other date on Flygt Dewatering pumps will be considered.

Xylem Water Solutions USA, Inc.'s sole obligation under this Warranty for Flygt Products shall be to replace, repair or grant credit for Flygt Products upon Xylem Water Solutions USA, Inc.'s exclusive determination that the Flygt Product does not conform to the above warranty. In the event that the Flygt product is replaced, warranty on the replacement product will be equal to the balance remaining on the original product or ninety (90) days, which ever is greater.

### MISUSE:

This Warranty shall not apply to any Flygt product or part of Flygt product which (i) has been subjected to misuse, misapplication, accident, alteration, neglect, or physical damage (ii) has been installed, operated, used and/or maintained in a manner which is in an application that is contrary to Xylem Water Solutions USA, Inc.'s printed instructions as it pertains to installation, operation and maintenance of Flygt Products, including but without limitation to (iii) operation of equipment without being connected to monitoring devices supplied with specific products for protection; or (iv) damaged due to a defective power supply, improper electrical protection, faulty installation or repair, ordinary wear and tear, corrosion or chemical attack, an act of God, an act of war or by an act of terrorism; or (v) has been damaged resulting from the use of accessory equipment not sold by Xylem Water Solutions USA, Inc. or not approved by Xylem Water Solutions USA, Inc. in connection with Flygt products.

### WEAR PARTS:

This warranty does not cover costs for standard and/or scheduled maintenance performed, nor does it cover Flygt parts that, by virtue of their operation, require replacement through normal wear (aka: Wear Parts), unless a defect in material or workmanship can be determined by Xylem Water Solutions USA, Inc.. Wear Parts are defined as Cutters, Cutting Plates, Impellers, Agitators, Diffusers, Wear Rings (Stationary or Rotating), Volutes (when used in an abrasive environment), oil, grease, cooling fluids and/or any items deemed necessary to perform and meet the requirements of normal maintenance on all Flygt equipment.



# WARRANTY

## Xylem Water Solutions USA, Inc.

### DISCLAIMERS:

(i) Xylem Water Solutions USA, Inc.'s warranties are null and void when Flygt Products are exported outside of the United States of America without the knowledge and written consent of Xylem Water Solutions USA, Inc.; (ii) Xylem Water Solutions USA, Inc. makes no independent warranty or representation with respect to parts or products manufactured by others and provided by Xylem Water Solutions USA, Inc. (however, Xylem Water Solutions USA, Inc. will extend to the Purchaser any warranty received from Xylem Water Solutions USA, Inc.'s supplier for such parts or products).

### LIMITATIONS:

XYLEM WATER SOLUTIONS USA, INC. NEITHER ASSUMES, NOR AUTHORIZES ANY PERSON OR COMPANY TO ASSUME FOR XYLEM WATER SOLUTIONS USA, INC., ANY OTHER OBLIGATION IN CONNECTION WITH THE SALE OF ITS FLYGT EQUIPMENT. ANY ENLARGEMENT OR MODIFICATION OF THIS WARRANTY BY A FLYGT PRODUCT DISTRIBUTOR, OR OTHER SELLING AGENT SHALL BECOME THE EXCLUSIVE RESPONSIBILITY OF SUCH ENTITY.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO FLYGT PRODUCT(S), INCLUDING AND WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. PURCHASER'S EXCLUSIVE REMEDY AND XYLEM WATER SOLUTIONS USA, INC.'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES IS LIMITED TO REPAIRING OR REPLACING FLYGT PRODUCTS AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE PURCHASER HEREUNDER. IN NO EVENT IS XYLEM WATER SOLUTIONS USA, INC. LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF USE, LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.

XYLEM WATER SOLUTIONS USA, INC. WILL NOT BE HELD RESPONSIBLE FOR TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR'S FEES, OR ANY EXPENSES ASSOCIATED WITH A FLYGT PRODUCT REPAIR SHOP NOT AUTHORIZED BY XYLEM WATER SOLUTIONS USA, INC. U.S.A., INC. REIMBURSEMENT COSTS FOR CRANES AND/OR ANY SPECIAL EQUIPMENT USED IN CONJUNCTION FOR THE REMOVAL AND/OR REINSTALLATION OF ANY FLYGT EQUIPMENT IS NOT COVERED UNDER THIS WARRANTY.

ANY UNAUTHORIZED ALTERATIONS TO SUPPLIED FLYGT EQUIPMENT USED WITHOUT XYLEM WATER SOLUTIONS USA, INC. SUPPLIED FLYGT BRAND CABLE OR CONTROLS WILL NOT BE COVERED UNDER THIS WARRANTY, UNLESS IT CAN BE PROVEN SUCH ANCILLARY EQUIPMENT IS SUITABLE FOR THE PURPOSE AND EQUAL TO XYLEM WATER SOLUTIONS USA, INC. SUPPLIED FLYGT BRAND CABLES OR CONTROLS THAT WOULD ORIGINALLY HAVE BEEN SUPPLIED WITH THE TYPE OF EQUIPMENT IN USE.

### REQUIREMENTS:

A copy of Electrical System Schematics of the Control used (including a Control's Bill of Material) could be required to support a Warranty Claim when a non Flygt Brand Control is used. In addition, a written record, hereby known as "the log", will be associated with each unit serial number and must be maintained by the organization having product maintenance responsibility. The log must record each preventative maintenance activity and any repair activity during the life of the warranty or verification that a Xylem Water Solutions USA, Inc. authorized Service Contract for Flygt Products is in force and must be available for review and/or auditing. Failure to meet these conditions could render this warrant null and void. Such logs could be required to determine warranty coverage.



# **WARRANTY**

## **Xylem Water Solutions USA, Inc.**

### **STORAGE:**

Should a delay occur between ship date and the date of start-up, maintenance as outlined in Xylem Water Solutions USA, Inc.'s Care & Maintenance Manual for Flygt Products must be performed by the "CONTRACTOR" and/or "OWNER" during any such period of storage. Documentation providing proof and outlining what maintenance was performed must be provided to Xylem Water Solutions USA, Inc. or its Flygt Products representative within thirty (30) days of said maintenance, or the Xylem Water Solutions USA, Inc. warranty for Flygt Products could be considered void.

### **CONTROLS:**

Warranty coverage for permanently installed controls will start for the end purchaser on the date of shipment. This warranty does not apply to controls that have been damaged due to a defective and/or improper input power supply, improper electrical protection, accidental damage, improper or unauthorized installation and/or repair, unauthorized alteration, negligence, environmental corrosion or chemical attack, improper maintenance or storage of control, any act of God, an act of war, an act of terrorism or damage resulting from the use of accessory equipment not approved by Xylem Water Solutions USA, Inc.. Further, this warranty does not apply in the event an adjustment is found to correct the alleged defect.

Solid state devices will be covered for a period of one (1) year. Electrical control panels containing controllers, PLC's, drives, soft starts, and other computerized equipment will require Transient Voltage Surge Suppression (TVSS) protection in order to satisfy the requirements of this warranty. The protection equipment associated with the control must be kept in working condition during the life of the warranty. Auxiliary equipment supplied with the control (air-conditioners etc.) is limited by the respective original equipment manufacturer's warranty offered. Consumable items such as: light bulbs, fuses, and relays are covered under normal operating conditions. Electrical surges experienced during startups and/or during normal operating use of the control panel will cause the consumable items not to be covered under this warranty policy. Components not supplied by Xylem Water Solutions USA, Inc. will not be covered by this warranty.

### **TOP (The Optimum Pump Station)**

Xylem Water Solutions USA, Inc. will warrant the Flygt TOP pre-engineered fiberglass pump station components against defects in material and workmanship for a period of one (1) year from date of start-up or eighteen (18) months from date of shipment and is valid only to the original owner of the station. Warranty shall cover the cost of labor and materials required to correct any warrantable defect, excluding any removal and reinstallation costs, FOB Xylem Water Solutions USA, Inc.'s authorized warranty service location for Flygt's TOP.

Flygt Products contained within a TOP pre-engineered fiberglass pump station will carry the standard Xylem Water Solutions USA, Inc. warranty for Flygt products and/or accessories installed in the TOP pre-engineered fiberglass pump station.

All Flygt Product restrictions and/or limitations as outlined and described within the context of this warranty are germane to all sections of this Xylem Water Solutions USA, Inc. Warranty document.

Xylem Water Solutions USA, Inc.  
National Quality Assurance - US Corporate



## WARRANTY

### Xylem Water Solutions USA, Inc.

#### ADDENDUM – WARRANTY COVERAGE BY PRODUCT

PRODUCT	PRODUCT SERIES AND CONFIGURATION	Months	Months	Months	Months	Months	Months
		1 - 12	13 - 18	19 - 24	25 - 36	37 - 39	40 - 60
Axial Flow/ Mixed Flow/ Centrifugal Pumps & Mixers	3000 Series (CP, NP, DP, CT, NT, CZ, NZ, LL) 4000 Series (SR, PP) 7000 Series (PL)	100%		50%			25%
ETO Electrical Control Panels	Engineered to Order, Xylem Manufactured Control Panels (permanently installed) - 3 Years	100% - 1 YR	LIMITED - 2 - YR				
Grinder Pumps	3000 Series (MP, MF, MH)	100% - 2 YR (From Ship Date)			3 YR (From Date of Manufacture)		
Abrasion/Corrosion Resistant & Chopper Pumps	3000 Series (FP, FS, FT, HP, HS) 5000 Series (HP, HS) 8000.280 Series (DP, DZ, DT, DS, DF)	100%					
Dewatering Pumps	2000 Series (BS, KS) 3000 Series (CS, NS, DS) 8000.280 Series (DS, DF)	100% (From Ship Date)					
TOPS	Fiberglass Pump Station	100% (From Ship Date)					
Accessories	Permanent / Portable	100% (From Ship Date)					
Hydro ejectors/ Aerators	HE, JA	100%					
Portable Pump Controls TOPS Control Panels	Control Boxes (Nolta, MSHA etc.) TOPS control panels (permanently installed)	100% (From Ship Date)					
Small Pumps	3045, 3057, SX	100% (From Ship Date)					
Parts - *	All new Flygt parts (mechanical & electrical)	100% (From Ship Date)					

\* - Parts that fail where used in a repair are warranted for one (1) year from the date of the repair for the failed part only – no labor; This Includes Flygt pump controllers, Flygt supervision equipment, Flygt submersible level transducers, etc.





# Installation Procedures

The faultless functioning of a Flygt Pumping Station will depend upon the correct selection of the pump to suit system requirements and proper installation. A great majority of Flygt Electric Submersible Wastewater Pumps are installed in underground wet pits with Automatic Discharge Connections, Guide Bars and Access Covers as shown in the station drawings.

Wet Pits constructed of precast concrete rings offer significant savings in labor costs over poured-in-place concrete, masonry or brick and are universally accepted for use in sanitary or storm sewer systems. Precast concrete sections are available up to 120 inch inside diameter (sometimes up to 144 inch inside diameter) throughout the U.S. and are generally manufactured in accordance with the provisions of ASTM Specification C478.

Because of this, Flygt official engineering documentation is based on stations designed in precast concrete circular man-holes. Each individual station drawing shows a suggested Simplex and a suggested Duplex Pumping Station built of precast concrete sections installed between a Bottom Slab and a Top Slab (the Top Slab, usually at ground level, contains the cast-in Access Cover).

The configurations and dimensions shown on these Proposed Layouts are suggested minimum requirements only, all details, including sizing of pit, type, size, location and arrangement of valves and piping, etc. are to be specified by the Consulting Engineer and are subject to his approval.

The following is a partial list of useful suggestions for construction and installation. ***Please always observe local regulations applicable.***

## A. Excavation:

Excavate a large enough hole to provide sufficient working room around the station. The outside diameter of the Bottom Slab should be at least one foot larger than that of the concrete sections used.

## B. Connecting Pipes:

Provide connecting holes for the Influent Pipe, Effluent Pipe(s) and Cable Thrulets in accordance with the Engineer's specification. Flexible joints outside of concrete wall will reduce the danger of dislocation due to settlement.

## C. Backfill:

Backfill gradually and evenly around station after concrete and joints have hardened. Compact backfill to minimize post-installation settlement.

## D. Top Slab with Access Cover:

Diameter of Top Slab shall be at least two feet larger than O.D. of ring sections. The Access Cover must be installed and properly oriented in the Top Slab.

1. See Station Drawings for Pump Model and Access Cover location in relation to the centerline of the station.
2. Positioning of the Hinge Side of the Cover (See Accessories Section).
3. The Top Slab and Access Cover must be level.

## E. Automatic Discharge Connection:

The Automatic Discharge Connection must be attached to the Bottom Slab at the exact location required relative to the Access Cover.

### SUGGESTED PROCEDURES:

1. Attach the Upper Guide Bar Bracket(s) to the Access Frame (See Accessories Section). Also, the centerline of the Bracket(s) will determine the centerline of the installed pump(s).
2. Place the pump Discharge Connection(s) on the Bottom Slab and line up as shown in the Accessories Section.
3. Cut to length and install the Guide Bars between the Upper Guide Bar Bracket(s) and Discharge Connection(s).
4. Before securing anchor bolt nuts, check across the Discharge Connection(s) Outlet Flange(s) face with level and shim if necessary. Guide Bars should be Parallel and Vertical.

## F. Internal Piping and Manifold:

Use proper gaskets, tighten bolts gradually and evenly. In deep stations, install Discharge pipe Brackets to relieve Discharge Connections from overload and intermediate Guide Bar Brackets to prevent Guide Bars from bending.

## G. Installation of Pump Units:

Lower Pump Units into place along guide bars. Check visually metal-to-metal contact between Volute Flange and Discharge Connection. If necessary, re-check and re-align Discharge Connection(s) and Guide Bars with pumps in place.

## Installation Procedures

### H. Grouting:

After proper alignment of all components, including metal-to-metal connection of pump flange is established, grout Access Cover, Discharge Connection(s) and Pipe Thrulets. Build up and shape slopes at bottom of the station as shown in Station Drawings. This will help in preventing build-up of solids at the bottom where side walls meet the floor.

### I. Surface Protection:

An epoxy-coal tar system is suggested for all internal surfaces, concrete or metallic, if possible, follow the recommendations in WPCF Manual of Practice No. 17 "Paints and Protective Coatings for Wastewater Treatment Facilities" or the instructions of a reputable manufacturer of protective coating systems, such as Carboline, Koppers, Inertol, Perry-Austen, etc. Proper surface preparation and careful application will pay off in reduced maintenance costs and longer life.

### J. Storage of Pump Units Prior to Start-Up:

It is **not** good practice to store the Pump Units in the wet pit, especially when long periods between installation

and start-up are anticipated. If this practice cannot be avoided, rather than leaving them on their Discharge Connections, secure them and their power cable at some point above any anticipated liquid level. Pay special attention to unprotected open cable ends; seal them off and make sure that they are not submerged or exposed to moisture. Penetration of moisture through the cable may cause breakdown of the insulation, arcing at the pump terminal board, destruction of the Junction Chamber and serious damage to the pump. If in doubt, before start-up, re-check the cable, Cable Entry and Junction Chamber following instructions in the Maintenance Manual under "Electrical Checks". If possible, connect Pumps power cables to Control Panel and during longer periods until the official start-up, start and run the units manually for 30 seconds at least once every two weeks. (see "Storage" in this section.)

## Storage

Each Flygt pump leaves the factory properly assembled and prepared to perform even after a reasonable idle time in storage. However, as prolonged idle time can be detrimental to any rotating machinery, the procedures outlined below should be followed in order to insure that the equipment is in top condition to operate when finally installed. Whenever possible, store pumping units in a dry environment free of extreme temperatures and strong direct sunlight.

### NEW pumps:

#### Storage 6 to 12 months:

In general, rotating machinery left idle for extended periods of time, tends to establish a “set” position due to inaction of the moving parts. Some of these areas may be damaged (especially seals) from the sudden fast breakaway of start-up after a prolonged idle time. To insure that all rotating parts are free for final installation and start-up, it is good practice to rotate the impeller by hand once a month. It is also good practice to relieve the tension on the cable entry sealing grommet by backing off the cable entry compression screws slightly. If this is done, it is most important that a clear note be attached as a reminder to:

***Re-Tighten Cable Entry Compression Screws Before Installation.***

#### Storage 12 to 24 months:

In addition to the above, apply a protective spray coating of silicone or rust inhibiting oil to the impeller and inside of the volute by spraying in through the volute outlet and up through the volute inlet. Also coat the volute outlet flange face.

### USED pumps:

Before storing a used pump for an extended period of time, the unit should be dismantled, checked for any defects, repaired where necessary and reassembled. At reassembly, follow instructions in the **Service Manual**, especially regarding seal assemblies. Protect the impeller and volute as mentioned in the paragraph above.

In all cases, it is good practice to check all external bolts, nuts and screws for tightness before final installation after extended storage.

### CONTROLS:

It is most important to make sure that Electrical Controls, when subjected to extended storage, be stored in a protected dry environment free from any corrosive atmosphere. Moisture in any form, including condensation, can cause serious corrosion problems to the contact point surfaces as well as terminal connections.

Even though all terminal connections have been made tight on initial assembly at the factory, they may not remain 100% tight over an extended storage period due to the compressibility of the copper wire and possible movement due to variations in ambient temperature. The problem will vary in degree depending on wire size and whether the terminal connection is of solid or stranded wire. To insure proper operation, recheck all terminal connection screws for tightness prior to placing the control on line.



Xylem Water Solutions USA, Inc.  
Flygt Products

## **Section 2**

# **Pump Information**

## NP 3202 MT 3~ 640

### Technical specification



#### Motor - General

<b>Motor number</b> N3202.185 30-29-6AA-W 60hp	<b>Phases</b> 3~	<b>Rated speed</b> 1170 rpm	<b>Rated power</b> 60 hp
<b>Approval</b> No	<b>Number of poles</b> 6	<b>Rated current</b> 72 A	<b>Stator variant</b> 1
<b>Frequency</b> 60 Hz	<b>Rated voltage</b> 460 V	<b>Insulation class</b> H	<b>Type of Duty</b> S1

#### Motor - Technical

<b>Power factor - 1/1 Load</b> 0.86	<b>Motor efficiency - 1/1 Load</b> 90.5 %	<b>Total moment of inertia</b> 14.3 lb ft <sup>2</sup>	<b>Starts per hour max.</b> 30
<b>Power factor - 3/4 Load</b> 0.83	<b>Motor efficiency - 3/4 Load</b> 91.0 %	<b>Starting current, direct starting</b> 420 A	
<b>Power factor - 1/2 Load</b> 0.74	<b>Motor efficiency - 1/2 Load</b> 91.0 %	<b>Starting current, star-delta</b> 140 A	

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# NP 3202 MT 3~ 640

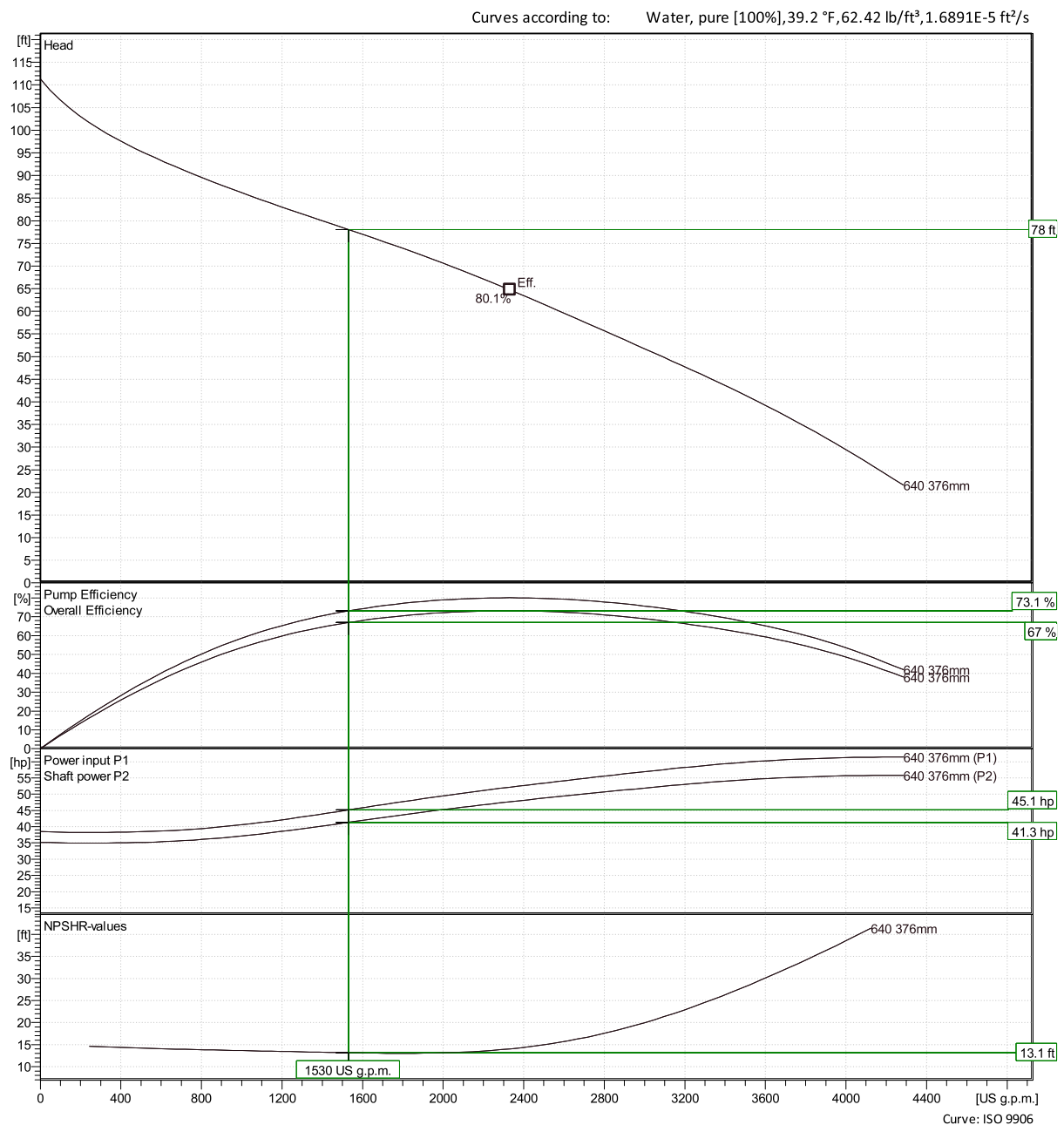
## Performance curve



### Duty point

Flow  
1530 US g.p.m.

Head  
78 ft



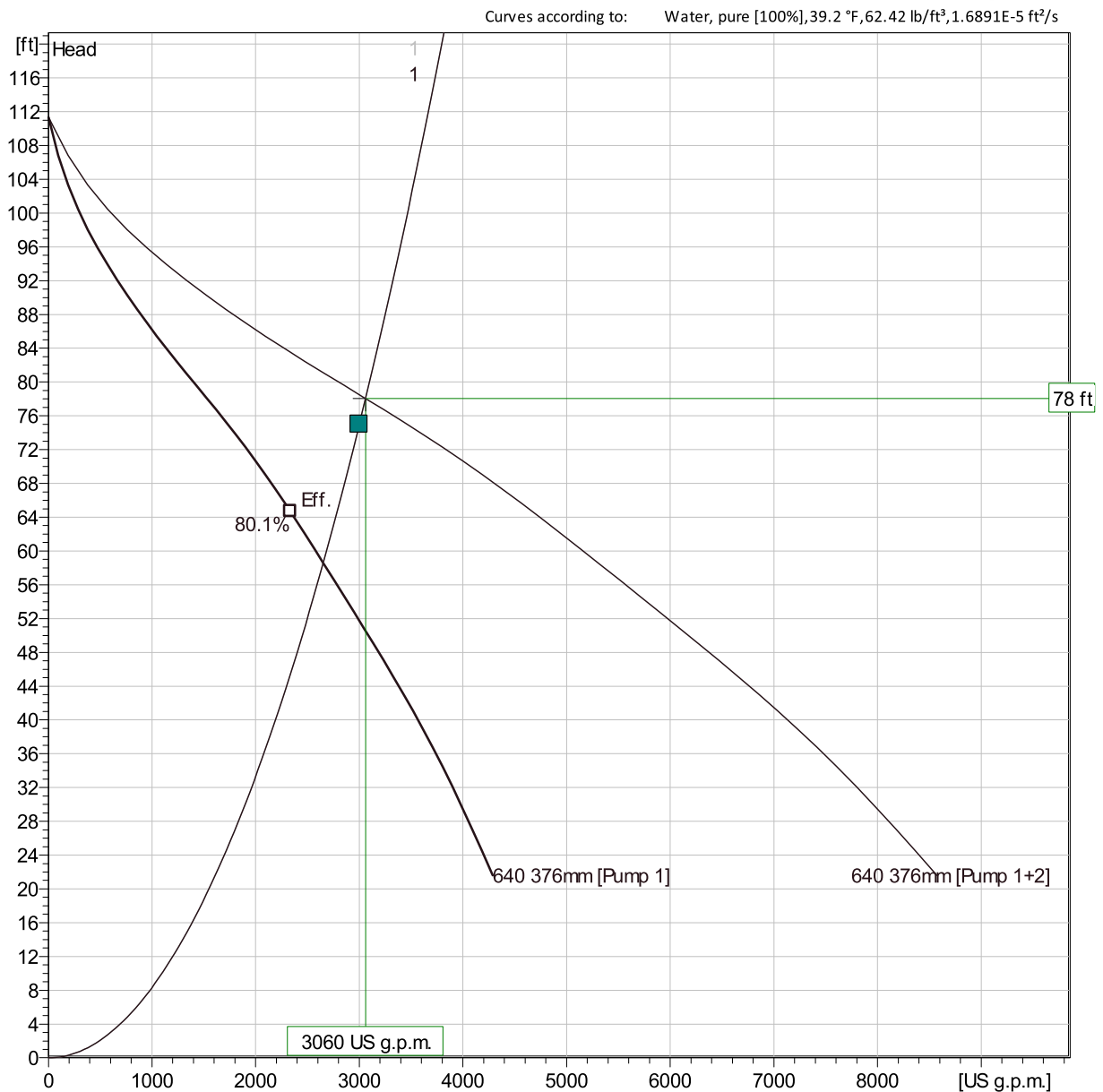
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# NP 3202 MT 3~ 640

## Duty Analysis



### Operating characteristics

Pumps/Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHr
2 / 1	1530 US g.p.m.	78 ft	41.3 hp	3060 US g.p.m.	78 ft	82.7 hp	73.1 %	367 kWh/US Mℓ	13.1 ft
1 / 1	2650 US g.p.m.	58.6 ft	49.7 hp	2650 US g.p.m.	58.6 ft	49.7 hp	79.1 %	255 kWh/US Mℓ	16.1 ft

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## **N-3202. 095 SPECIFICATION**

### **REQUIREMENTS**

Furnish and install 3 submersible non-clog wastewater pump(s). Each pump shall be equipped with a 60 HP submersible electric motor, connected for operation on 460 volts, 3 phase, 60 hertz, with 50 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and also meet with P-MSHA Approval.

### **PUMP DESIGN CONFIGURATION (Wet pit installation)**

The pump shall be supplied with a mating cast iron 8 inch discharge connection. The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor.

### **PUMP CONSTRUCTION**

Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle shall be of stainless steel. All exposed nuts or bolts shall be of stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

### **COOLING SYSTEM**

#### **(Cooling Jacket Equipped)**

Each unit shall be provided with an integral motor cooling system. A stainless steel motor cooling jacket shall encircle the stator housing, providing for dissipation of motor heat regardless of the type of pump installation. An impeller, integral to the cooling system and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The cooling liquid shall pass about the stator housing in the closed loop system in turbulent flow providing for superior heat transfer. The cooling system shall have one fill port and one drain port integral to the cooling jacket. The cooling system shall provide for continuous pump operation in liquid or ambient temperatures of up to 104°F (40°C). Operational restrictions at temperatures below 104°F are not acceptable. Fans, blowers or auxiliary cooling systems that are mounted external to the pump motor are not acceptable.

### **CABLE ENTRY SEAL**

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer grommets, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered equal.



## **MOTOR**

The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of pins, bolts, screws or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 104°F. The motor shall be capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel.

The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

The motor service factor (combined effect of voltage, frequency and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10%. The motor shall be designed for continuous operation in up to a 40°C ambient and shall have a NEMA Class B maximum operating temperature rise of 80°C. A motor performance chart shall be provided upon request exhibiting curves for motor torque, current, power factor, input/output kW and efficiency. The chart shall also include data on motor starting and no-load characteristics.

Motor horsepower shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

## **BEARINGS**

The integral pump/motor shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper motor bearing shall be a two row angular contact ball bearing. The lower bearing shall be a two row angular contact ball bearing to handle the thrust and radial forces. The minimum  $L_{10}$  bearing life shall be 50,000 hours at any usable portion of the pump curve.

## **MECHANICAL SEALS**

Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion and abrasion resistant tungsten-carbide ring. The upper secondary seal, located between the seal chamber and the seal inspection chamber shall be a leakage-free seal. The upper seal shall contain one stationary and one positively driven rotating corrosion and abrasion resistant tungsten-carbide seal ring. The rotating seal ring shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are

accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication.

The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float type switch that will signal if the chamber should reach 50% capacity.

**Seal lubricant shall be non-hazardous.**

#### **PUMP SHAFT**

The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T. Shaft sleeves will not be acceptable.

#### **IMPELLER**

The impeller shall be of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation as they pass across a spiral groove located on the volute suction. The leading edges of the impeller shall be hardened to Rc 60 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 5% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. The impeller shall be locked to the shaft, held by an impeller bolt and shall be coated with alkyd resin primer.

#### **VOLUTE / SUCTION COVER**

The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

#### **PROTECTION**

Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm. A float switch shall be installed in the seal leakage chamber and will activate if leakage into the chamber reaches 50% chamber capacity, signaling the need to schedule an inspection.

The thermal switches and float switch shall be connected to a Mini CAS control and status monitoring unit. The Mini CAS unit shall be designed to be mounted in the pump control panel.

#### **MODIFICATIONS**

1. Explosion-proof Pumps (X).

Refer to the General Guide Specifications for additional information.

# Explosion-proof Pumps

## Explosion-proof Pumps for Hazardous Locations

Flygt Electric Submersible Explosion-proof Wastewater Pumps are examined, tested, and approved by Factory Mutual Research (FM) as Explosion-proof. They conform to the latest edition of the National Electrical Code (NEC), Articles 500, 501, 502, and 503 requirements as explosion proof and suitable for use in Class I, Division 1, Groups C and D, and dust ignition proof and suitable for use in Class II, Division 1, Groups E, F and G hazardous locations, and suitable for use in Class III, Division 1 hazardous locations. FM approval also meets OSHA (Occupational Safety and Health Administration) requirements.

### Definition of Hazardous Locations by NEC

**Class I locations** are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosion or ignitable mixtures.

**Class I, Division 1 location** is a location: (1) in which ignitable concentrations of flammable gases or vapors exist under normal operating conditions; or (2) in which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or (3) in which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also **cause** simultaneous failure of electric equipment.

**Class II locations** are those that are hazardous because of the presence of combustible dust.

**Class II, Division 1 location** is a location: (1) in which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures; or (2) where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes; or (3) in which combustible dusts of an electrically conductive nature may be present.

**Class III locations** are those that are hazardous because of the presence of easily ignitable fibers or flyings but not likely in air suspension in quantities sufficient to produce ignitable mixtures.

**Class III, Division 1 location** is one in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

## Special Features

The construction of an Explosion Proof pump is similar in most respects to the standard wastewater pump, but differs in the following details:

1. Hydrostatically pressure tested high strength, cast iron housings are designed to withstand an internal explosion and have long tight flame paths to reduce exit temperature of any exploding gases to a value below the ignition temperature of the surrounding environment.
2. All pumps have required pilot thermal sensors embedded in stator windings, to guarantee that the pump surface temperature never exceeds safe limits, avoiding possible environmental ignition.
3. Externally mounted leakage sensors may not be used unless explosion proof or intrinsically safe (consult factory for details).
4. Special approved power cables required: Flygt SUBCAB.
5. All pumps, except 3045(X), 3057(X), 3085(X), 3102(X) and 3127(X), have a **special** stator inspection plug. The 3085(X), 3102(X) and 3127(X) stator housings are inspected for leakage through the cable entry. Here, penetration of oil from the oil chamber below, or water from the junction chamber above can be detected.
6. Flygt controls supplied with these pumps incorporate the following **required** circuits:
  - A. Motor pilot thermal sensors (connection is approval **mandatory**).
  - B. Intrinsically safe relays for ENM-10 level sensors (or equal) - usage is **mandatory**.

**CAUTION:** All controls, used with these pumps but not supplied by Flygt, **must** be designed according to the latest applicable standards. See **Monitoring & Controls** Section for additional details and requirements.

## Environmental Limits

The maximum temperature of exposed (external) pump surfaces is self controlled by the motor pilot thermal switches. Maximum allowed ambient (environmental) temperature is 115°F (46°C).

## Application of Explosion-proof Pumps

These pumps may be used in sewage wet wells that are classified as Class I, Division 1, Groups C and D

# Explosion-proof Pumps

hazardous locations (gases and vapors). They can also be used in applications that are classified as Class II, Division 1, Groups E, F and G hazardous locations (typified by grain or coal storage); also, Class III, Division 1 locations (fibers and flyings).

Other areas, which may be classified hazardous under normal conditions and where the use of Explosion-proof pumps for handling contaminated wastewater is required are: refineries, petrochemical industry locations, tank farms, gas utility vaults, etc., always taking into consideration that these pumps are **not designed or approved as process pumps deliberately and protractedly handling high concentrations of hazardous liquids, e.g.: gasoline, etc.**

## Limitations

1. CP/CS, DP/DS and FP/FS 3085(X) does not optionally have a terminal board as does the standard version.
2. This Explosion-proof pump is not available in the Warm Liquid (WL) variant.

**Division 2, All Classes:** For Class I or II locations, a Division 2 designation means that the ignitable or combustible materials will not normally be present in hazardous concentrations except by accident or malfunctions of containing or protective systems. In Class III locations, Division 1 and 2 are almost the same (check NEC Article 503).

Equipment approved as suitable for use in Division 1 locations is automatically suitable for use in Division 2 locations. **However**, if the Authority Having Jurisdiction has definitely defined the area as Division 2, standard submersible pumps (motors) may be used so long as they do not contain any open (non-hermetically sealed) ignition sources (See NEC Article 501-8 and 502-8) and use motor pilot thermal switches to limit surface temperatures. Standard Flygt submersible pumps meet these requirements.

## Classification

A sewage wet well (or any other wastewater collection location) is not automatically a hazardous location. The nature and classification of any location must be determined and indicated by whoever is considered to be the Authority Having Jurisdiction.

This Authority is not always easily determined. Care and diligence must be exercised to make sure, once a preliminary identification has been made, that there is not some other superseding Authority.

Depending on the type and geographical position of the "location", the Authority may range the gamut from a federal agency to state, regional, local agencies or the consulting or plant engineer. Often the best source of information is the state Administrative Code or a state agency such as a Department of Environmental Protection (DEP), Environmental Protection Agency (EPA), Department of Health, etc.

## Approval Requirements (NEC/Factory Mutual)

Class I, Division 1: suitable equipment must be explosion proof. It must also contain pilot motor thermal sensors (which must be connected in the motor control).

Class II, Division 1: suitable equipment must be "dust ignition proof" and use motor pilot surface temperature limiting thermal switches as in Class I.

Class III, Division 1: suitable equipment need only be totally enclosed, non ventilated.

**Current Approvals** for hazardous location pumps previously noted are by FM (Factory Mutual Research). FM is officially listed by OSHA (Occupational Safety & Health Administration) in the Federal Register as a Nationally recognized testing laboratory (NRTL). It is in all regards equivalent to UL (Underwriters Laboratory).

**Restrictions:** The listed (X) pumps are not approved for "process pumping" where high concentrations of liquids (other than wastewater) are handled for process work, transfer, or recovery. The acceptable usage is for handling wastewater (contaminated water, sewage, etc.) for the purposes of treatment, transfer, storage, or disposal.

No accessory equipment may be attached to an approved pump unless it is specifically approved for the location or "intrinsically safe" (See NEC 500-2 for Intrinsic Safe requirements).

**WARNING:** All NEC and local code requirements must be scrupulously observed when making an installation. Be certain that glands and conduits where pump(s) or control wiring/cable passes from a hazardous location (wet pit, etc.) to electrical service, controls, or nonclassified area are suitably sealed against passage of gases or liquids.

**Aggressive Liquids:** Depending on temperature, pH, concentration, and their intrinsic reactivity, certain contaminant chemicals (acids, alkalies, solvents, etc.) may have a deteriorating effect on the equipment and

## Explosion-proof Pumps

pose a safety hazard to the installation. Be careful to fully examine these circumstances with the end user or his representative and consult with Flygt.

A number of alternative configurations or approaches are available which may make the equipment suitable in the presence of these materials: alternate elastomers, cable sheathing, special cable entries, etc.

**Accessories:** Non-sparking bronze "Safe-Slide®" installation/removal guide accessories are available for all approved pumps. While not required by the Approval Authority they may be desired by local authorities and do provide an extra margin of safety for particularly hazardous classified locations.

**Cable:** Flexible cords or cables used in hazardous locations must be of the NEC type "extra-hard usage" and be specifically approved/tested for the approved equipment (motor/pumps) which they will be used with.

**No unapproved substitutions may be made without loss of official approval.** Cables supplied by Flygt and used with Flygt electric submersible pumps are FM tested and approved for the hazardous locations listed for the pumps in the beginning of this Explosion-proof pumps section.

To protect against the damaging and unsafe effects of very aggressive contaminants (liquids, dissolved solids) in the wastewater, special cable entries are available which will allow pipe or stainless steel flex hose sheathing to be attached to protect the cable.

**Special Exceptions for Hazardous Locations:** It is possible in some circumstances to use standard pumps in what would normally be declared as hazardous locations. These approaches are supported by various codes but may **not** be used if specifically disallowed by an Authority Having Jurisdiction.

**Guaranteed Pump Submersion (GPS):** If the equipment is so controlled that the liquid level never falls below a point 4 - 6 inches above the topmost point of the pump, then standard non-approved pumps may be used. This is because the volume below a liquid surface is not considered hazardous.

The means for guaranteeing that a pump will always remain submerged during operation vary from one part of the country to another. Consult Flygt for appropriate configurations.

**Declassification:** An examination of local/state administrative codes, NEC Chapter 5, and NFPA Standard 70C and 496, shows that a hazardous location may be reduced in classification from Division 1 to Division 2 or even to a nonhazardous condition through the use of suitable air purging and use of monitoring safeguards. This would then allow the installation of standard pumping equipment.

This is a common practice in many parts of the country when the installation makes it practical. The approach has additional benefits: purging not only removes any explosive/flammable gases, but also removes smothering or poisonous gases thus improving the personnel safety aspects of the location.

### **Mine Safety and Health Administration (MSHA)**

Equipment approved by MSHA (Permissible-suitable for use in gassy mines) may **not** be used in any hazardous location covered by the NEC categories (Class I, II, or III) without written permission of the **authority having jurisdiction**.

Nor may equipment approved/listed by FM or UL be used in a gassy mine without the written approval of MSHA.

# N-3202.185,095

## Materials of Construction

Components	Cast Iron Pump
<b>Major Castings:</b>	Cast iron, A48, Class 35B
<b>Pump Lifting Handle:</b>	Stainless steel
<b>Motor Cable:</b>	Chloroprene rubber jacketed
<b>Cable Entry Grommets:</b>	Nitrile rubber
<b>Shaft:</b>	Stainless steel ASTM A479 S43100-T
<b>Impeller:</b>	Hard Iron™ (25 ASTM A-532 (Alloy III A) 25% chrome cast iron)
<b>Insert Ring</b>	Hard Iron™ (25 ASTM A-532 (Alloy III A) 25% chrome cast iron)
<b>O-Rings:</b>	Nitrile rubber
<b>Lubricant Plug</b>	316 Stainless steel
<b>Screws, studs and nuts</b>	316 Stainless steel
<b>Inner Mechanical Shaft Seal:</b>	*Tungsten carbide/ *Tungsten carbide
<b>Outer Mechanical Shaft Seal:</b>	*Tungsten carbide/ *Tungsten carbide

\*All corrosion and abrasion resistant

## 3202 Standard Pump Cable

Pump Model	HP	Volts	Ø	Cable Size/ Nominal O.D.	Part Number	No. of Cables	Max. Cable Length (Ft)
3202	60 Y//	230	3	4G25+S(2x0.5) 1.30"-(33.0 mm)	94 19 83	2	190
	YSER	460	3	*S3x25+16/3+S(4x0.5) 1.18"-(30.0mm)	94 19 94	2	755
	4-Pole						
	Δ	460	3	4G25+S(2x0.5) 1.30"-(33.0 mm) *S3x25+16/3+S(4x0.5) 1.18"-(30.0mm)	94 19 83 94 19 94	1	375
	Δ	575	3	4G16+S(2x0.5) 1.06"-(27.0 mm) *S3x16+3x16/3+S(4x0.5) 0.98"-(25.0mm)	94 19 82 94 19 93	1	380
	60 Δ	460	3	4G25+S(2x0.5) 1.30"-(33.0 mm) *S3x25+16/3+S(4x0.5) 1.18"-(30.0mm)	94 19 83 94 19 94	1	370
	6-Pole						
	Δ	575	3	4G16+S(2x0.5) 1.06"-(27.0 mm) *S3x16+3x16/3+S(4x0.5) 0.98"-(25.0mm)	94 19 82 94 19 93	1	370

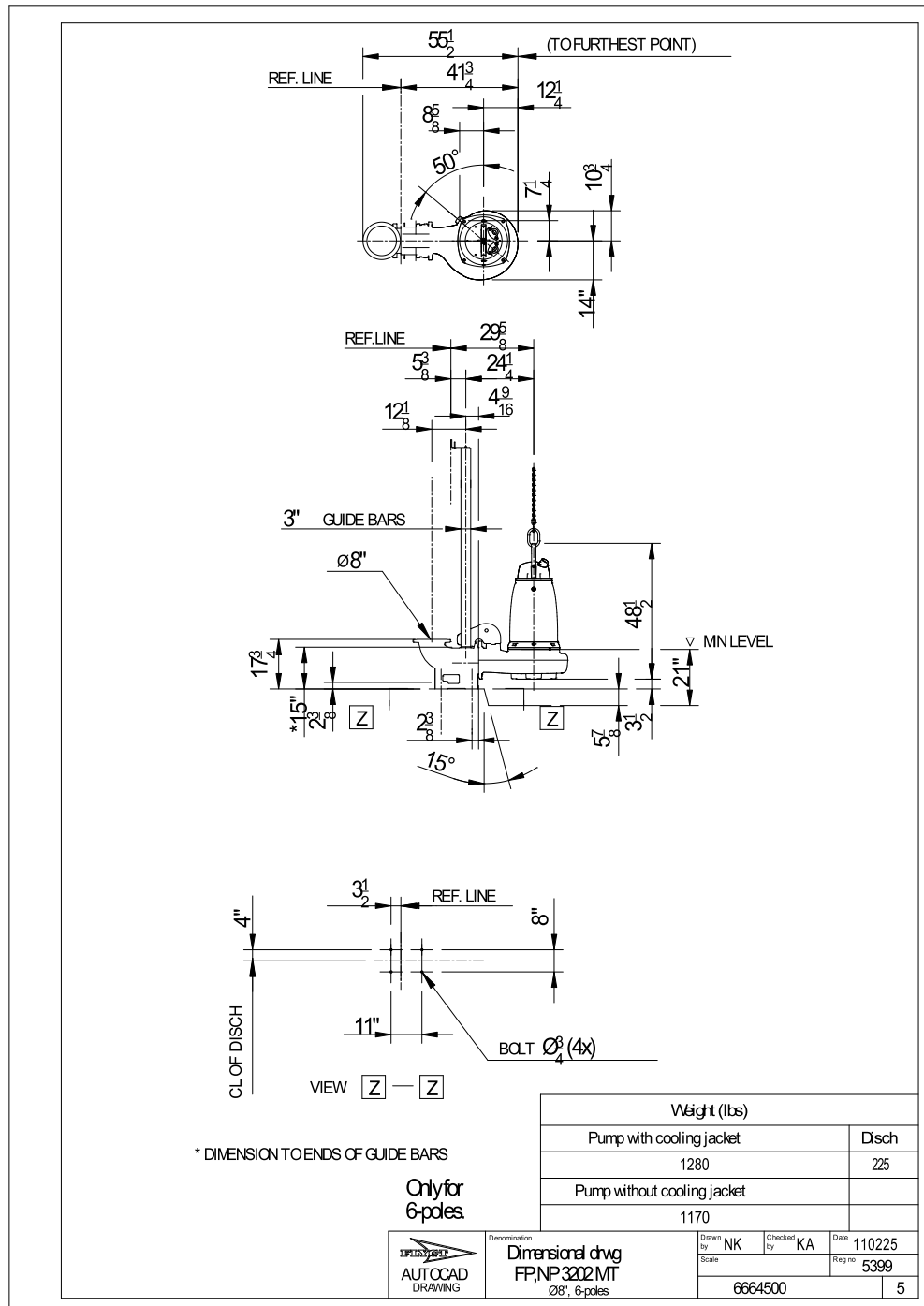
\*Optional **Shielded Cable** - Use with **SmartRun™** intelligent controls.

**Shielded pump power cable** may be necessary when using VFD driven pumps and the communication features of the MAS711 system. Please contact your A.E. to discuss your specific application requirements.

**Note:** Shielded cable max. lengths and number of cables are the same as standard cable.

# NP 3202 MT 3~ 640

## Dimensional Drawing



Project  
Block

Created by  
Created on 2/10/2020

Last update





Xylem Water Solutions USA, Inc.  
Flygt Products

## **Section 3**

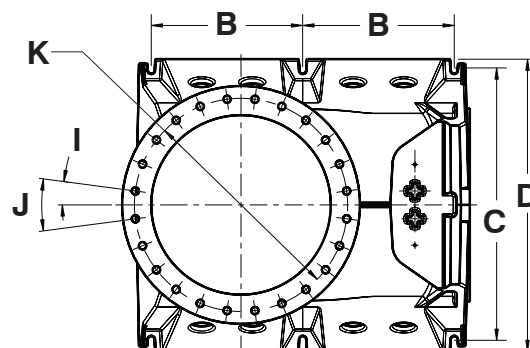
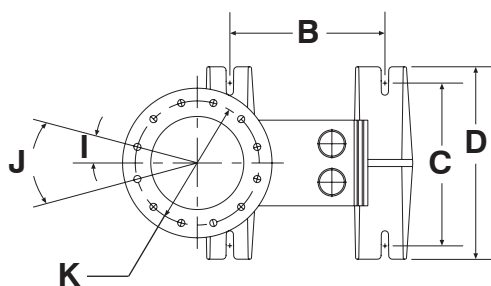
# **Pump Accessories**

# Standard CP/NP Discharge Connections (Cast Iron)

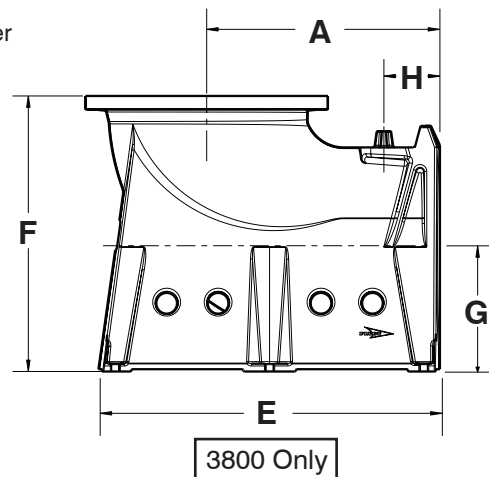
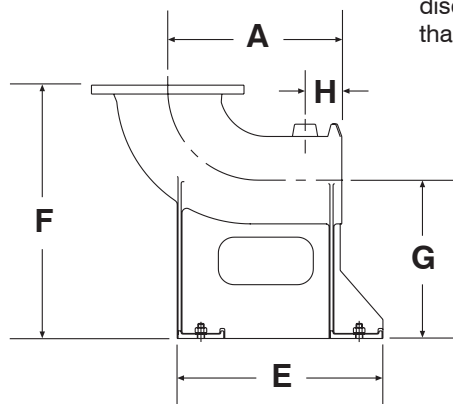
All dimensions (inches)

Pump Model	Part Number	Disch. Inlet	Disch. Outlet	A	B	C	D	E	F	G	H	I	J	K
8" - 3102, 3127.	444 71 06	6"	8"	16 3/4	11	10	12 3/16	15	17 3/4	10 1/8	4 9/16	22.5°	45° x 8	11 3/4
8" - 3153, 3171, 3202	374 76 06	8"	8"	16 3/4	11	10	12 3/16	15 3/8	17 3/4	10 1/4	4 9/16	22.5°	45° x 8	11 3/4
8" - 3231	695 77 06	8"	8"	21 5/8	19 3/4	15 3/4	19 3/4	23 5/8	17 3/4	9 1/8	6 7/8	22.5°	45° x 8	11 3/4
8" - 3240	695 77 08	8"	8"	21 5/8	19 3/4	15 3/4	19 3/4	23 5/8	17 3/4	9 1/8	6 7/8	15°	30° x 12	13
10" - 3153, 3171, 3301, 3315.	604 59 05	10"	10"	18 3/4	19 3/4	10	12 3/16	24 3/4	18 3/4	10	4 9/16	15°	30° x 12	14 1/4
12" - 3202, 3301, 3315.	604 61 05	12"	12"	21 5/8	19 3/4	20 3/4	24 7/16	26	31 1/2	19 11/16	4 9/16	15°	30° x 12	17
12" - 3306, 3312.	373 92 05	12"	12"	24 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	10 13/16	6 7/8	15°	30° x 12	17
14" - 3301, 3315, 3356.	388 27 05	14"	14"	25 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	11 13/16	6 7/8	15°	30° x 12	18 3/4
14" - 3306, 3312.	442 16 05	12"	14"	25 5/8	25 5/8	23 3/4	27 9/16	29 1/2	23 3/4	11 13/16	6 7/8	15°	30° x 12	18 3/4
14" - 3351	557 00 05	14"	14"	27 9/16	31 1/2	27 3/4	31 1/2	35 7/16	23 3/4	11 13/16	8 7/8	15°	30° x 12	18 3/4
16" - 3400	581 98 05	16"	16"	29 9/16	31 1/2	31 1/2	35 1/2	35 1/2	29	13 3/4	8 13/16	11.25°	22.5° x 16	21 1/4
20" - 3501, 3531.	387 90 05	20"	20"	30 5/8	31 1/2	27 3/4	31 1/2	35 1/2	33	15 3/8	8 7/8	9°	18° x 20	25
24" - 3602	388 65 05	24"	24"	33	35 1/2	31 1/2	35 7/16	39 3/8	37 1/2	17 3/4	8 7/8	9°	18° x 20	29 1/2
32" - 3800	586 03 05	32"	32"	40 1/4	26 5/8	47 1/4	51 1/4	57 1/4	47 1/2	22	9 3/4	6.43°	12.86° x 28	38 1/2

**Note:** Alternative discharge connections may be available, contact Flygt Application Engineering.



**Caution:**  
Contact Flygt applications engineering department when making a pump/discharge connection combination other than those paired in the chart above.

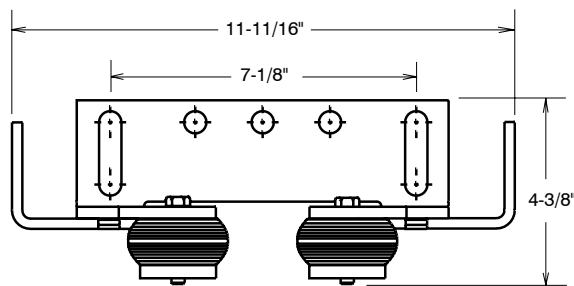
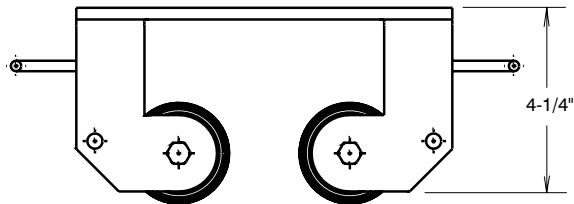


3800 Only

## Upper Guide Bar Bracket (for 3000, 5500 & 8000 Series Pumps)

### 2" UPPER GUIDE BAR BRACKET

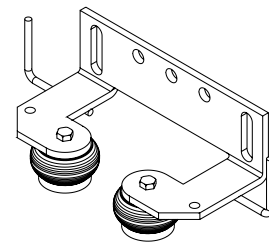
613 68 00	Galvanized Steel
613 68 04	316 Stainless Steel

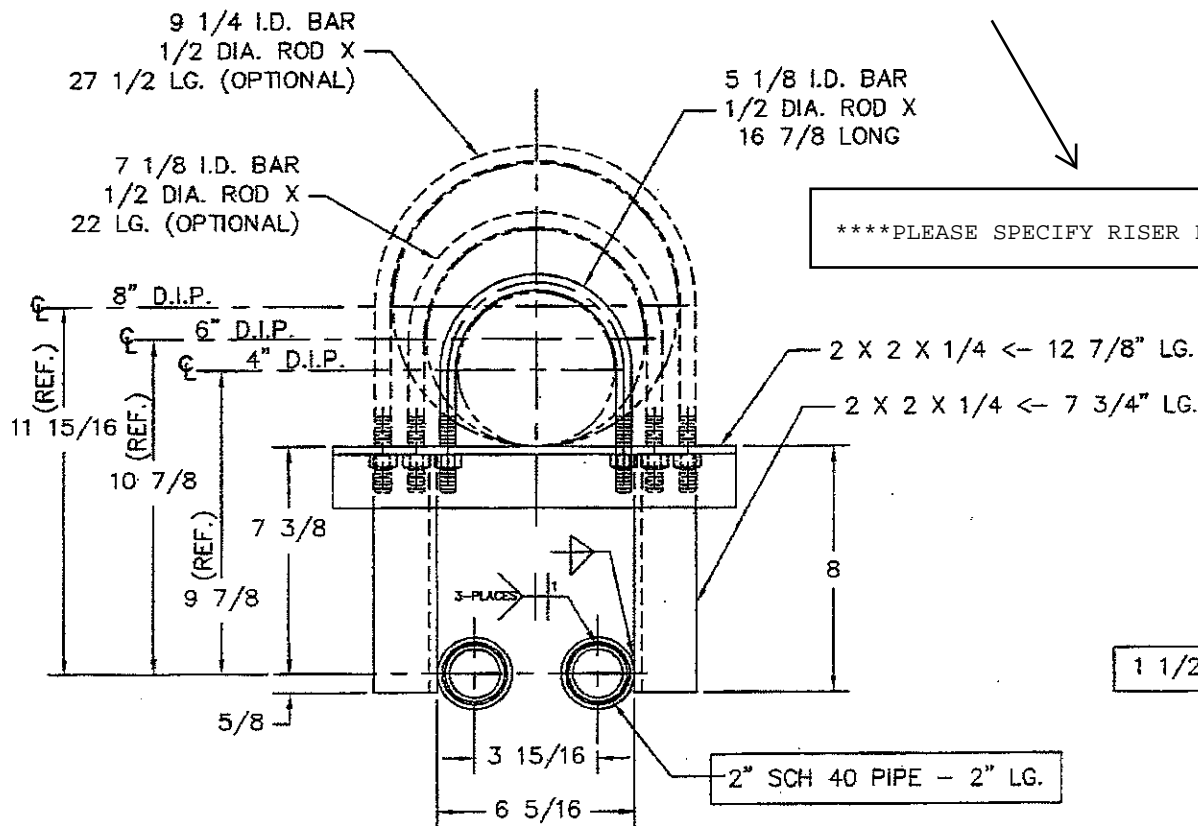


Note: use with 2" nominal guide bars

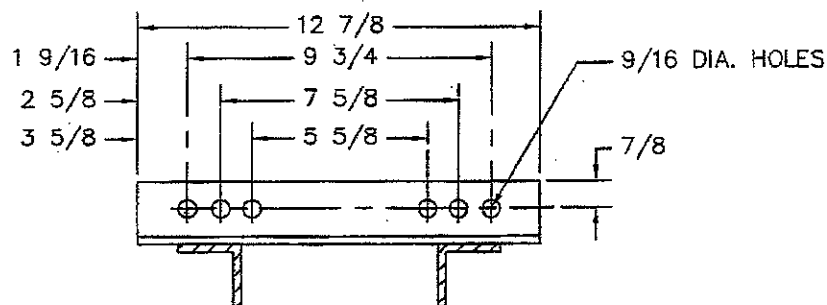
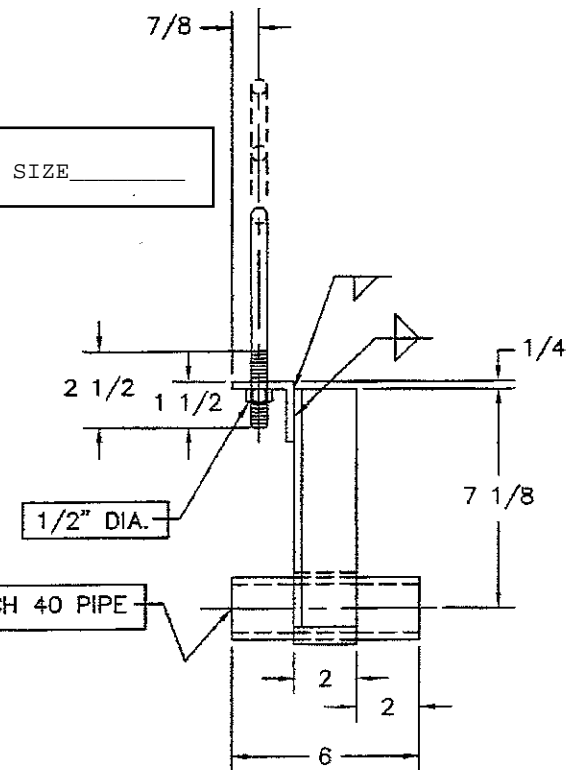
Standard for the following pumps:

DP-3068  
DP-3080  
CP/DP/FP/NP-3085  
CP/FP/NP-3102  
CP/FP/NP-3127  
NP/FP-3153  
NP/FP-3171  
HP-5520, 5530  
DP-8050, 8053, 8056, 8058





\*\*\*\*PLEASE SPECIFY RISER PIPE SIZE\_\_\_\_\_



MATERIAL: 316 STAINLESS STEEL

P/N 1400000591034

**FLYGT**

ITT FLYGT CORPORATION, NORWALK, CONNECTICUT 06856

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UNIVERSAL INTERMEDIATE GUIDE BAR BRACKET  
FOR 4", 6" & 8" D.I. PIPE W/ 2" RAILS

DRWN	DATE	BY	D.B.	REF.	NUMBER	REV.
APD	DATE	BY	LES	SCALE	43274	
	1/5/06			1/4"=1"		

## AC100+ Gold®

## PRODUCT INFORMATION

### AC100+ Gold® Vinyvester Injection Adhesive Anchoring System

#### PRODUCT DESCRIPTION

The AC100+ Gold is a two-component vinyvester adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. The AC100+ Gold is designed for bonding threaded rod and reinforcing bar elements into drilled holes in concrete and masonry base materials.

#### GENERAL APPLICATIONS AND USES

- Bonding threaded rod and reinforcing bar into hardened concrete and masonry
- Evaluated for use in dry and water-saturated concrete including water filled holes
- Suitable to resist structural loads in uncracked concrete base materials for cases where anchor design theory and criteria applies
- Can be installed in a wide range of base material temperatures

#### FEATURES AND BENEFITS

- Designed for use with threaded rod and reinforcing bar hardware elements
- Consistent performance in low and high strength concrete (2,500 to 8,500 psi)
- Evaluated and recognized for a range of embedments and for interior and exterior applications
- Versatile low odor formula with quick cure time
- Mixing nozzles proportion adhesive and provide simple delivery method into drilled holes
- Cartridge design allows for multiple uses using extra mixing nozzles

#### TESTING AND EVALUATION

- + Tested and evaluated by an accredited independent laboratory in accordance with ICC-ES AC308 criteria and ASTM E 1512 for anchoring in uncracked concrete, including but not limited to the following:
  - + Reliability testing for freeze/thaw conditions
  - + Reliability testing for sensitivity to hole cleaning, mixing effort and installation direction
  - + Reliability testing for sustained loads, i.e. creep resistance
    - (see applicable long-term and short term temperature ranges)
  - + Service condition testing at elevated and decreased temperatures
  - + Service condition testing in low and high strength concrete
  - + Service condition testing for resistance to alkalinity and sulfur exposure

#### APPROVALS AND LISTINGS

International Code Council, Evaluation Service (ICC-ES) ESR-2582  
 Code compliant with the 2006 IBC, 2006 IRC, 2003 IBC, 2003 IRC, 2000 IBC, 2000 IRC, 1997 UBC  
 Tested in accordance with ICC-ES AC308 for use in structural concrete and design with ACI 318 Appendix D (Strength Design) and as amended by provisions of ICC-ES AC308 Annex A, Section 3.3 ([www.icc-es.org](http://www.icc-es.org))  
 Compliant with NSF/ANSI Standard 61 for drinking water system components – health effects; minimum requirements for materials in contact with potable water and water treatment  
 Conforms to requirements of ASTM C 881, Types I, II, IV and V, Grade 3, Classes A & B (meets Type III with exception of elongation)  
 Department of Transportation listings – see [www.powers.com](http://www.powers.com) or contact transportation agency

#### GUIDE SPECIFICATIONS

**CSI Divisions:** 03151-Concrete Anchoring, 04081 Masonry Anchorage and 05090-Metal Fastenings.  
 Adhesive anchoring system shall be AC100+ Gold as supplied by Powers Fasteners, Inc., Brewster, NY. Anchors shall be installed in accordance with published instructions and requirements of the Authority Having Jurisdiction.



AC100+ Gold coaxial cartridge with mixing nozzle



AC100+ Gold dual cartridge with mixing nozzle and extension

#### PACKAGING

##### Coaxial Cartridge

5 fl. oz. (150 ml or 9.2 in<sup>3</sup>)  
 10 fl. oz. (280 ml or 17.1 in<sup>3</sup>)

##### Dual (side-by-side) Cartridge

8 fl. oz. (235 ml or 14.3 in<sup>3</sup>)  
 12 fl. oz. (345 ml or 21.0 in<sup>3</sup>)  
 28 fl. oz. (825 ml or 50.3 in<sup>3</sup>)

#### STORAGE LIFE & CONDITIONS

Fifteen months in a dry, dark environment with temperature ranging from 32°F and 86°F (-0°C to 30°C)

#### ANCHOR SIZE RANGE (TYP.)

3/8" to 1-1/4" diameter threaded rod  
 No. 3 to No.10 reinforcing bar (rebar)

#### SUITABLE BASE MATERIALS

Normal-weight concrete  
 Grouted concrete masonry (CMU)  
 Hollow concrete masonry (CMU)  
 Brick masonry





## INSTALLATION SPECIFICATIONS

### Installation Specifications for Threaded Rod and Reinforcing Bar (Solid Concrete Base Materials)

Dimension/Property	Notation	Units	Nominal Anchor Size								
Threaded rod	-	-	3/8"	1/2"	5/8"	3/4"	7/8"	1"	-	1-1/4"	-
Reinforcing bar	-	-	#3	#4	#5	#6	#7	#8	#9	-	#10
Nominal anchor diameter	$d$	in. (mm)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)	0.875 (22.2)	1.000 (25.4)	1.125 (28.6)	1.250 (31.8)	1.250 (31.8)
Nominal diameter of drilled hole	$d_o, (d_{bit})$	in.	7/16 ANSI	9/16 ANSI	11/16 or 3/4 ANSI	7/8 ANSI	1 ANSI	1-1/8 ANSI	1-3/8 ANSI	1-3/8 ANSI	1-1/2 ANSI
Minimum embedment <sup>1</sup>	$h_{ef,min}$	in. (mm)	2-3/8 (61)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)	3-1/2 (89)	4 (102)	4-1/2 (114)	5 (127)	5 (127)
Maximum embedment <sup>1</sup>	$h_{ef,max}$	in. (mm)	4-1/2 (114)	6 (153)	7-1/2 (191)	9 (229)	10-1/2 (267)	12 (305)	13-1/2 (343)	15 (381)	15 (381)
Minimum concrete member thickness <sup>1</sup>	$h_{min}$	in. (mm)	$h_{ef} + 1-1/4$ ( $h_{ef} + 30$ )			$h_{ef} + 2d_o$					
Minimum spacing distance <sup>1,2</sup>	$s_{min}$	in. (mm)	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)	1-3/4 (44)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)
Minimum edge distance <sup>1</sup>	$c_{min}$	in. (mm)	1-7/8 (48)	2-1/2 (64)	3-1/8 (80)	3-3/4 (95)	4-3/8 (111)	5 (127)	5-5/8 (143)	6-1/4 (159)	6-1/4 (159)
Maximum torque <sup>2</sup> (only possible after full cure time of adhesive)	A307 Grade C or F1554 carbon steel rod	$T_{max}$	ft.-lb. (N-m)	10 (13)	25 (34)	50 (68)	90 (122)	125 (169)	165 (224)	-	280 (379)
	F593 Condition CW stainless steel rod or ASTM A193, Grade B7 carbon steel rod	$T_{max}$	ft.-lb. (N-m)	16 (22)	33 (45)	60 (81)	105 (142)	125 (169)	165 (224)	-	280 (379)

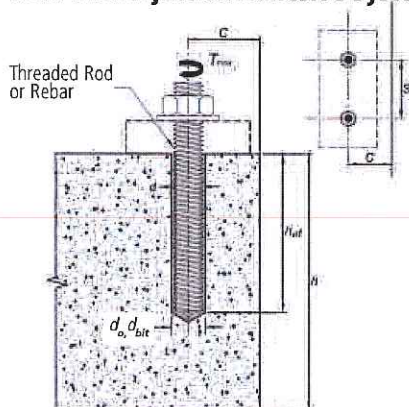
1. For use with the design provisions of ACI 318 Appendix D and ICC-ES AC308 Annex A, Section 3.3 and ESR-2582.

2. For installations between the minimum edge distance and 5 anchor diameters, the tabulated maximum torque must be reduced (multiplied) by a factor of 0.45.

### Installation Specifications for Threaded Rod (Hollow Base Material)

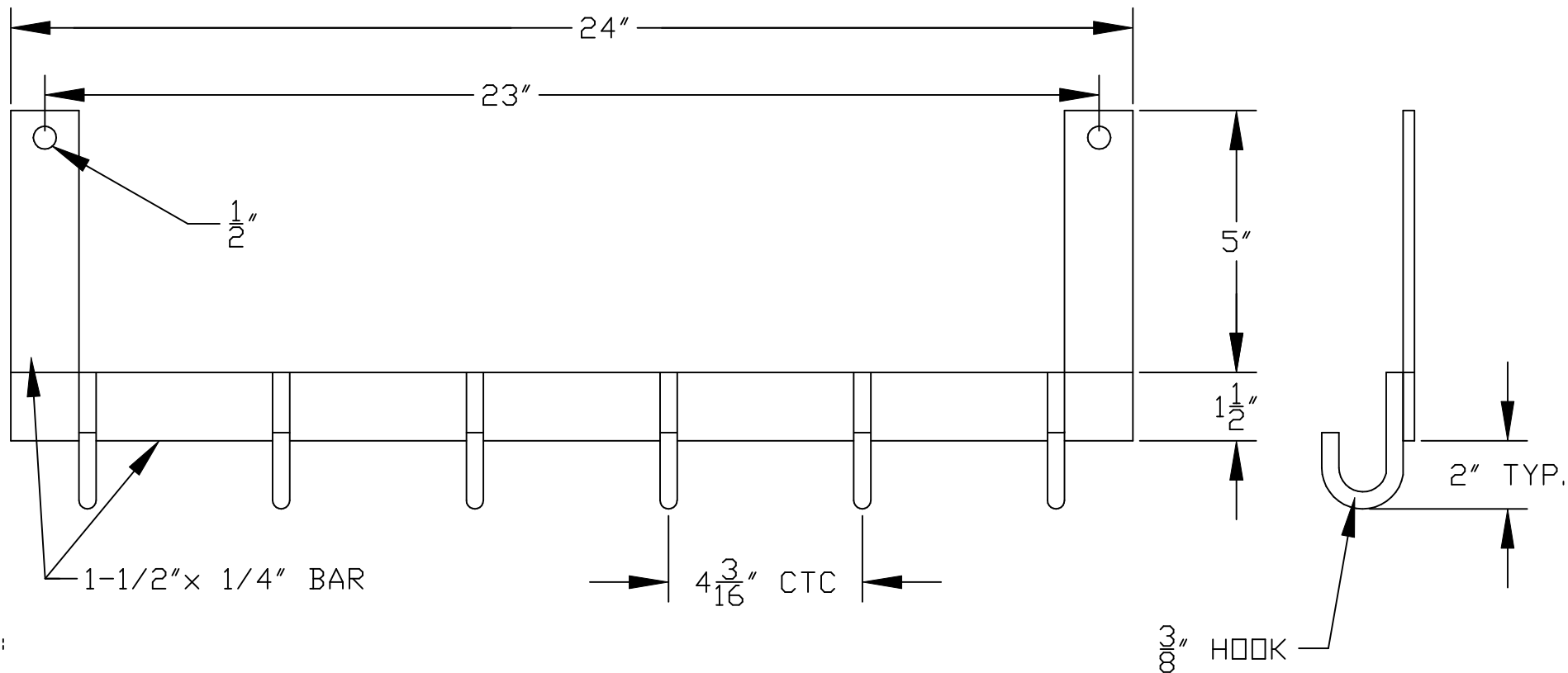
Dimensions/property	Notation	Units	Nominal Size	
			3/8"	1/2"
Nominal threaded rod diameter	$d$	in (mm)	0.375 (9.5)	0.500 (12.7)
Nominal stainless steel tube size	-	in.	3/8	1/2
Nominal diameter of drilled hole	$d_o, (d_{bit})$	in	1/2 ANSI	5/8 ANSI
Maximum torque (only possible after full cure time of adhesive)	$T_{max}$	ft.-lb. (N-m)	10 (8)	10 (8)

### Detail of Steel Hardware Elements used with Injection Adhesive System



Threaded Rod and Deformed Reinforcing Bar Material Properties				
Steel Description (General)	Steel Specification (ASTM)	Nominal Anchor Size (inch)	Minimum Yield Strength, $f_y$ (ksi)	Minimum Ultimate Strength, $f_u$ (ksi)
Carbon rod	A 36, or F1554 Grade 36	3/8 through 1-1/4	36.0	58.0
Stainless rod (Alloy 304 / 316)	F 593, Condition CW	3/8 through 5/8	65.0	100.0
		3/4 through 1-1/4	45.0	85.0
High strength carbon rod	A 193, Grade B7	3/8 through 1-1/4	105.0	125.0
Grade 60 reinforcing bar	A 615, A 706, A 767, or A 996	3/8 through 1-1/4 (#3 through #10)	60.0	90.0

1. ASTM A 36 carbon steel threaded rod specification is equivalent in listed properties.




# NOTES:

- 1.) MODEL #  
"F-CH-316SS-HD"  
STAINLESS STEEL  
CABLE HOLDER, AS  
MANUFACTURED FOR  
ITT/FLYGT.
- 2.) MATERIAL SHALL  
BE TYPE 316  
STAINLESS STEEL.
- 3.) UNIT SUPPLIED  
WITH (6) HOOKS.

DRAWING NOT TO SCALE

NO.				REVISION				BY	DATE	APVD.	DATE	ACAD R14

		
Xylem Water Solutions, Inc. TRUMBULL, CONNECTICUT 06611		
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<b>TYPE 316 STAINLESS STEEL HEAVY DUTY CABLE HOLDER</b>		
REF.	NUMBER	REV.
F-CHHD316SS		
SCALE	PLOT TO FIT	

DRAWN	BY	DATE
CHKR.	BY	DATE
PROJ. ENGR.	BY	DATE
APVD.	BY	DATE

## **APPENDIX E**

**APPROVED SHOP DRAWING – GENERATOR AND AUTOMATIC TRANSFER  
SWITCH**





**Acf Standby Systems**  
Power Generation



## Engineering Submittal Package

FSA-LRECD-LS-082

**Dealer:**

John Agnes  
Sales Engineer  
Acf Standby Systems, LLC  
Cell (352) 277-6403  
[j.agnes@acfpower.com](mailto:j.agnes@acfpower.com)  
[www.acfstandbysystems.com](http://www.acfstandbysystems.com)

# Table of Contents

## SPECIFICATION SHEET

0192540SBY

0K5096

PSTS SER 100-1000A SPC SHT

SD175 6.7L

## CONTROL PANEL AND OPTIONS

0172110SBY

SPEC SHEET H-100 CONTROL PANEL

## ALTERNATOR AND OPTIONS

0187980SBY

GENPROTECT DATA SHEET

## UNIT OPTIONS

0161970SBY

BATTERY INDEX

0163180SBY

SERIES 2000 ENCL SPEC

0180230SBY

SPEC SHEET RHINO COAT

0189380SSD

EATON CB TABLE THERM/MAG

0191900SBY

2.5A & 10A BATT CHRGR H&G

0192390SSD

EATON CB LUG DATA

0192670SBY

PSTS ATC-300 SPC SHT

084918H\_SBM

HEATER BLOCK 1500W 240V

## INSTALLATION DRAWINGS

0J4194

INSTALL D6.7L OPEN SET D-GRP

0J4194C

INSTALL D6.7L G17 L2A D-GRP

67B8226

SER 225/300A 3P 208-600V 4X

## GENSET ELECTRICAL DRAWINGS

0H9882

WD D6.7L G17 H-PANEL

0H9883

SD D6.7L G17 H-PANEL

## SYSTEM INTERCONNECT DRAWINGS

0191120SSD

INTERCONNECT DIAG H PANEL

## EMISSIONS DATA

0185170SSD

SOUND DATA SD175 6.7L

A0000514950

EMISSIONS SD175 D6.7 2020

## CERTIFICATIONS

0184520SSD

QUALITY CERTIFICATION DOC

0J4299

2YEAR LIMITED WARRANTY STANDBY

0J4303

2YEAR EXTND WARR-TRNSFR SWITCH

0K8347

ISO CERTIFICATE 9001 : 20

A0000083487

2019 EPA CERT KFPXL06.7DGS-007

A0000519419

2020 EPA CERT LFPXL06.7DGS-005

EMSNWRNTY003

EPA WARRANTY STATEMENT US

## GENERATOR AND LOAD SUMMARY



**A-F Standby Systems**  
Power Generation



**Date:** June 18, 2020

**Reference:** FSA-LRECD-LS-082

We are pleased to offer the following quote for the above project:

Quantity 1 - PSTS Series Automatic Transfer Switch consisting of the following features and accessories:

- **Service Entrance Rated, Open Transition**
- **300 Amp, 3 Pole, 277/480 VAC three phase**
- CUL Listed
- UL1008 Listed
- **NEMA 4X Enclosure**
- ATC-300+ Microprocessor-Based Controller
  - 2-Line, 32-Character Alphanumeric LCD Display
  - Front Panel Mimic Diagram with colored LEDs for Source/Load Indication
  - Standard Features:
    - Sensing and Programmable Setpoints for both Normal (S1) and Emergency (S2): Under-voltage/Under-frequency, Over-voltage/Over-frequency; Voltage Unbalance Sensing and Phase Reversal for all phases
    - Adjustable Time Delays: Engine Start, Transfer Normal to Emergency & Emergency to Normal, Engine Cooldown, Emergency Fail
    - Pushbutton for Bypassing Time Delays on Transfer/Retransfer
    - Test Pushbutton
    - Contacts for Go to Emergency (S2)
    - MODBUS Communication
    - Digital Programmable Plant Exerciser:
      - Off, 1-Day, 7-Day, 14-Day, 28-Day Intervals
      - Adjustable 0-600 Minutes Run Time
      - Selectable for Load or No Load
    - Auxiliary Contacts:
      - Normal (S1) Source Present (2 Form C)
      - Emergency (S2) Source Present (2 Form C)
      - Normal (S1) Position Indication (1 Form C)
      - Emergency (S2) Position Indication (1 Form C)
      - Pre-Transfer Signal Contacts (1 Form C)
- 37A - Service Equipment Rated w/o Ground Fault Protection
- 41A - 100W Space Heater with Adjustable Thermostat
- 42 - IBC/CBC Seismic Qualified
- 12L - Indicator Light, Normal Source Tripped
- 36 - Load Shed from Emergency
- 16N - Overcurrent Protection, Source 1
- 32A - Time Delay Neutral, Adjustable
- Normal Terminal Mechanical Lugs, Customer Connection: (1) #3-350MCM per phase
- Emergency Terminal Mechanical Lugs, Customer Connection: (1) #3-350MCM per phase
- Load Terminal Mechanical Lugs, Customer Connection: (1) #6-350MCM per phase
- Neutral Terminal Mechanical Lugs, Customer Connection: (3) #4-350MCM
- **2-Year Extended Warranty**

Quantity 1 - Generac Industrial diesel engine-driven generator set with turbocharged/aftercooled 6-cylinder 6.7L engine, consisting of the following features and accessories:

- Stationary Emergency-Standby rated

- **175 kW Rating, wired for 277/480 VAC three phase, 60 Hz**
- Permanent Magnet Excitation
- **With upsized 300 kW alternator**
- **Level 2 Acoustic Enclosure, Aluminum**
  - **Industrial Grey Baked-On Powder Coat Finish**
  - **150 MPH Wind Load Certified**
- UL2200
- EPA Certified
- H-100 Control Panel
  - Meets NFPA 99 and 110 requirements
  - Temp Range -40 to 70 degrees C
  - Digital Microprocessor:
    - Two 4-line x 20 displays, full system status
    - 3 Phase sensing, +/-0.25% digital voltage regulation
    - RS232, RS485 and Canbus remote ports
    - Waterproof connections
    - All engine sensors are 4-20ma for minimal interference
    - Programmable I/O
      - **HUIO Module**
      - **Increase the number of inputs and outputs**
    - Built-in PLC for special applications
  - Engine function monitoring and control:
    - Full range standby operation; programmable auto crank, Emergency Stop, Auto-Off-Manual switch
    - Isochronous Governor, +/-0.25% frequency regulation
    - Full system status on all AC output and engine function parameters
    - Service reminders, trending, fault history (alarm log)
    - I2T function for full generator protection
    - Selectable low-speed exercise
  - HTS transfer switch function monitoring and control
  - 2-wire start controls for any 2-wire transfer switch
- 110 AH, 925 CCA Group 31 Batteries, dual-paralleled, with rack, installed
- Air Filter Restriction Ind
- Battery Charger, 10 Amp, NFPA 110 compliant, installed
- Coolant Heater, 1500W
- **36" 946 Gallon Double-Wall UL142 Basetank**
  - **70hours at full load**
  - **Mechanical fuel level indicator gauge**
  - **Electronic fuel level sender**
  - **Emergency Vent**
  - **FDEP**
    - **5 Gallon Spill/Fill**
    - **2"overfill Protection valve**
    - **High level Fuel Switch**
    - **High fuel alarm panel**
    - **2" Scully-Type Fuel inlet fitting with dust cap**
    - **FDEP Labeling**
- **3 Owner's Manuals, 1 PDF**
- 120V GFCI and 240V Outlet
- **MLCB, 100% rated thermal-magnetic**
  - **250 Amp**
- **Secondary MLCB, 100% rated thermal-magnetic**
  - **250 Amp**
- *2-Year Comprehensive Warranty*

Quantity 1 - Freight to Jobsite Off Loading by others

Quantity 1 - Start-up and testing Including a **2-hour** load bank test, **M-F, 8A-5P, No Holidays**. Maximum if one trip for this start-up. It is the contractor's responsibility to ensure this generator set is completely installed, and all fuel tank testing is completed before the start up is scheduled. If at time of start-up, the installation is incomplete and/or no fuel available, an additional trip will be required to complete this start-up. Additional trip(s) will be billed our customer.

**NOTES:**

- Field start-up and testing conducted by a Factory Trained Certified Technician
- Onsite training to be done on the same day as start-up
- Start-up and testing is limited to one (1) day on site as described above.
- Load Bank Testing will be done using a resistive type load bank.

**Access within 50 feet of the generator must be provided for the load bank test. If the distance between the load bank and the generator is greater than 50 feet, we reserve the right to requote this start-up and load bank testing.** The distance must be provided to calculate the required additional cable and cost for this testing.

**Based on (2) 60 HP Pumps starting with VFD. One 60HP at a time. Third 60HP not included in sizing. See sizing report**

**Notes**

1. This Quotation is based upon Engineering Specifications ***E-mail dated 6/9/2020*** & Drawings ***E-4 Dated 3-31-2020*** .. No other sections shall apply.
2. Quotation is valid for 60 days. If not released to production within 60 days, pricing, delivery extension and escalation charges may apply.
3. ACF Standby Systems is not responsible for any delays in delivery due to Act of Nature, explosion, fire, strikes, accidents, war, terrorism, flood, accidents or other causes beyond our company control. Quoted shipping schedules are not guaranteed and subject to change without notice. In no case is ACF Standby Systems responsible for incidental or consequential damages.
4. ACF Standby Systems does not accept liquidated damages as a part of third party contracts.
5. Equipment will be invoiced (and payment expected according to ACF's Terms and Conditions) at the time of shipment or when ready to ship from point of origin. Delays by the buyer may result in storage fees and/or additional freight charges.
6. Completed equipment to be delivered to a 3rd party manufacturer for further fabrication will be invoiced upon shipment to the 3rd party manufacturer.
7. The warranty is that of the above-named manufacturer(s). Refer to the manufacturer's warranty statement for details. No special warranty is implied. The Manufacturer's warranty begins on the day of start-up or 6 months after shipment, whichever occurs first, not substantial completion. It is the contractor's responsibility to coordinate start-up along with the date of substantial completion.
8. If the generator set is not installed and ready for startup within 6 months of shipment it will require long term storage procedures. Please refer to the Operation and Maintenance Manual for such requirements. All costs related to long term storage is the responsibility of the purchaser. Failure to follow these procedures may void warranty and affect equipment operation. Contact ACF Standby Systems for assistance.
9. Additional sets of O&M manuals are available at an additional cost. The manufacturer's standard format shall apply. Custom O&M manuals will be available at an additional charge.
10. Startup services will not proceed until the buyer's account is current and in good standing.

11. Quotation does not include offloading, rigging, anchoring, installation, exhaust plumbing, exhaust insulation, fuel or permitting.
12. ACF Standby Systems is not responsible for testing of fuel tank(s) provided by any party. Fuel tank testing, as required by FDEP (Florida Department of Environmental Protection) Chapters 62-761 and 62-762, is the responsibility of the installing Contractor and Generator Permit Applicant. ACF Standby Systems LLC is not responsible for damages or costs incurred by any party, when a fuel tank is filled before field testing required under FDEP or testing mandated by a Local Inspector of Authority under FBC, is performed.
13. Pricing is subject to ACF Standby Systems' Payment Terms.

### **Terms and Conditions**

This proposal is subject to ACF Terms and Conditions of Sale, attached.

**Sincerely,**

John Agnes  
Sales Engineer  
ACF Standby Systems, LLC  
Cell (352) 277-6403  
j.agnes@acfpower.com

### **Acceptance of Quote**

Prior to ordering equipment or services, please sign and return as a confirmation of the content of this proposal and the attached terms and conditions

### **Customer Signature**

\_\_\_\_\_ PO# \_\_\_\_\_

# Power Series Transfer Switch

100 – 1,000 Amps

Service Entrance Rated · Molded Case Type · Open and Delayed Transition

## 300A ATS 277/480 3phase 3 pole NEMA 4X

- Automatic Transfer Switch, 100% Service Entrance Rated
- 100 – 1,000 A, up to 600 VAC, 50/60 Hz
- 2, 3 or 4 Poles
- NEMA 1, 3R, or 4X
- Open and Delayed Transition
- UL 1008 Listed
- CSA C22.2 No. 178 Certified



Image used for illustration purposes only

## Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.



UL 1008 Listed



CSA C22.2 No. 178 Certified



NFPA 37, 70, 99, 110



NEC 700, 701, 702, 708



ISO 3046, 7637, 8528, 9001,  
Pluses #2b, 4



NEMA ICS10, MG1, 250, ICS6, AB1



ANSI C62.41



IEC 61000 EMC Testing and  
Measuring



IBC 2009, CBC 2010, IBC 2012,  
ASCE 7-05, ASCE 7-10, ICC-ES  
AC-156 (2012)

## Description

Generac's Service Entrance Molded Case Type Transfer Switch integrates automatic power switching with required disconnecting, grounding, and bonding for use as service entrance equipment. The integrated service entrance power switch meets all National Electrical Code requirements for service entrance equipment in a compact package. The switches are rated for full load transfers in critical operating, emergency, legally required, and optional power systems.

Designed with integral overcurrent protection and 100% rated disconnect breaker for unmatched performance, safety, and reliability. The internal dead front cover allows for manual operation under load with a permanently affixed handle. The full assembly is listed to UL 1008 with exceptional withstand and closing ratings.

The microprocessor-based ATS controller offers standard features of Modbus® RTU and pretransfer contacts, with three phase sensing on both sources plus load for voltage, frequency, sequencing, loss and unbalance. The mimic diagram displays source availability and connection, providing "at a glance" indication, further simplifying users interface. The controller is designed beyond industry EMC standards with a time-stamped history log.

# Power Series Transfer Switch

100 – 1,000 Amps

Service Entrance Rated · Molded Case Type · Open and Delayed Transition

## STANDARD FEATURES

### GENERAL

- Double-Throw, Mechanically Interlocked Transfer Mechanism
- High Withstand and Closing Ratings
- LCD-Based Display for Programming, System Diagnostics and Help Menu Display
- Mimic Diagram with Source Available and Connected LED Indication
- Top, Bottom and Side Cable Entry
- Time-Stamped History Log
- System TEST Pushbutton
- Programmable Plant Exerciser – OFF, Daily, 7 Day Interval Selectable Run Time 0-600 Minutes No Load/Load with Failsafe
- Safe Manual Operation Under Full Load with Permanently Affixed Operating Handle
- Space Heater with Thermostat (NEMA 3R)
- Modbus® RTU
- Field Programmable Time Delays
- ATC-300+ Controller
- Operating Temperature -4 ° to 158 °F (-20 ° to 70 °C)

### VOLTAGE AND FREQUENCY SENSING

- Three Phase Under and Over Voltage Sensing on Normal and Emergency Sources, Plus Load
- Under and Over Frequency Sensing on Normal, Emergency and Load
- Three Phase Sequence Sensing for Phase Sensitive Loads
- Three Phase Voltage Unbalance and Loss Sensing

### CONTACTS

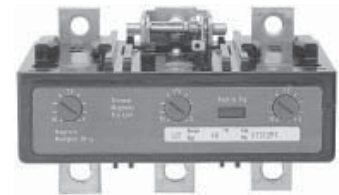
- Source Available:
  - Source-1 Present, 2-N.O. and 2-N.C.
  - Source-2 Present, 2-N.O. and 2-N.C.
- Switch Position:
  - Source-1 Position, 1-N.O. and 1-N.C.
  - Source-2 Position, 1-N.O. and 1-N.C.
- Pre-Transfer Signal Contacts 1-N.O. and 1-N.C.

### FAST, POWERFUL AND SAFE POWER SWITCHING MECHANISM

The power panel utilizes a unidirectional gear motor mechanism. The power panel can be operated manually under a full load.

### INTEGRAL OVERCURRENT PROTECTION CAPABILITY

The Service Entrance Molded Case Type Transfer Switch trip units are integrated in to the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space.



## CONFIGURABLE OPTIONS

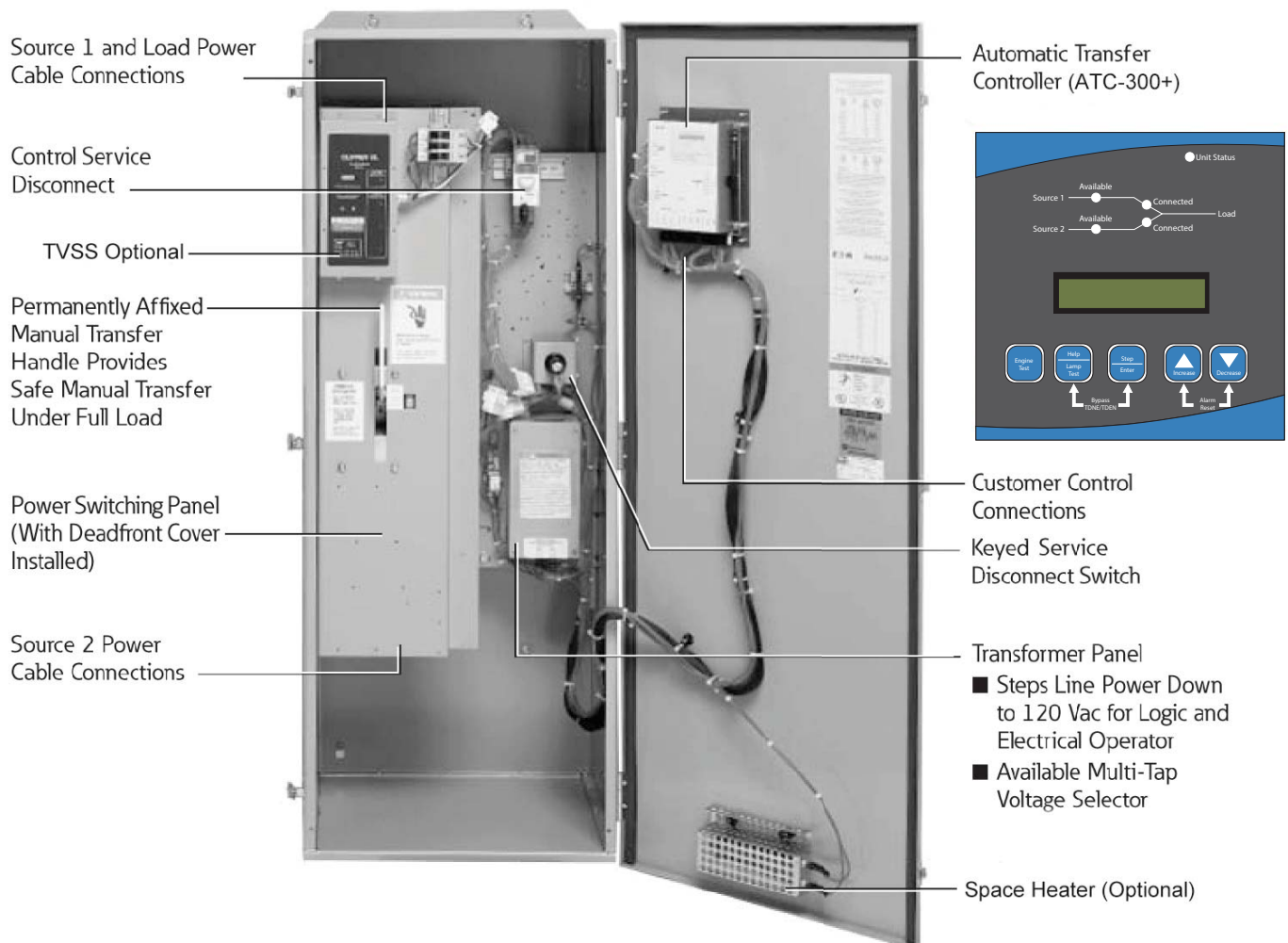
- ATC-900 Controller
- Digital Multi-Function Power Quality Metering
- Ethernet Connectivity
- Maintenance Selector Switch
- Remote Multi-Switch Annunciator Panel with Controller
- Remote Annunciator Panel with Controller
- Transient Voltage Surge Suppression (TVSS)
- Padlockable Cover for Controller
- Padlockable Cover for Device Panel
- Emergency Inhibit
- General Alarm Indication
- Selectable Retransfer
- Manual Generator Retransfer



# Power Series Transfer Switch

100 – 1,000 Amps

Service Entrance Rated · Molded Case Type · Open and Delayed Transition



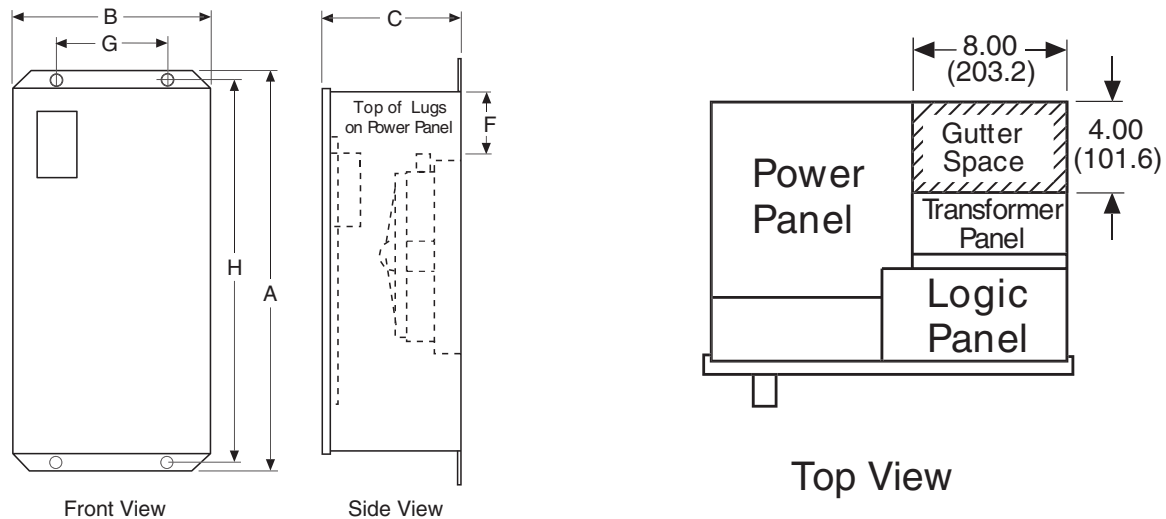
**Components of Automatic Transfer Switches**

# Power Series Transfer Switch

100 – 1,000 Amps

Service Entrance Rated · Molded Case Type · Open and Delayed Transition

## UNIT DIMENSIONS\*



### Service Entrance Rated, Molded Case Type, Open and Delayed Transition, 100 – 1,000 A

Amperes	Switch Type	in (mm)					Cu/Al			lbs (kg)
		A (Height)	B (Width)	C (Depth)	G (Horizontal)	H (Vertical)	Normal and Standby Source	Load Connection	Neutral Connection	Weight
Information provided is for 3-pole configurations and is subject to change. Does not apply to NEMA 4X. Alternate lug terminal sizes are available for some configurations. Contact factory.										
100	HFD	47.5 (1213)	20.8 (529)	15.2 (387)	10.8 (273)	46.4 (1180)	(1) #14-1/0	(1) #14-1/0	(3) #14-1/0	232 (105)
100	HFD <sup>1</sup>	35.6 (904)	20.1 (510)	11.3 (288)	10.8 (273)	34.3 (904)	(1) #14-1/0	(1) #14-1/0	(3) #14-1/0	150 (68)
200 – 225	HFD <sup>1</sup>	35.6 (904)	20.1 (510)	13.3 (339)	10.8 (273)	34.3 (904)	(1) #6-300	(1) #6-300	(3) #4-300	150 (68)
200 – 225	HKD	48.0 (1219)	20.8 (529)	16.7 (423)	11.0 (279)	45.5 (1156)	(1) #3-350	(1) #6-350	(3) #4-350	305 (138)
300	HKD	56.0 (1422)	20.8 (529)	16.7 (423)	11.0 (279)	53.5 (1359)	(1) #3-350	(1) #6-350	(3) #4-350	295 (134)
400	HKD <sup>2</sup>	64.0 (1626)	25.8 (656)	16.7 (423)	16.0 (406)	61.5 (1562)	(2) #1-500	(2) #1-500	(6) 250-350	340 (150)
400	HLD	64.0 (1626)	25.8 (656)	16.7 (423)	16.0 (406)	51.5 (1308)	(1) 4/0-600	(2) #1-500	(6) 250-350	425 (193)
600	HLD	64.0 (1626)	25.8 (656)	16.7 (423)	16.0 (406)	62.5 (1588)	(2) 3/0-350	(2) #1-500	(6) 250-350	475 (214)
600	HMDL	76.7 (1949)	25.8 (656)	17.8 (451)	16.0 (406)	75.2 (1909)	(2) #1-500	(2) #1-500	(6) 4/0-500	480 (218)
600 (Four-pole)	NB	76.7 (1949)	25.8 (656)	17.8 (451)	16.0 (406)	75.2 (1909)	(3) 3/0-400	(3) 3/0-400	(3) 3/0-400	600 (272)
800	HMDL	76.7 (1949)	25.8 (656)	17.8 (451)	16.0 (406)	75.2 (1909)	(3) 3/0-400	(3) 3/0-400	(12) 4/0-500	510 (232)
800 – 1,000	HNB	76.7 (1949)	25.8 (656)	17.8 (451)	16.0 (406)	75.2 (1909)	(4) 4/0-500	(4) 4/0-500	(12) 4/0-500	570 (259)

<sup>1</sup> Applies to three phase (208/120) and single phase (240/120 or 208/120) voltage configurations with ATC-300+ controller only

<sup>2</sup> Applies to 2-pole single phase (240/120 or 208/120) voltage configurations with ATC-300+ controller only

### UL 1008 Withstand and Closing Ratings

Ampere Rating	3-Cycle Rating (kA)			Rating when Used with Upstream Fuse		
	240 V	480 V	600 V (kA)	Max Fuse Rating	Fuse Type	600 V
100	100	65	25	200	J, T	200
200	100	65	25	400	J, T	200
225	100	65	35	400	J, T	200
300	100	65	35	400	J, T	200
400	100	65	35	400	J, T	200
600 <sup>3</sup>	100	65	35	1,200	J, T	200
800 <sup>3</sup>	65	50	25	1,600	L	200
1,000 <sup>3</sup>	65	50	25	1,600	L	200

<sup>3</sup> Four-pole units rated at 35 kA

\* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

# SD175 | 6.7L | 175 kW

## INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

### STANDBY POWER RATING

175 kW, 219 kVA, 60 Hz

### PRIME POWER RATING\*

158 kW, 197 kVA, 60 Hz



\*Built in the USA using domestic and foreign parts

\*EPA Certified Prime ratings are not available in the U.S. or its Territories.

\*\*Certain options or customization may not hold certification valid.

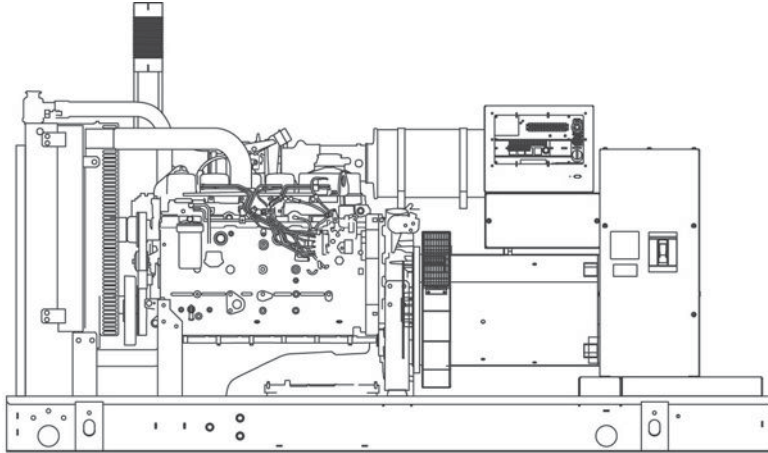


Image used for illustration purposes only

### CODES AND STANDARDS

Generac products are designed to the following standards:



UL2200, UL508, UL142, UL498



NFPA70, 99, 110, 37



NEC700, 701, 702, 708



ISO9001, 8528, 3046, 7637,  
Pluses #2b, 4



NEMA ICS10, MG1, 250, ICS6, AB1



ANSI C62.41

### POWERING AHEAD

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

## STANDARD FEATURES

## ENGINE SYSTEM

## General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Critical Exhaust Silencer (enclosed only)
- Factory Filled Oil
- Radiator Duct Adapter (open set only)

## Fuel System

- Fuel lockoff solenoid
- Primary fuel filter

## Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene glycol antifreeze
- 120 VAC Coolant Heater

## Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Solenoid activated starter motor
- Rubber-booted engine electrical connections

## ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 leads (3-phase, non 600 V)
- Class H insulation material
- Vented rotor
- 2/3 pitch
- Skewed stator
- Auxiliary voltage regulator power winding
- Amortisseur winding
- Brushless Excitation
- Sealed Bearings
- Automated manufacturing (winding, insertion, lacing, varnishing)
- Rotor dynamically spin balanced
- Full load capacity alternator
- Protective thermal switch

## GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Silencer Heat Shield
- Wrapped Exhaust Piping
- Silencer housed in discharge hood (enclosed only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Limited Warranty (Prime rated Units)
- Silencer mounted in the discharge hood (enclosed only)

## ENCLOSURE (IF SELECTED)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

## TANKS (IF SELECTED)

- UL 142
- Double wall
- Vents
- Sloped top
- Sloped bottom
- Factory pressure tested (2 psi)
- Rupture basin alarm
- Fuel level
- Check valve in supply and return lines
- Rhino Coat™ - Textured polyester powder coat
- Stainless hardware

## CONTROL SYSTEM



## Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)

- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection

- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

## Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Low Fuel Pressure Alarm
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

## CONFIGURABLE OPTIONS

## ENGINE SYSTEM

## General

- ☐ Oil Heater
- ☐ Industrial Exhaust Silencer

## Fuel System

- ☐ Flexible fuel lines
- ☐ Primary fuel filter

## Engine Electrical System

- ☐ 10A UL battery charger
- ☐ 2.5A UL battery charger
- ☐ Battery Warmer

## ALTERNATOR SYSTEM

- ☐ Alternator Upsizing
- ☐ Anti-Condensation Heater
- ☐ Tropical coating
- ☐ Permanent Magnet Excitation

## CIRCUIT BREAKER OPTIONS

- ☐ Main Line Circuit Breaker
- ☐ 2nd Main Line Circuit Breaker
- ☐ Shunt Trip and Auxiliary Contact
- ☐ Electronic Trip Breaker

## GENERATOR SET

- ☐ Gen-Link Communications Software (English Only)
- ☐ IBC Seismic Certification
- ☐ 8 Position Load Center
- ☐ 2 Year Extended Warranty
- ☐ 5 Year Warranty
- ☐ 5 Year Extended Warranty

## ENCLOSURE

- ☐ Weather Protected
- ☐ Level 1 Sound Attenuation
- ☐ Level 2 Sound Attenuation
- ☐ Steel Enclosure
- ☐ Aluminum Enclosure
- ☐ 150 MPH Wind Kit
- ☐ 12 VDC Enclosure Lighting Kit
- ☐ 120 VAC Enclosure Lighting Kit
- ☐ AC/DC Enclosure Lighting Kit
- ☐ Door Alarm Switch

## TANKS (Size on last page)

- ☐ Electrical Fuel Level
- ☐ Mechanical Fuel Level
- ☐ 8" Fill Extension
- ☐ 13" Fill Extension

## CONTROL SYSTEM

- ☐ 21-Light Remote Annunciator
- ☐ Remote Relay Panel (8 or 16)
- ☐ Oil Temperature Sender with Indication Alarm
- ☐ Remote E-Stop (Break Glass-Type, Surface Mount)
- ☐ Remote E-Stop (Red Mushroom-Type, Surface Mount)
- ☐ Remote E-Stop (Red Mushroom-Type, Flush Mount)
- ☐ Remote Communication - Modem
- ☐ Remote Communication - Ethernet
- ☐ 10A Run Relay
- ☐ Ground Fault Indication and Protection Functions

## ENGINEERED OPTIONS

## ENGINE SYSTEM

- ☐ Coolant heater ball valves
- ☐ Block Heaters
- ☐ Fluid containment pans

## ALTERNATOR SYSTEM

- ☐ 3rd Breaker Systems

## CONTROL SYSTEM

- ☐ Spare inputs (x4) / outputs (x4) - H Panel Only
- ☐ Battery Disconnect Switch

## GENERATOR SET

- ☐ Special Testing

## ENCLOSURE

- ☐ Motorized Dampers
- ☐ Door switched for intrusion alert
- ☐ Enclosure ambient heaters

## TANKS

- ☐ Overfill Protection Valve
- ☐ UL2085 Tank
- ☐ ULC S-601 Tank
- ☐ Stainless Steel Tank
- ☐ Special Fuel Tanks (MIDEQ and FL DEP/DERM, etc.)
- ☐ Vent Extensions

## RATING DEFINITIONS

**Standby** - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

**Prime** - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Generac
EPA Emissions Compliance	Stationary Emergency
EPA Emissions Reference	See Emissions Data Sheet
Cylinder #	6
Type	In-Line
Displacement - L (cu In)	6.7 (406.86)
Bore - mm (in)	104 (4.09)
Stroke - mm (in)	128 (5.2)
Compression Ratio	16.5:1
Intake Air Method	Turbocharged/Aftercooled
Cylinder Head Type	4 Valve
Piston Type	Alloy Aluminum
Crankshaft Type	Forged Steel

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	+/- 0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full Flow Cartridge
Crankcase Capacity - L (qts)	19.6 (20.7)

Cooling System

Cooling System Type	Closed Recovery
Water Pump	Belt Driven Centrifugal
Fan Type	Pusher
Fan Speed (rpm)	2538
Fan Diameter mm (in)	-
Coolant Heater Wattage	1500
Coolant Heater Standard Voltage	120 V /240 V

Fuel System

Fuel Type	Ultra Low Sulfur Diesel Fuel
Fuel Specifications	ASTM
Fuel Filtering (microns)	5
Fuel Injection	Electronic
Fuel Pump Type	Engine Driven Gear
Injector Type	Electronic
Fuel Supply Line mm (in)	12.7 (0.5) NPT
Fuel Return Line mm (in)	12.7 (0.5) NPT

Engine Electrical System

System Voltage	12 VDC
Battery Charging Alternator	Std
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	520
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	<50

Standard Excitation	Permanent Magnet
Bearings	Single Seated Cartridge
Coupling	Direct, Flexible Disc
Load Capacity - Standby	100%
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Digital
Number of Sensed Phases	3
Regulation Accuracy (Steady State)	± 0.25%

SD175 | 6.7L | 175 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

OPERATING DATA

POWER RATINGS

		Standby
Single-Phase 120/240 VAC @1.0pf	175 kW	Amps: 729
Three-Phase 120/208 VAC @0.8pf	175 kW	Amps: 607
Three-Phase 120/240 VAC @0.8pf	175 kW	Amps: 526
Three-Phase 277/480 VAC @0.8pf	175 kW	Amps: 263
Three-Phase 346/600 VAC @0.8pf	175 kW	Amps: 210

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip													
Alternator	kW	480 VAC						208/240 VAC					
		10%	15%	20%	25%	30%	35%	10%	15%	20%	25%	30%	35%
Standard	200	187	280	373	467	560	653	140	210	280	350	420	490
Upsize 1	250	263	395	527	658	790	922	197	296	395	494	593	692
Upsize 2	300	303	454	605	757	908	1059	227	341	454	568	681	794

FUEL CONSUMPTION RATES\*

Fuel Pump Lift - ft (m)		Diesel - gal/hr (l/hr)	
3 (1)		Percent Load	Standby
		25%	3.9 (14.8)
		50%	7.3 (27.6)
Total Fuel Pump Flow (Combustion + Return)		75%	10.5 (39.7)
29.0 gal/hr		100%	13.5 (51.1)

\* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow per Minute	gal/min (l/min)	44.6 (168.8)
Coolant System Capacity	gal (L)	7.5 (28.4)
Heat Rejection to Coolant	BTU/hr	497,718
Inlet Air	cfm (m³/hr)	7946 (13502)
Max. Operating Radiator Air Temp	F° (C°)	122 (50)
Max. Ambient Temperature (before derate)	F° (C°)	104 (40)
Maximum Radiator Backpressure	in H <sub>2</sub> O	0.5

COMBUSTION AIR REQUIREMENTS

		Standby
Flow at Rated Power	cfm (m³/min)	470 (13.31)

ENGINE

		Standby
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	279
Piston Speed	ft/min (m/min)	1559 (475)
BMEP	psi	257

\*\* Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m³/min)	1326 (37.55)
Max. Backpressure (Post Silencer)	inHg (Kpa)	1.5 (5.1)
Exhaust Temp (Rated Output)	°F (°C)	1040 (560)
Exhaust Outlet Size (Open Set)	mm (in)	101.6 (4)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

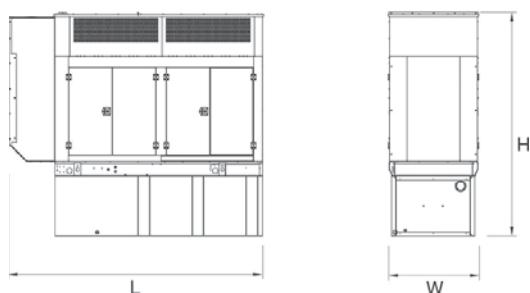
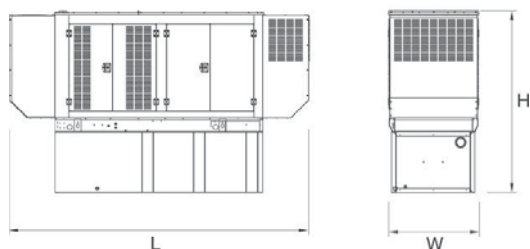
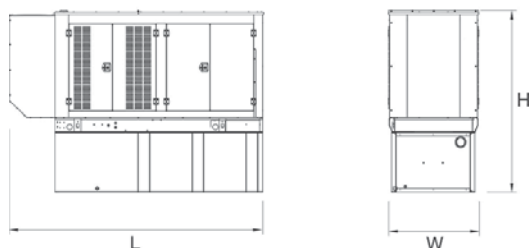
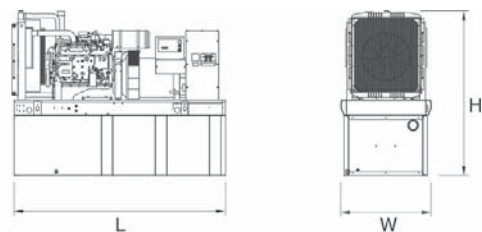


# SD175 | 6.7L | 175 kW

## INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

### DIMENSIONS AND WEIGHTS\*



YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

#### OPEN SET

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Tank & Open Set
NO TANK	-	117 (2972) x 50 (1270) x 57 (1448)	3980 (1805)
10	134 (507)	117 (2972) x 50 (1270) x 71 (1803)	4764 (2161)
24	322 (1219)	117 (2972) x 50 (1270) x 82 (2083)	5052 (2292)
38	510 (1930.6)	117 (2972) x 50 (1270) x 94 (2388)	5345 (2424)
51	693 (2623.3)	136 (3454) x 53 (1346) x 98 (2489)	5575 (2530)
70	946 (3581)	208 (5283) x 53 (1346) x 98 (2489)	7005 (3117)
98	1325 (5015.7)	278 (7061) x 53 (1346) x 96 (2438)	8020 (3638)

#### STANDARD ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	143 (3632) x 50 (1270) x 68 (1727)	850 (386)	280 (127)
10	134 (507)	143 (3632) x 50 (1270) x 81 (2057)		
24	322 (1219)	143 (3632) x 50 (1270) x 93 (2362)		
38	510 (1930.6)	143 (3632) x 50 (1270) x 105 (2667)		
51	693 (2623.3)	143 (3632) x 53 (1346) x 109 (2769)		
70	946 (3581)	208 (5283) x 53 (1346) x 109 (2769)		
98	1325 (5015.7)	278 (7061) x 53 (1346) x 107 (2718)		

#### LEVEL 1 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	168 (4267) x 50 (1270) x 68 (1727)	1050 (476)	347 (157)
10	134 (507)	168 (4267) x 50 (1270) x 81 (2057)		
24	322 (1219)	168 (4267) x 50 (1270) x 93 (2362)		
38	510 (1930.6)	168 (4267) x 50 (1270) x 105 (2667)		
51	693 (2623.3)	168 (4267) x 53 (1346) x 109 (2769)		
70	946 (3581)	234 (5944) x 53 (1346) x 109 (2769)		
98	1325 (5015.7)	304 (7722) x 53 (1346) x 107 (2718)		

#### LEVEL 2 ACOUSTIC ENCLOSURE

RUN TIME HOURS	USABLE CAPACITY GAL (L)	L x W x H in (mm)	WT lbs (kg) - Enclosure Only	
			Steel	Aluminum
NO TANK	-	143 (3632) x 50 (1270) x 92 (2337)	1250 (567)	413 (187)
10	134 (507)	143 (3632) x 50 (1270) x 105 (2667)		
24	322 (1219)	143 (3632) x 50 (1270) x 117 (2972)		
38	510 (1930.6)	143 (3632) x 50 (1270) x 129 (3278)		
51	693 (2623.3)	143 (3632) x 53 (1346) x 133 (3378)		
70	946 (3581)	208 (5283) x 53 (1346) x 133 (3378)		
98	1325 (5015.7)	278 (7061) x 53 (1346) x 131 (3327)		

\*All measurements are approximate and for estimation purposes only. Sound dBA can be found on the sound data sheet. Enclosure Only weight is added to Tank & Open Set weight to determine total weight.

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.



## H-100 CONTROL PANEL



The Quiet-Test™ H-100 Control Panel is a digital microprocessor electronic controller that integrates all engine and transfer switch functions into a single control system.

- Digital Controls for All Safety Shutdowns
- Isochronous Governor Control
- Digital 3 Phase Sensing Voltage Regulator
- Sealed Digital Circuit Board
- Mates with HTS Transfer Switch and Any 2-wire Start ATS
- Alarm and Event Logging
- Built-in Diagnostics
- Internal PLC

### Features

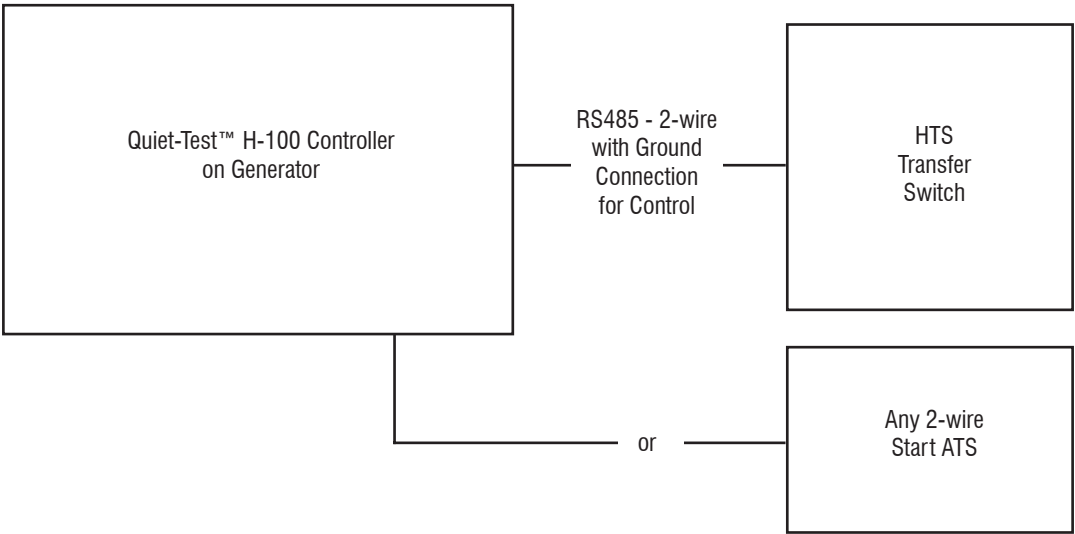
- Two 4-line x 20 Displays
- Full System Status
- 3 Phase Sensing Digital Voltage Regulator
- Remote Ports
  - RS232
  - RS485
  - CANbus
- Waterproof Connections
- Built -in PLC
- Full Range Standby Operation
- Full System Status
  - 3 Phase AC Volts
  - 3 Phase Amps
  - kW
  - Power Factor
  - Reactive Power
  - Oil Pressure
  - Water Temperature
  - Water Level
  - Oil Temperature (Optional)
  - Fuel Pressure
  - Engine Speed
  - Battery Voltage
  - Alternator Frequency
  - Time
  - Date
  - Transfer Switch Status
  - Run Hours
  - Service Reminders
  - Trending
  - Fault History (Alarm Log)
  - I<sup>2</sup>T Function for Full Generator Protection
- Shutdowns
  - Overvoltage
  - Overspeed
  - Low Oil Pressure
  - High Coolant Temperature
  - Low Coolant Level
- Remote Communications
- Configurable to NFPA 110, Level 1 or 2
- Programmable Auto Crank
- Emergency Stop
- On/Off/Manual Switch
- Not in Auto Flashing Light
- Audible Alarm for Fault Condition
- Transfer Switch Logic Communicates with HTS Transfer Switch
- Selectable Low Speed Exercise
- Temperature Range: -40° to +70°C

The generator set parameters can be manipulated and monitored without standing in front of the control panel with GenLink® software. The Generac H-100 control panel also monitors and controls transfer switch functions when used with the HTS transfer switch.

- Monitors Utility Voltage
- Monitors Generator Voltage
- Timer for Line Interrupt Delay
- Timer for Engine Warmup
- Timer for Minimum Engine Run Time
- Timer for Return to Utility Position
- Timer for Engine Cooldown
- Built-in Exerciser Timer (7 Day)
- Additional 2-wire Start Controls for Any 2-wire Transfer Switch

# H-100 CONTROL PANEL

## Typical Control Connection



## GENprotect™

# Seamless Protection for Industrial Power Generators

### GENprotect Operation

The design choice of an onsite power system using a Generac Industrial Power Generator assures your emergency power source is protected from unexpected power distribution faults. Typically, a generator will include some type of over-current device, such as a circuit breaker, or be protected by inherent design with the controller protecting the alternator through a protection algorithm. Generac's GENprotect generator protection system monitors the system current output and protects the alternator with extended security against fault scenarios that could occur within the site's downstream distribution system.

It is a common misconception that the alternator's main circuit breaker protects the alternator from a short circuit event. The main output breaker protects the cabling and provides a convenient disconnect. The characteristic trip curve for the industry standard thermal magnetic breaker (MCCB, molded case thermal magnetic or solid state) does not coordinate with the thermal damage limitation for an on-site generator. If circuit breakers are used for generator protection, a solid-state circuit breaker with full adjustments (Long Time, Short Time and Instantaneous, LSI) is required to coordinate the breaker protection curve within the generator thermal damage curve. Historically, this limitation was often accepted in system design since failures of the main generator feeder are extremely rare. Most short circuit events happen at a branch circuit, equipment level, where the fault is easily cleared by the smaller down stream breakers.

Given the mission critical nature of today's back-up power applications, it is more desirable to protect the system against even relatively rare failure modes. As generator controllers have become more powerful it is feasible for manufactures to supply coordinated short circuit protection integral to the generator control system, negating the need for a main-line circuit breaker.

Generac's GENprotect alternator protection algorithm monitors the generator output. If this monitoring senses short circuit current in excess of rated amps, GENprotect steps in to provide a controlled and safe approach to breaker coordination and alternator protection. GENprotect first limits the alternator short circuit current level to 300%. By limiting the available fault current, GENprotect extends the time the alternator can maintain fault current resulting in consistent breaker coordination. Without this functionality a

line to neutral fault may be at 800% of rated current and need to be cleared within 1.4 seconds. The second function GENprotect performs is I<sup>2</sup>T thermal protection for the alternator. Since a short circuit event can heat the alternator so rapidly, it is not possible to protect the alternator by monitoring temperature. Instead GENprotect calculates the heat energy of the fault current. When this energy reaches the limits of NEMA MG1, GENprotect trips the generator off-line. This configuration ensures the alternator is protected and the power system is ensured 10 seconds of 300% fault current for breaker coordination.

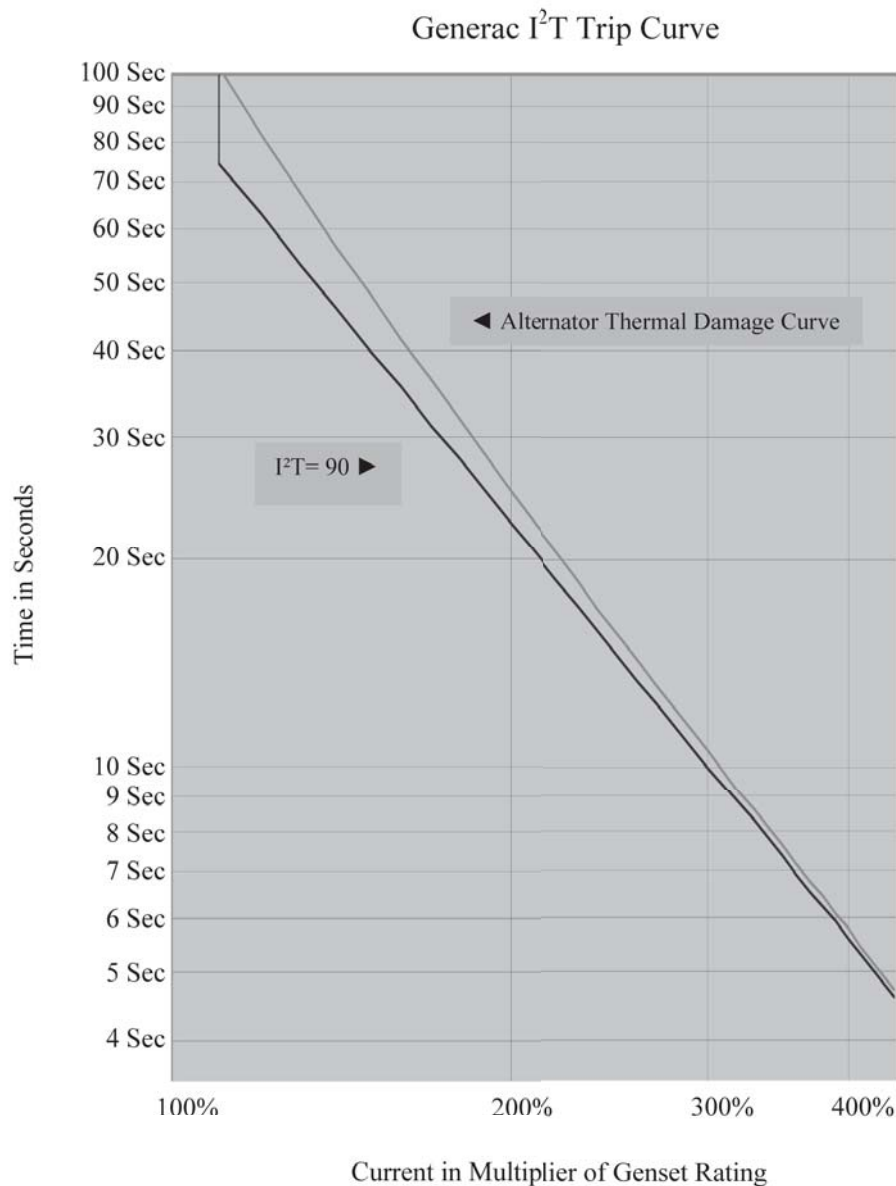
### DESCRIPTION

- GENprotect is an alternator protection algorithm approved by UL.
- Protects alternator from damage due to shorts and electrical faults.
- Provides breaker coordination and alternator protection.
- Allows for use of multiple circuit breaker choices, including "no" breaker.



# GENprotect™

## Seamless Protection for Industrial Power Generators



The above Figure shows the Generac GENprotect thermal protection curve for use in protection and coordination studies. The alternator Thermal Damage Curve is shown just to the right of the GENprotect protection curve. If the alternator load is greater than the thermal damage protection curve for the alternator, the generator set will trip off-line. For example, an overload current of 110% for 75 seconds causes an overload alarm and will trip the generator off-line, shutting down the engine. GENprotect will provide generator protection over a full range of time and current, from instantaneous faults to overloads lasting several minutes. An advantage of GENprotect over a MCCB is that GENprotect allows for downstream breakers to clear faults without tripping the generator off-line, providing selective coordination with the first level of downstream breakers.

## INDUSTRIAL GENSET - BATTERY INDEX

• Warranty by Exide Corp. • Exide e-mail: tbгна@exide.com • 800-782-7848 National Hot line

### INDUSTRIAL SPARK-IGNITED GENSETS - AVAILABLE BATTERIES

INDUSTRIAL SPARK-IGNITED GENSETS - AVAILABLE BATTERIES					GENERAC PART #			
Engine	System Voltage	Battery Quantity	058208 (Group 24F)	077483 (Group 26)	058665 (Group 27F)	061119 (Group 31)	061104 (Group 8D)	BT0015A02 (Group 8D)
G2.4	12	1		X				
G4.5	12	1			X	X		
G9.0	12	1			X	X		
G14.2	24	2					X	
G21.9	24	2					X	
G25.8	24	2					X	
G33.9	24	4					X	
G49.0	24	4					X	X

### INDUSTRIAL DIESEL GENSETS - AVAILABLE BATTERIES

Engine	System Voltage	Battery Quantity	GENERAC PART #			
			058665 (Group 27F)	061119 (Group 31)	061104/BT0015A00 (Group 8D)	BT0015A02 (Group 8D)
D2.2 Perkins	12	1	X	X		
D2.4 Generac	12	1	X	X		
D3.4 Generac	12	1	X	X		
D4.5 FPT	12	1		X		
D6.7 FPT 100, 130kW	12	1 or 2 <sup>†</sup>		X		
<b>D6.7 FPT 150, 175kW</b>	<b>12</b>	<b>2<sup>†</sup></b>		<b>X</b>		
D8.7 FPT	24	2		X		
D10.3 FPT	24	2		X	X	
D12.9 FPT	24	2		X	X	
D12.5 Perkins	24	2			X	
D15.2 Perkins	24	2			X	
D16.0 Volvo	24	2		X	X	
D18.1 Perkins	24	2			X	
D33.9 MHI	24	2			X	X
D37.1 MHI	24	4			X	X
D49.0 MHI	24	4			X	X
D65.4 MHI	24	4			X	X

Part Number	Group Number*	Nominal CCA @ 0° F	DIMENSIONS (in) NOMINAL		
			L	W	H
058208	24F	525	6.75	10.63	9.00
077483	26	525	6.75	8.25	7.75
058665	27F	700	6.75	12.50	9.00
<b>061119</b>	<b>31</b>	<b>925</b>	<b>6.75</b>	<b>13.00</b>	<b>9.40</b>
061104/ BT0015A00	8D	1,155	11.00	20.80	10.00
BT0015A02	8D	1,300	11.00	20.80	10.00

All batteries are 12V, 6 cell construction, lead calcium type.  
For 24V systems, batteries are wired in series.

X Battery available with electrolyte and installed in genset.

<sup>†</sup> Single or dual-parallel battery options are available on 100 and 130kW. Single-battery option not available on 150 and 175kW.

\* BCI Group Size reference.

## GENERATOR ENCLOSURES



### DESCRIPTION

GENERAC POWER SYSTEMS' generator enclosures provide year-round weather protection for your power equipment. Engineered with functionality and value in mind, the enclosure design benefits are unique in that the enclosures utilize dimensionally matched components for either a weather protective configuration or a sound attenuated/acoustic configuration. With common components used between design, modification and on-site upgrades can be accomplished with ease.

The enclosure design offers several benefits over the "standard enclosures" of other manufacturers. Generac's enclosures have been created with the goal of maximizing the customer's product performance satisfaction while maintaining the functionality of reducing exterior noise levels and discouraging product tampering.

Although others may require a "premium" for a self-enclosed exhaust system, rugged steel panel construction or protective polyethylene washers under all exterior panel fasteners, Generac includes these and several other features on every enclosure configuration. Be sure to compare. Generac Enclosures offer additional design enhancement extras that other "standard enclosures" do not.

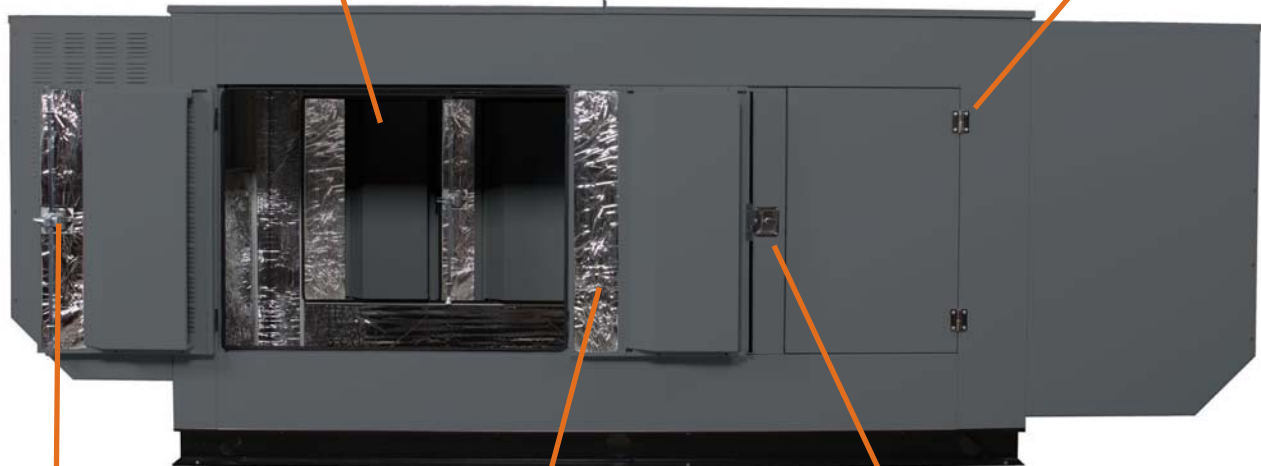
## GENERATOR ENCLOSURES

**Post-Free Twin Doors**  
Provide Large, Unobstructed Service Access



**Gasket-Free, Interconnected Roof Panel Joint**  
Drip-Free, Maintenance-Free

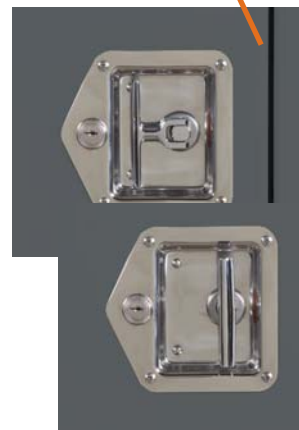
**Heavy Gauge, Stainless Steel, Partial Pin Hinges with Nylon Spacers**  
Durable, Corrosion-Free, Removable Doors



**Two-Point Door Latch System**  
Ensures Proper Seal  
Preventing Water Ingress  
and Sound Egress



**Dense, Closed-Cell Foam Insulation with Reflective Silver Mylar Layer**  
Improved Sound Attenuation Without Damaging Effects From Radiant Heat Exposure



**Lockable Turn and Tuck Stainless Steel Latch Handle**  
Corrosion-Free, Non-Protruding and Secure



## GENERATOR ENCLOSURES

### FEATURES:

Dimensional matching of acoustic and non-acoustic enclosure designs

Standardized enclosure components \*

Enclosure mounted directly to unit baseframe

Electrostatically painted panels

12 or 14 gauge steel based on kW rating

Aluminum Enclosure optional

Stainless steel door latch and hinge hardware

Stainless steel door latch strike plate

Door hinges utilize slip-pin design

Polyethylene gasketing under door hinges

Keyed door latches

Large removable access doors

Relocation of access doors

Redesigned door gasketing

Weather resistant aluminum roof design with drip ledge

Cabled and gasketed radiator access cover

Acoustic roof panels manufactured with mechanical retention pins

Polyethylene washers under all panel fasteners

Internally fastened enclosure panels (where possible)

Additional roof panel stiffener

Self-enclosed exhaust system

Discharge air duct has been designed with minimal fasteners

Stainless steel exhaust band clamps

Drain holes within air ducts

Rodent-proof, tamper proof enclosure design

Redesigned baseframe lifting lugs

Up to 200 MPH wind kit options (Contact Factory for Availability)

### BENEFITS:

Reduces variation in fuel tank pricing, inventory; removes need to change out fuel tank or retrofit

Ease of retrofit or upgrade to acoustic system; reduced parts inventory, costs

Simplified delivery and installation with enclosure and unit in single component design

Maximum protection from weather elements

Maximum sound attenuation, protection and product life

Prevents corrosion in coastal regions

Provides extended component life; maximum protection against rusting

Maximum protection against enclosure paint damage from door latch pin

Provides quick door removal for full-unit access

Additional protection for enclosure paint finish

Protection for equipment and personnel

Ease of maintenance

Provides improved access to MLCB on all units

Improved sealing quality from sound and weather elements

Provides optimum moisture/rain runoff from unit

Provides improved radiator access and additional protection from weather elements

Increased acoustic foam retention within unit

Additional paint finish protection from stainless steel fastener

Provides streamlined unit appearance

Added overall compartment rigidity and acoustic foam panel retention

Provides safe unit operation; no enclosure hot spots; streamlined unit appearance

Ease of removal and access to exhaust system

Provides extended component life; ensures proper exhaust seal

Enables maximum water run-off

Safety and security for personnel and equipment

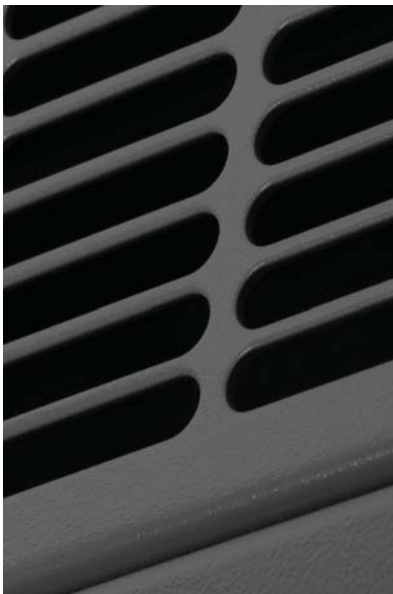
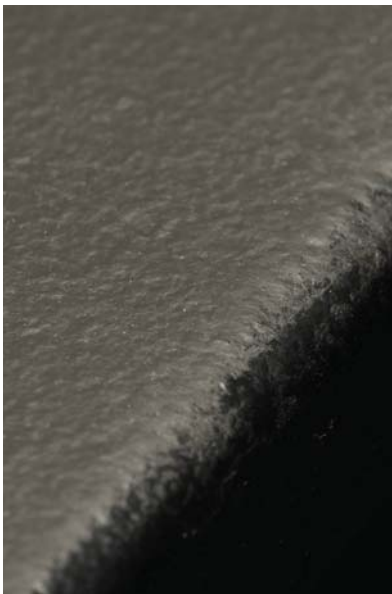
Ease of unit relocation; prevents compartment damage from lifting straps

Meets locally enforced wind requirements

\* Consult Generac Power Systems, Inc. for installation drawings for specific configurations and dimensions.



# RhinoCoat™



Generac's RhinoCoat™ finish system provides superior durability as a standard for all Generac Industrial enclosures, tanks and frames.\*

## Testing Standards

Generac's RhinoCoat™ finished surfaces are subjected to numerous tests. These include:

- ASTM D - 1186 - 87.....2.5+ MIL Paint Thickness
- ASTM D - 3363 - 92a.....Adequate Material Hardness
- ASTM D 522 - B.....Resistant to Cracking
- ASTM D 3359 - B.....Exceptional Adhesion
- ASTM B117 D 1654.....Resistant to Salt Water Corrosion
- ASTM D1735 D 1654.....Resistant to Humidity
- ASTM 2794 93 (2004).....Exceptional Impact Resistance
- SAEJ1690 - UV Specifications.....UV Protection

In addition to the testing standards above, Generac adds the following test requirements more specific to generator applications:

- Resistant to Typical Oils
- Resistant to Typical Fuels
- Resistant to Typical Antifreeze
- Resistant to Distilled Water

## Primary Codes and Standards



\*RhinoCoat™ powder coat paint is durable and corrosion resistant however it is not a rust preventative. Generac pretreats all powder coated parts to assist with resistance to corrosion.

# EATON CIRCUIT BREAKERS

## 100% Rated Thermal-Magnetic

AMPS	VOLTS	ACCESSORIES	EATON PART #	SERIES	FRAME	GENERAC PART#
70	600	No Accessories	JGE3070FAGC	G	JG-FRAME	0H9302TH00
		Shunt Trip & Aux. Contacts	JGE3070FAGCA2 **			0H9302TH ***
80		No Accessories	JGE3080FAGC			0J0841TH00
		Shunt Trip & Aux. Contacts	JGE3080FAGCA2 **			0J0841TH ***
90		No Accessories	JGE3090FAGC			0J0837TH00
		Shunt Trip & Aux. Contacts	JGE3090FAGCA2 **			0J0837TH ***
100		No Accessories	JGE3100FAGC			0H9314TH00
		Shunt Trip & Aux. Contacts	JGE3100FAGCA2 **			0H9314TH ***
125		No Accessories	JGE3125FAGC			0J0231TH00
		Shunt Trip & Aux. Contacts	JGE3125FAGCA2 **			0J0231TH ***
150		No Accessories	JGE3150FAGC			0H9315TH00
		Shunt Trip & Aux. Contacts	JGE3150FAGCA2 **			0H9315TH ***
175		No Accessories	JGE3175FAGC			0H9316TH00
		Shunt Trip & Aux. Contacts	JGE3175FAGCA2 **			0H9316TH ***
200		No Accessories	JGE3200FAGC			0J0232TH00
		Shunt Trip & Aux. Contacts	JGE3200FAGCA2 **			0J0232TH ***
225		No Accessories	JGE3225FAGC			0H9317TH00
		Shunt Trip & Aux. Contacts	JGE3225FAGCA2 **			0H9317TH ***
250		No Accessories	JGE3250FAGC			0H9318TH00
		Shunt Trip & Aux. Contacts	JGE3250FAGCA2 **			0H9318TH ***
300		No Accessories	LGE3300FAGC		LG-FRAME	0H9319TH00
		Shunt Trip & Aux. Contacts	LGE3300FAGCA2 **			0H9319TH ***
350		No Accessories	LGE3350FAGC			0H9320TH00
		Shunt Trip & Aux. Contacts	LGE3350FAGCA2 **			0H9320TH ***
400		No Accessories	LGE3400FAGC			0H9321TH00
		Shunt Trip & Aux. Contacts	LGE3400FAGCA2 **			0H9321TH ***
500		No Accessories	LGE3500FAGC			0H9323TH00
		Shunt Trip & Aux. Contacts	LGE3500FAGCA2 **			0H9323TH ***
600		No Accessories	LGE3600FAGC			0H9324TH00
		Shunt Trip & Aux. Contacts	LGE3600FAGCA2 **			0H9324TH ***
700*		No Accessories	CMDLB3800T33W	C	M-FRAME	0H9325TH00
		Shunt Trip & Aux. Contacts	CMDLB3800T33WA13S02			0H9325THB0
800*		No Accessories	CMDLB3800T33W			0H9326TH00
		Shunt Trip & Aux. Contacts	CMDLB3800T33WA13S02			0H9326THB0
900 <sup>1</sup>		No Accessories	NGS312033MCZ08	G	NG-FRAME	0H9327TH00
		Shunt Trip & Aux. Contacts	NGS312033MCA12S03Z08			0H9327THB0
1,000 <sup>1</sup>		No Accessories	NGS312033MCZ08			0H9328TH00
		Shunt Trip & Aux. Contacts	NGS312033MCA12S03Z08			0H9328THB0
1,200 <sup>1</sup>		No Accessories	NGS312033MCX23Y08			0H9329TH00
		Shunt Trip & Aux. Contacts	NGS312033MCA12S03Y08			0H9329THB0
1,400 <sup>1</sup>		No Accessories	RGH316033MCY22		RG-FRAME	0H9360TH00
		Shunt Trip & Aux. Contacts	RGH316033MCA12S21Y22			0H9360THB0
1,600 <sup>1</sup>		No Accessories	RGH316033MCY22			0H9361TH00
		Shunt Trip & Aux. Contacts	RGH316033MCA12S21Y22			0H9361THB0
2,000 <sup>1</sup>		No Accessories	RGH320033MC			0H9367TH00
		Shunt Trip & Aux. Contacts	RGH320033MCA12S21			0H9367THB0

\*LS-type electronic trip breaker RMS 310 trip unit. <sup>1</sup>LS-type electronic trip breaker equipped with RMS 310+ trip unit.

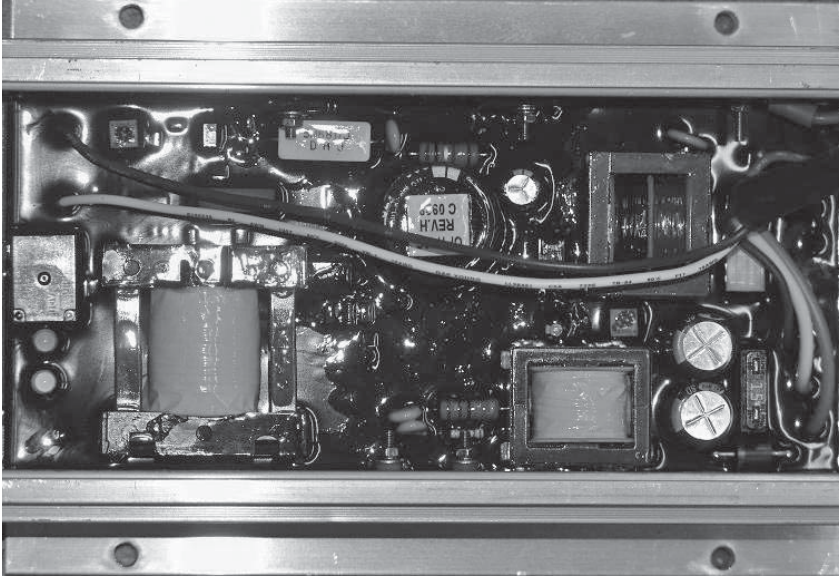
To finish part numbers with either a \*\* or \*\*\* Please see data below:

\*\* 12V System, Use - S4  
24V System, Use - S6

\*\*\* 12V System, use B0  
24V System, use C0

## BATTERY CHARGER

### 2.5 amp and 10 amp



Battery charger shown from inside of control panel enclosure.  
Connections are made via an attached harness.

The Generac 2.5 amp 12 volt and 10 amp 12/24 volt battery chargers are designed to work with Generac Industrial Controls to provide the ultimate in automatic battery voltage maintenance.

The 2.5 amp charger is self-regulating and produces instantaneous output current adjustments to keep the battery charged to an optimum level. Battery voltage is read on the control panel digital display.

The 10 amp charger has automatic float and equalize control. It precisely monitors the battery's voltage and automatically activates the correct charging mode. The charge rate is limited and controlled to efficiently and safely maintain ideal battery levels under varying conditions.

The equalize system uses a control circuit to limit charging current to 10 amps. When battery voltage drops below a preset level, charging current increases to 5 amps and then to the 10 amp charge rate if needed. When the battery reaches maximum charge, the charger switches to float mode to supply just enough current to maintain the battery at or above 13/26 volts. Battery voltage and charging current are read at the control panel digital display.

Specifications	2.5A	10A
Nominal Input	120 VAC	120 VAC
Operating AC Line Voltage Range	108 to 132 VAC	108 to 132 VAC
Input AC Line Frequency	50/60 Hz	50/60 Hz
Battery Fuse	N/A	15 A
Nominal Charge Rate	2.5 A	10 A
Equalize Voltage	N/A	13.8/27.6 V
Float Voltage	13.4 V	13.0/26.0 V
Current @ Equalize to Float Transition	N/A	5 A
Battery Under-voltage shutdown	N/A	11/22 V
LED Indicators	No	Yes
AC Line Voltage	N/A	Green LED
Battery Connected and Charging	N/A	Yellow LED
Battery Current Drain	30 mA	30 mA
AC Line Connection	Connector Plug	Connector Plug
Battery Connection	Connector Plug	Connector Plug
Control Connection		AC Power Fail Form Relay Form C 2 A Rating
CUL Recognized	Yes	Yes
NFPA 110 Compliant	No	Yes
AGM Compatible	No	Yes
UL1236	No	Yes
CSA 22.2 No. 107	No	Yes



## EATON CIRCUIT BREAKER DATA LUG INFORMATION

### Eaton Series C Circuit Breaker Lugs

Amps	Series	Frame	Standard Lug	
			Eaton Part #	Wire (QTY) Size
15-70	C	G	-	(1) #10-1/0
15-100	C	F	3T100FB	(1) #14-1/0
125-200	C	F	3TA225FD	(1) #4-4/0
225	C	F	3TA225FDK	(1) #6-300MCM
250	C	J	TA250KB	(1) #4-350MCM
300	C	K	TA350K	(1) 250-500MCM
350-400	C	K	3TA400K	(2) 3/0-250MCM
450-500	C	L	TA602LD	(2) 3/0-350MCM
600	C	L	3TA603LDK	(2) 400-500MCM
700-800	C	M	TA800MA2	(3) 3/0-400MCM
900-1,000	C	N	T1200NB3	(4) 3/0-400MCM
1,200	C	N	TA1201NB1	(3) 500-750MCM

### Eaton Series G Circuit Breaker Lugs

Amps	Series	Frame	Standard Lug	
			Eaton Part #	Wire (Qty) Size
50-250	G	JG	TA250FJ	(1) #8-350MCM
300-600	G	LG	3TA632LK	(2) #2-500MCM
900-1,200	G	NG	TA1201NB1	(3) 500-750MCM
1,400-1,600	G	RG	T1600RD	(4) 1-600MCM
2,000	G	RG	Lugs Not Included	
2,500	G	RG	Lugs Not Included	

# Power Series Transfer Switch

ATC-300+

Open and Delayed Transition Controller

- Automatic Transfer Switch, Open and Delayed Transition Controller
- Up to 600 VAC, 50/60 Hz
- Single and Three Phase
- UL Recognized Component

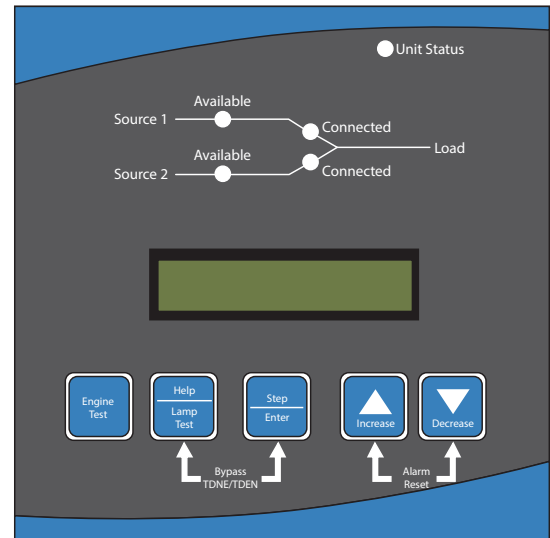


Image used for illustration purposes only

## Codes and Standards



UL recognized component, complies with UL1008 and UL991



NFPA 37, 70, 99, 110 (complies)



Applicable for use in NEC 700, 701, 702, 708



ISO 3046, 7637, 8528, 9001, Pluses #2b, 4



ANSI C62.41



Seismic IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012) Certified in ATS assemblies



IEC 61000-4-2, 3, 4, 5, 6, 11 EMC Testing and Measuring (complies)



FCC Part 15, Class A (complies)

CISPR 11, Class A

## Description

The ATC-300+ microprocessor-based ATS controller is unmatched in performance, reliability and functionality for critical operating, emergency, legally required and optional power systems. The easy to use front LCD display panel simplifies programming, routine operation, data presentation, and setting adjustments. The mimic diagrams displays source availability and connection, providing “at a glance” indication, further simplifying users interface. Designed beyond industry EMC standards, the ATC-300+ is rock-solid for transfer control operations, monitoring and reporting.

Customer/factory established parameters are stored in non-volatile memory. The controller has field-programmable time delays, plus displays real-time and historical information with a time-stamped history log. System testing is performed via a front screen test pushbutton. Features also include programmable plant exerciser—OFF, daily, 7, 14, 28-day interval programmable run times. With the standard features of pretransfer contacts, 3 phase sensing on utility and generator source, phase unbalance, phase reversal, load shed/emergency inhibit, and communications (Modbus® RTU) the ATC-300+ is the industry benchmark for transfer switch controllers. The ATC-300+ complies with UL 1008 / CSA C22.2-178.

# Power Series Transfer Switch

ATC-300+

Open and Delayed Transition Controller

## STANDARD FEATURES

### GENERAL

- Monitors Both Voltage and Frequency on Utility and Generator
- Provides Undervoltage and Overvoltage Protection of the Utility and Generator Power Sources
- Provides Underfrequency and Overfrequency Protection of the Utility Generator Power Source
- Permits Easy Customer Set Up
- Displays Real-time and Historical Information
- Permits System Testing
- Stores Customer/Factory Established Parameters in Nonvolatile Memory
- Provides Faceplate Source Status Indications

### INPUT FUNCTIONS

- Help/Lamp Test
- Engine Test
- Step/Enter
- Increase
- Decrease
- Alarm Reset
- Bypass Time Delay

### OUTPUT FUNCTIONS

- Unit Status
- Utility Available
- Utility Connected
- Generator Available
- Generator Connected

#### Source 1, Source 2, and Load LEDs:

Shows status of both Sources and Load.

#### Step/Enter Button:

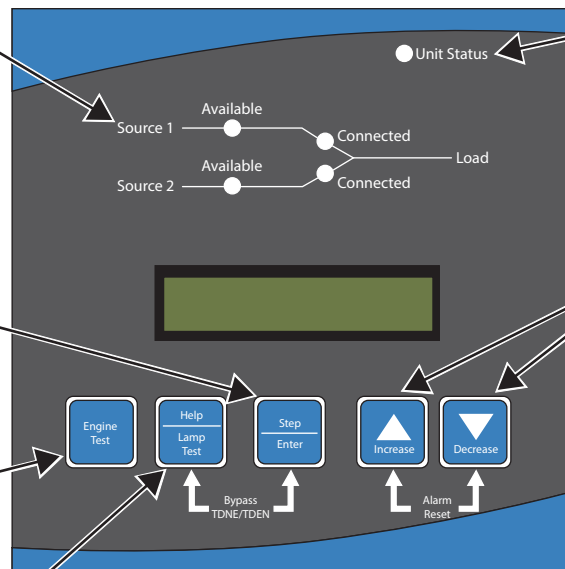
Allows for navigation through information and setpoint displays.

#### Engine Test Button:

Allows for testing of the Source 2 (generator) engine.

#### Help/Lamp Test Button:

Displays additional information about what is on the screen or, when pressed from the Home Screen, momentarily illuminates all LEDs and displays information such as the controller serial number and firmware version.



#### Unit Status LED:

Blinks once per second while the controller is in "Run" mode to indicate the controller has completed a self-diagnostic and system diagnostic cycle.

#### Increase/Decrease Buttons:

Increase or decrease setpoint values.



# Power Series Transfer Switch

ATC-300+

Open and Delayed Transition Controller

## SPECIFICATIONS AND PROGRAMMABLE SETPOINTS

### SPECIFICATIONS

System Application Voltage	Up to 600 VAC RMS	50/60 Hz
Input Control Voltage	65 to 145 VAC	50/60 Hz
Voltage Measurements of	Utility VAB	Generator VAB
	Utility VBC	Generator VBC
	Utility VCA	Generator VCA
Voltage Measurement Range	0 to 790 VAC RMS	50/60 Hz
Voltage Measurement Accuracy	$\pm 1\%$ of Full Scale	
Frequency Measurements of	Utility and Generator (Source 1 and Source 2)	
Frequency Measurement Range	40 Hz to 70 Hz	
Frequency Measurement Accuracy	$\pm 0.3$ Hz Over the Measurement Range	
Operating Temperature Range	-4 to +158 °F (-20 to +70 °C)	
Storage Temperature Range	-22 to +185 °F (-30 to +85 °C)	
Operating Humidity	0 to 95% Relative Humidity (Non-condensing)	
Operating Environment	Resistant to Ammonia, Methane, Nitrogen, Hydrogen, and Hydrocarbons	
Generator Start Relay	5 A, 1/6 HP @ 250 VAC 5 A @ 30 VDC with a 150 W Maximum Load	
K1, K2 Relays	10 A, 1-3 HP @ 250 VAC	
	10 A @ 30 VDC	

### PROGRAMMABLE SETPOINTS

Undervoltage Dropout Range	Breaker/Switch Style ATS	50% to 97% of the Nominal System Voltage
	Contactactor Style ATS	78% to 97% of the Nominal System Voltage
Undervoltage Pickup Range	Breaker/Switch Style ATS	(Dropout +2%) to 99% of the Nominal System Voltage
	Contactactor Style ATS	(Dropout +2%) to 99% of the Nominal System Voltage
Overvoltage Dropout Range	Breaker/Switch Style ATS	105% to 120% of the Nominal System Voltage
	Contactactor Style ATS	105% to 110% of the Nominal System Voltage
Overvoltage Pickup Range	Breaker/Switch Style ATS	103% to (Dropout -2%) of the Nominal System Voltage
	Contactactor Style ATS	103% to (Dropout -2%) of the Nominal System Voltage
Underfrequency Dropout Range	Breaker/Switch Style ATS	90% to 97% of the Nominal System Frequency
	Contactactor Style ATS	90% to 97% of the Nominal System Frequency
Underfrequency Pickup Range	Breaker/Switch Style ATS	(Dropout +1Hz) to 99% of the Nominal System Frequency
	Contactactor Style ATS	(Dropout +1Hz) to 99% of the Nominal System Frequency
Overfrequency Dropout Range	Breaker/Switch Style ATS	103% to 110% of the Nominal System Frequency
	Contactactor Style ATS	103% to 105% of the Nominal System Frequency
Overfrequency Pickup Range	Breaker/Switch Style ATS	101% to (Dropout -1Hz) of the Nominal System Frequency
	Contactactor Style ATS	101% to (Dropout -1Hz) of the Nominal System Frequency

# Power Series Transfer Switch

ATC-300+

Open and Delayed Transition Controller

## SPECIFICATIONS AND PROGRAMMABLE SETPOINTS

### ADDITIONAL PROGRAMMABLE SETPOINTS

Time Delay Nml to Emr	0 to 1,800 seconds
Time Delay Emr to Nml	0 to 1,800 seconds
Time Delay Engine Cool	0 to 1,800 seconds
Time Delay Engine Start	0 to 120 seconds
Time Delay Neutral <sup>1</sup>	0 to 120 seconds
Time Delay Source 2 Fail	0 to 6 seconds
Time Delay Volt Unbal	10 to 30 seconds
Volt Unbal 3-Phase	0 or 1 (1 = Enable)
% of Unbal Volt Dropout	5% to 20% (DO)
	Dropout -2% to 3% (PU)
Nominal Voltage	120 to 600 Volts
Nominal Frequency	50 or 60Hz
Baud Rate	9,600 or 19,200
Phase Reversal 3-Phase	OFF, ABC, or CBA
In-Phase <sup>2</sup>	0 or 1 (1 = Enable)
Pre-Transfer Signal	1 to 120 seconds
Manual/Retransfer	0 or 1 (1 = Enable)
Plant Exerciser	Off, Daily, 7-Day, 14-Day, 28-Day Intervals
	0 to 600 minutes
	Load or No Load
Daylight Svgs Time Adj	0 or 1 (1 = Enable)
System Selection	Utility/Generator or Dual Utility
Modbus Address	1 to 247
Communications	Modbus <sup>®</sup> RTU
	Ethernet and/or Remote Annunciator (Optional)
Applicable Testing	UL Recognized Component
	UL 1008, UL 991 Environmental
	IEC 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-11
	CISPR 11, Class A
	FCC Part 15, Class A
Enclosure Compatibility	NEMA 1, NEMA 3R, NEMA 4X, and NEMA 12
	UV Resistant ATC-300+ Faceplate

1. Not available on open transition with inphase only switches

2. Not available on molded case type switches



## COOLANT HEATER OPTION

### 1500 WATT, 240VAC

#### SPECIFICATIONS:

**VOLTAGE: 240VAC**

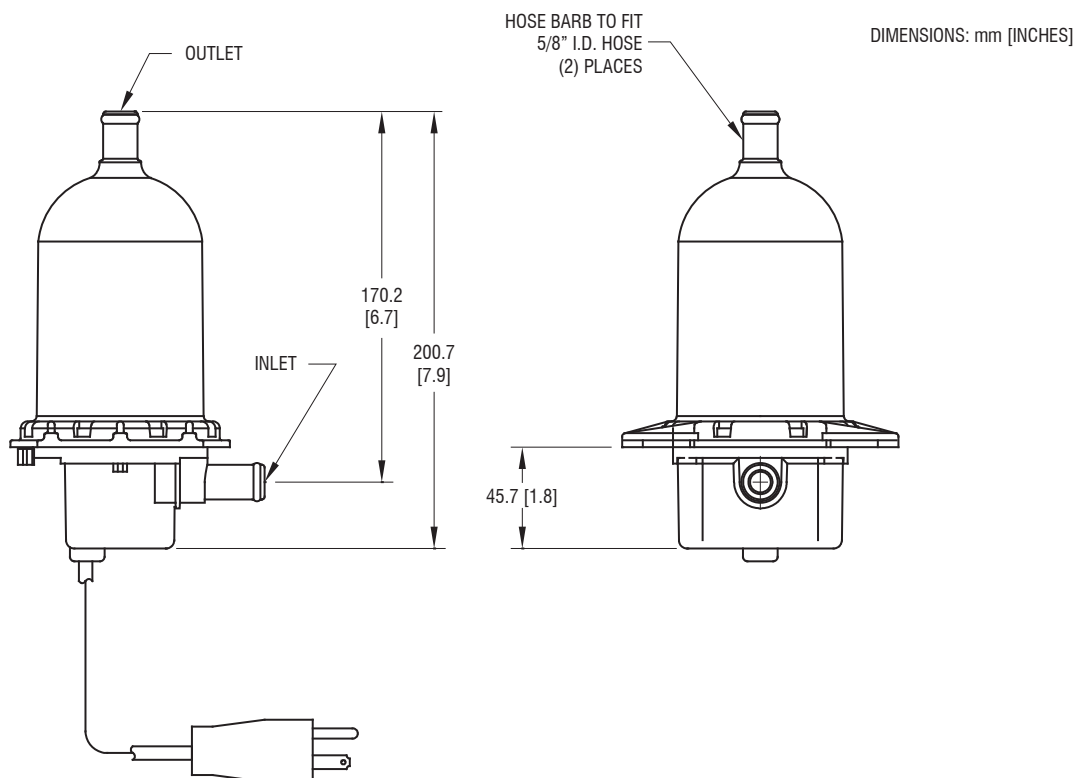
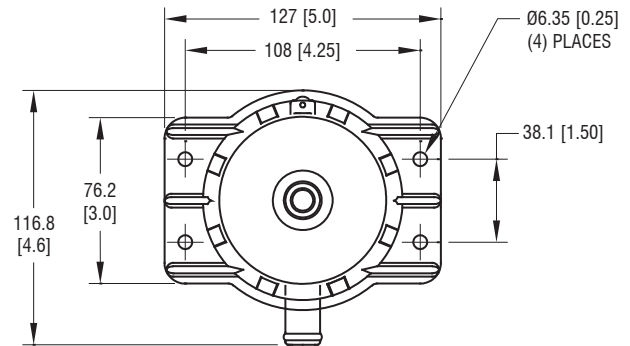
HEAT POWER: 1500W

FIXED THERMOSTAT: 100°-120°F

HEATING ELEMENT: INCOLOY 800

MAXIMUM PRESSURE: 90 PSI (620 kPa)

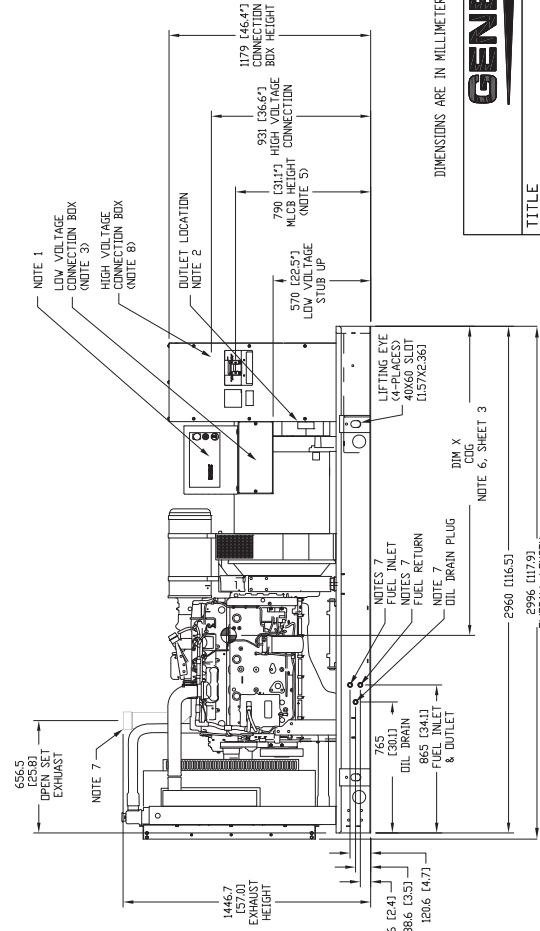
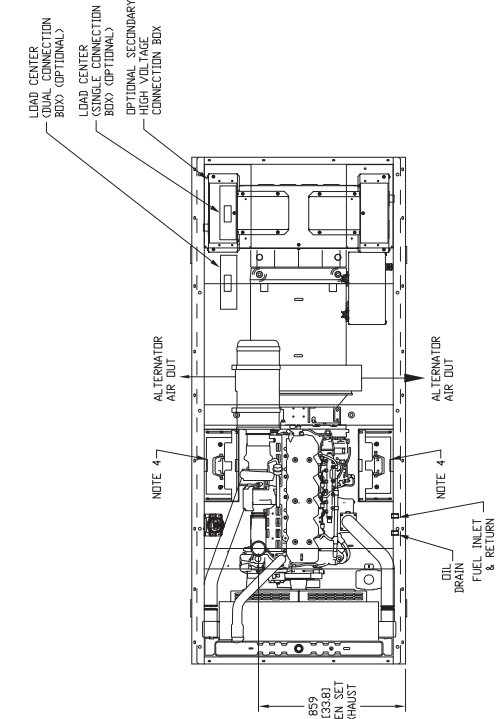
PLUG NEMA STD: 6-15P



Notes:  
1. CONTROL PANEL (OPTIONAL BATTERY CHARGER INSIDE).  
2. 120V 20A GFCI & 250V 15A OUTLET (OPTIONAL).  
3. CONNECTION POINTS FOR CONTROL WIRES PROVIDED IN THE LOW VOLTAGE CONNECTION BOX (USE LOW VOLTAGE STUB-UP AREA).  
4. VOLTAGE CONNECTION BOX (USE LOW VOLTAGE STUB-UP AREA).  
5. MAIN LINE CIRCUIT BREAKER (600V) AC LOAD LEADS.  
6. DIMENSIONS MAY VARY DUE TO UNIT CONFIGURATION.  
7. CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS.

7. ENGINE SERVICE CONNECTIONS:  
INLET NATURAL GAS = N/A  
RETURN DIESEL = 1/2" NPT COUPLING  
OIL DRAIN = 1/2" NPT COUPLING  
RADIATOR DRAIN = N/A  
EXHAUST OUTLET = 4" ID.  
\*\*\*\*\* SEE GENERATOR SIZING GUIDE FOR FUEL PIPE SIZING TO SUIT APPLICATION \*\*\*\*\*

8. AUXILIARY AC CONNECTION FOR UNIT OPTIONS ARE LOCATED IN HIGH VOLTAGE CONNECTION BOX, UNLESS AN OPTIONAL LOAD CENTER IS INSTALLED.  
9. EXHAUST PIPES MAY BE ROTATED TO ALLOW MUFFLER TO POINT OUT TO THE SIDE OF THE UNIT OR DOWNWARD. IF DOWNWARD, THE EXHAUST MUST BE AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.  
10. BOTTOM OF GENERATOR SET MUST BE ENCLOSED TO PREVENT PEST INTRUSION.  
11. EXHAUST BLANKETS ALONG THIS LINE FOR IMPROVED COOLING AIR FLOW.  
12. INSTALL THE OPEN SET EXHAUST PER NFPA 37 OR BASE TANK SHALL BE 5/8"-11 GRADE 5.  
13. BOLTS AND WELDS USED TO MOUNT UNIT TO PAD, AND MOUNTED FUEL TANK TO PAD REFER TO INSTALL DRAWING OF THE BASE TANK.  
ADDITIONAL NOTES: FOR WEIGHT AND CENTER OF GRAVITY DATA SEE NOTE 6, AND SHEET 3.



DIMENSIONS ARE IN MILLIMETERS (INCHES)

**GENERAC**

TITLE		OPEN SET D6.7L, 60HZ: SDI50, PD135 SDI75, PD158	
ISSUE DATE:		9/30/14	
SIZE	CAGE NO	DWG NO	REV
B	N/A	0J4194	J
SCALE	0.035	WT-KG	SHEET 1 of 3

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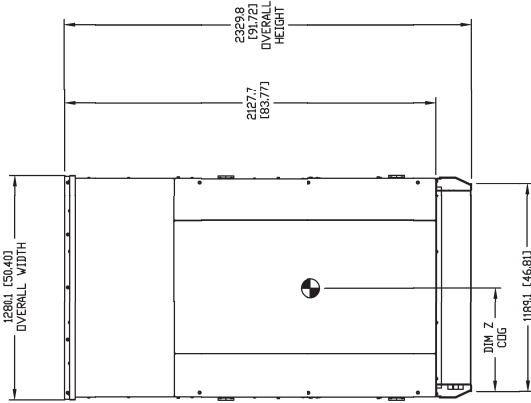
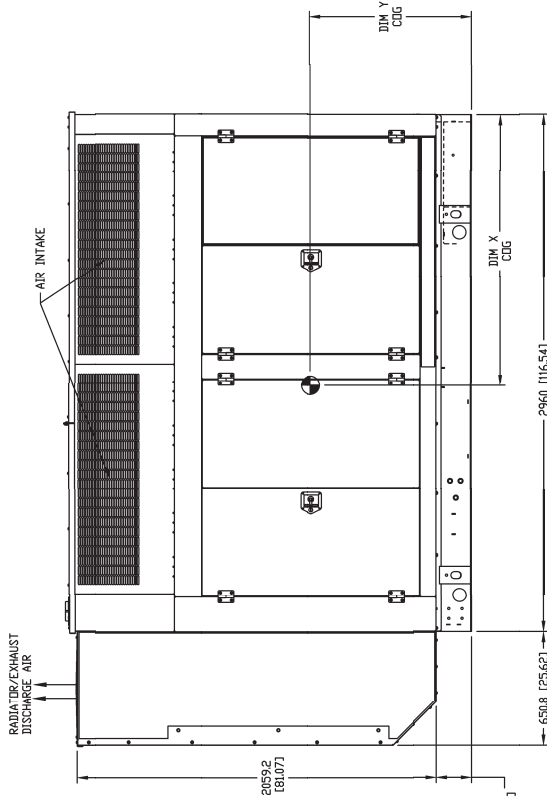
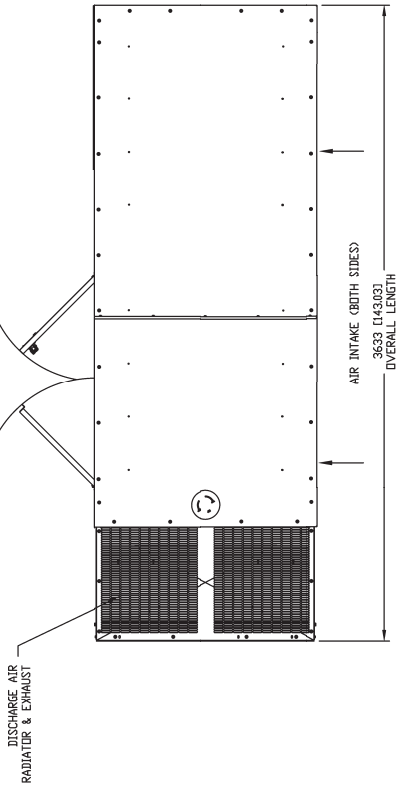
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INSTEAD OF SIGNATURE

# INSTALLATION DRAWING

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.







FOR ALL STUB-UP, WEIGHT, AND COG DETAILS, SEE  
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.

**GENERAC**

DRAWING CREATED FROM PRO/ENGINEER  
3D FILE. ECO MODIFICATION TO BE  
APPLIED TO SOLID MODEL ONLY.

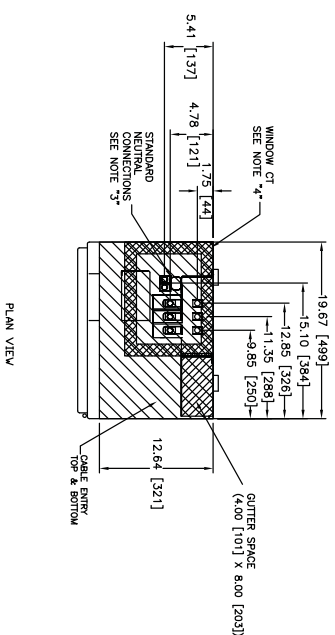
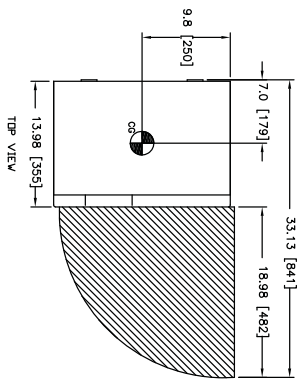
DIMENSIONS ARE IN MILLIMETERS (INCHES)

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L2A ENCLOSURE D6.7L, 60HZ: SD150, PD135 SD175, PD158			

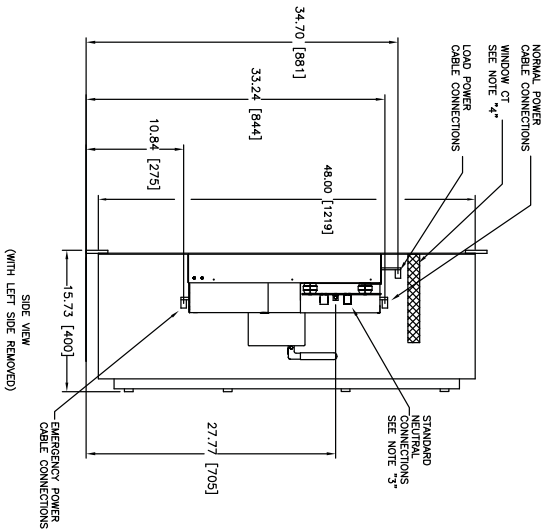
ISSUE DATE: 6/13/14		REV	
SIZE	CAGE NO	DWG NO	REV
B	N/A	0J4194C	F
SCALE	0.035	WT-KG	SHEET 1 of 1

# INSTALLATION DRAWING

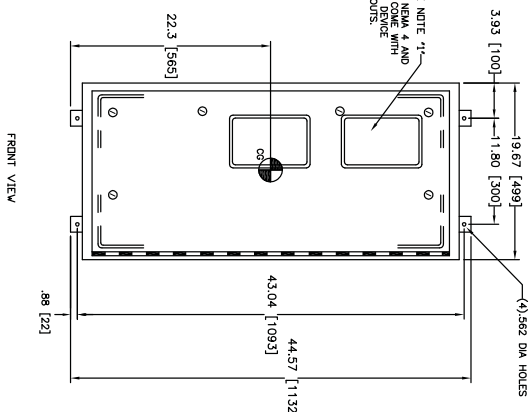
67B8226



PLAN VIEW



SIDE VIEW  
(WITH LEFT SIDE REMOVED)



FRONT VIEW

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# AUTOMATIC TRANSFER SWITCH

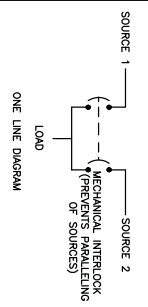
## WALL MOUNT - SER

### KD FRAME, 225-300A 3PDL

#### NEMA 4X

Seismic Mechanical Mounting Requirements

A For wall mount seismic application use (4) 1/2-13UNC grade 5 or better hex head bolts and washers. These bolts are to be torqued to 75 ft.lbs. (102 Nm).



#### NOTES:

- 1 Automatic, Non-automatic, Manual, and Service Entrance controls provided based on customer order information.
- 2 Dimensions: inches [millimeters].
- 3 For switched neutral applications, connect to terminals marked "NN", "EN", and "LN". Neutral assembly will not be provided.
- 4 If a Ground Fault Sensing System was ordered, a window CT and a GFR relay are provided. Installer to route all load phase and neutral conductors through window CT with "H1" and "X1" markings facing the bus terminals.
- 5  $\phi$  = Center of gravity.
- 6 Nema 3R and 12 have three latches equally spaced on handle side of enclosure.
- 7 This drawing pertains to the switch types listed in the following table:

APPROX. SHIPPING WT. Lbs. (kg)	CATALOG NUMBER	STYLE NUMBER
320 (145)	ATM	N/A
320 (145)	ATM	N/A
320 (145)	NTVS	N/A

**GENERAC POWER SYSTEMS**  
Waukegan, IL 60087  
Waukegan, WI 53187

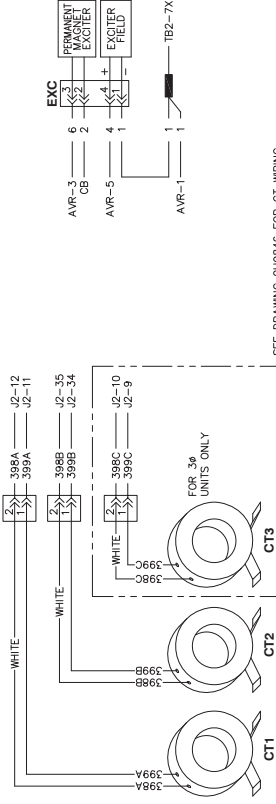
FILE NAME 67B8226.DWG size B  
SCALE NTS FIRST USE  
DWG NO. 67B8226 REV -

# INSTALLATION DRAWING

# GROUP G

- LEGEND**
- ARM WORN
  - DC CHARGE ALTERNATOR
  - AUT - AUTO VOLTAGE REGULATOR
  - BCC - BATTERY CHARGER CONNECTOR
  - LD - LEAK DETECTOR
  - CAND - CAN BUS DIAGNOSTIC BREAKER
  - CB - CIRCUIT BREAKER DPE
  - COM - CROSS OVER CONNECTOR
  - CTM - CURRENT TRANSFORMER
  - CT1 - DIODE BRIDGE
  - DB - DIGITAL CONTROL
  - ESC - EMERGENCY STOP SWITCH
  - EXC - EXCITER
  - F - FUSE
  - FUSE - FUSE LEVEL SENDER
  - SWC - SWITCH
  - SW - SWITCH AUTO/MANUAL
  - WLS - COOLANT LEVEL SENDER
  - GROUND FAULT CIRCUIT INTERRUPT
  - GROUND BAR CONNECTION
  - INTERFACE TRANSFORMER
  - ENG - ENGINE CONTROL MODULE CONN.
  - MOD - MODERN CONNECTOR
  - NB - NEUTRAL BLOCK
  - RE - RESISTOR
  - REL - RELAY BOARD
  - REL - RELAY BOARD CONNECTOR
  - RR - RUN RELAY
  - SW - STARTER VOLTAGE
  - SW - STARTER VOLTAGE
  - SW - SWITCH AUTO/MANUAL
  - SW - SWITCH
  - WLS - COOLANT LEVEL SENDER

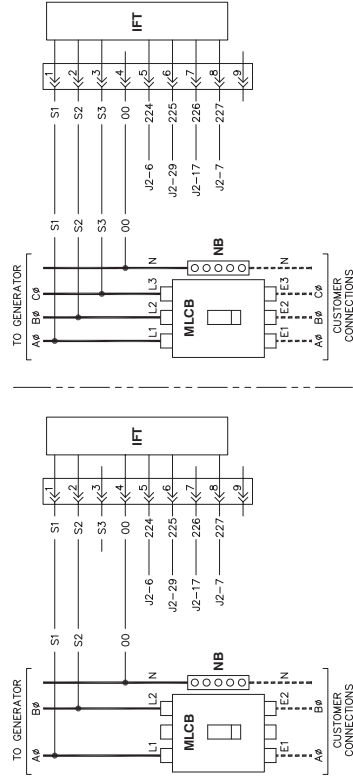
## COMPONENTS LOCATED IN ALTERNATOR CONNECTION BOX



SEE DRAWING 0H9846 FOR CT WIRING.

## COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

- CONNECTIONS FOR 10 UNIT**
- NOTE: ALL WIRES IN THIS SECTION ARE 600V RATED



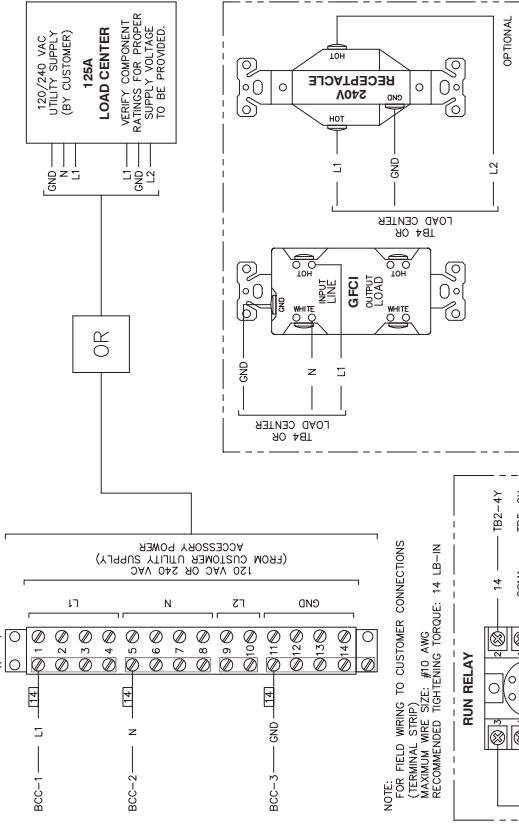
PAGE 1 OF 6

REVISION: H-9136-D  
DATE: 6/9/11

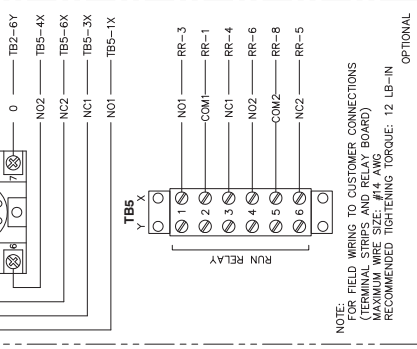
# GROUP G

## COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED



NOTE: FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIP) (MAXIMUM WIRE SIZE: #10 AWG) (RECOMMENDED TIGHTENING TORQUE: 14 LB-IN)



NOTE: FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIPS AND RELAY BOARD) (MAXIMUM WIRE SIZE: #14 AWG) (RECOMMENDED TIGHTENING TORQUE: 12 LB-IN)

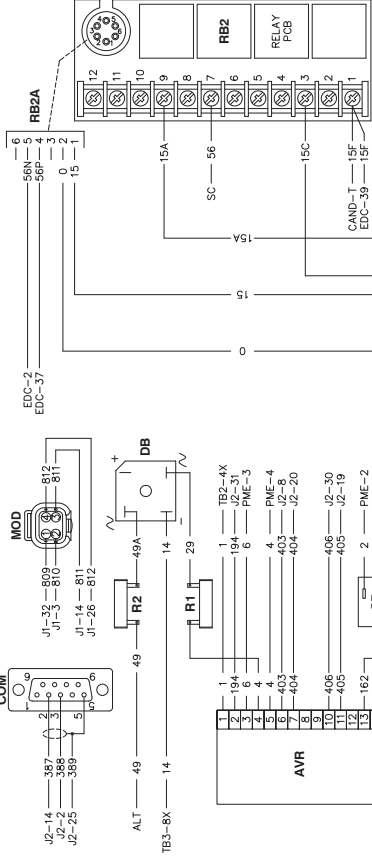
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DATE: 6/9/11

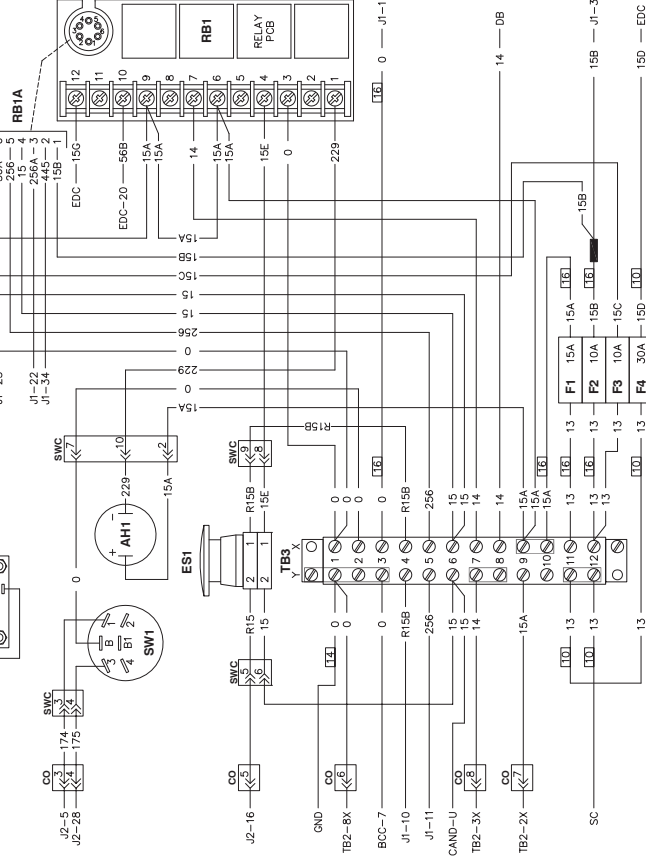
WIRING - DIAGRAM  
D67L G17 12V W/CAN BUS  
DRAWING #: 0H9882

GROUP G

### COMPONENTS LOCATED IN CONTROL PANEL



## CUSTOMER CONNECTIONS



NOTE:  
FOR FIELD WIRING TO CUSTOMER CONNECTIONS  
(TERMINAL STRIPS AND RELAY BOARD)  
MAXIMUM WIRE SIZE: #14 AWG  
RECOMMENDED TIGHTENING TORQUE: 12 LB-IN

PAGE 3 OF 6

REVISION: H-9136-D  
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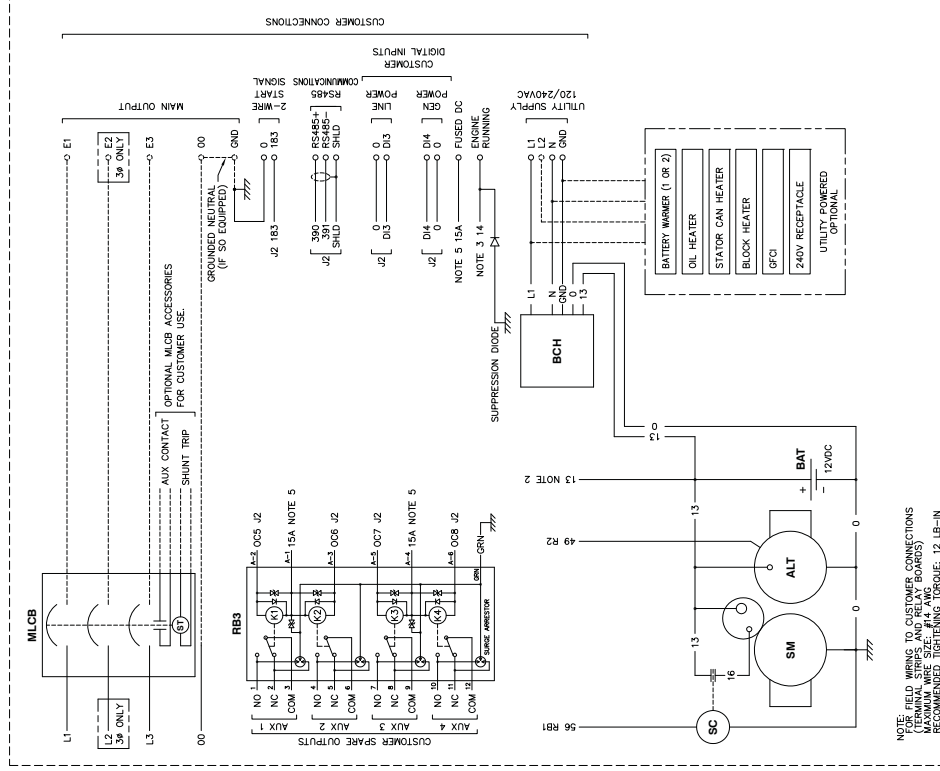
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D6.7L G17 12V W/CAN BUS  
DRAWING #: 0H9882

REVISION: H-9136-D  
DATE: 6/9/11





## GROUP G



PAGE 2 OF 4

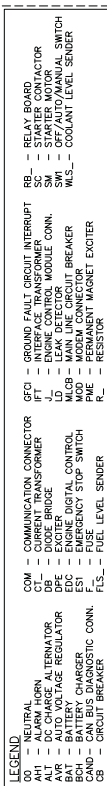
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DATE: 7/9/10

SCHEMATIC - DIAGRAM  
D67LG17 12V W/CAN BUS  
DRAWING #: 0H9883

REVISION: -A-  
DATE: 7/9/10

SCHEMATIC - DIAGRAM  
D67LG17 12V W/CAN BUS  
DRAWING #: 0H9883

## GROUP G



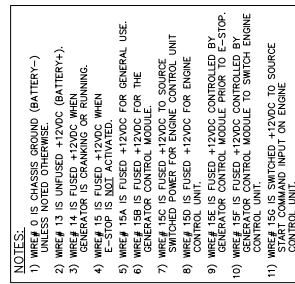
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DATE: 7/9/10  
SCHEMATIC - DIAGRAM  
D67L G17 12V W/CAN BUS  
DRAWING #: 0H9883

DATE: 7/9/10

**SCHEMATIC - DIAGRAM**  
D6.7L G17 12V W/CAN BUS  
DRAWING #: 0H9883

DATE: 7/9/10

## GROUP G



SCHEMATIC - DIAGRAM  
D6.7L G17 12V W/CAN BUS  
DRAWING #: 0H9883

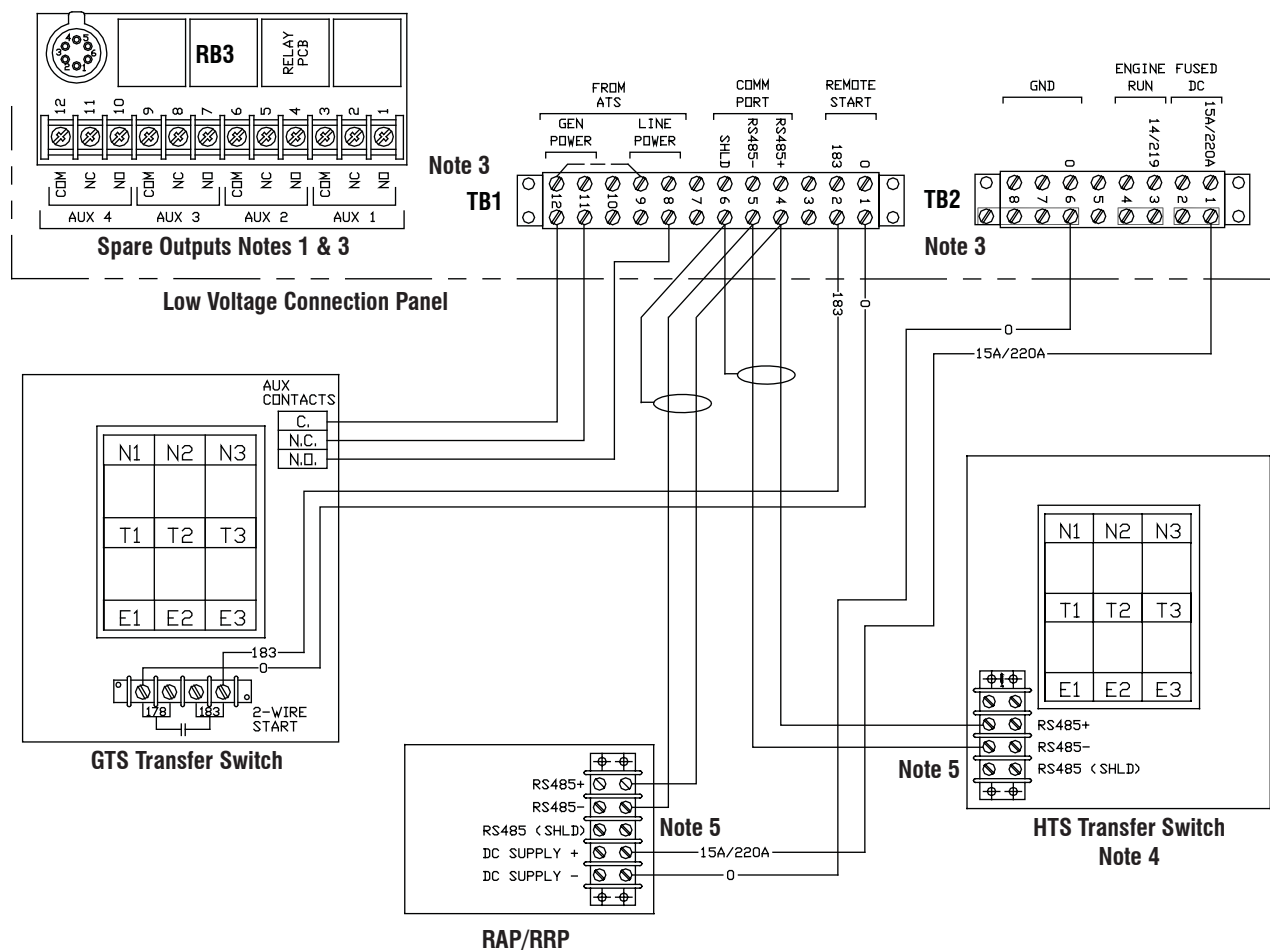
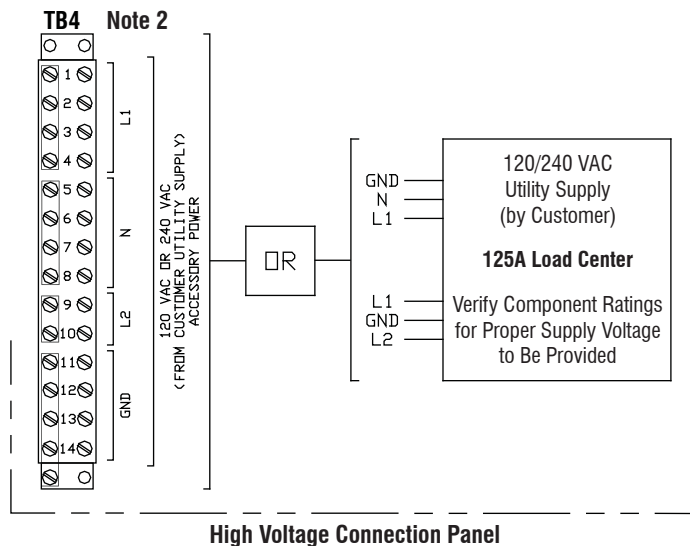
DATE: 7/9/10

SCHEMATIC - DIAGRAM  
D6.7L G17 12V W/CAN BUS  
DRAWING #: 0H9883

## H-PANEL CONTROL INTERCONNECTIONS

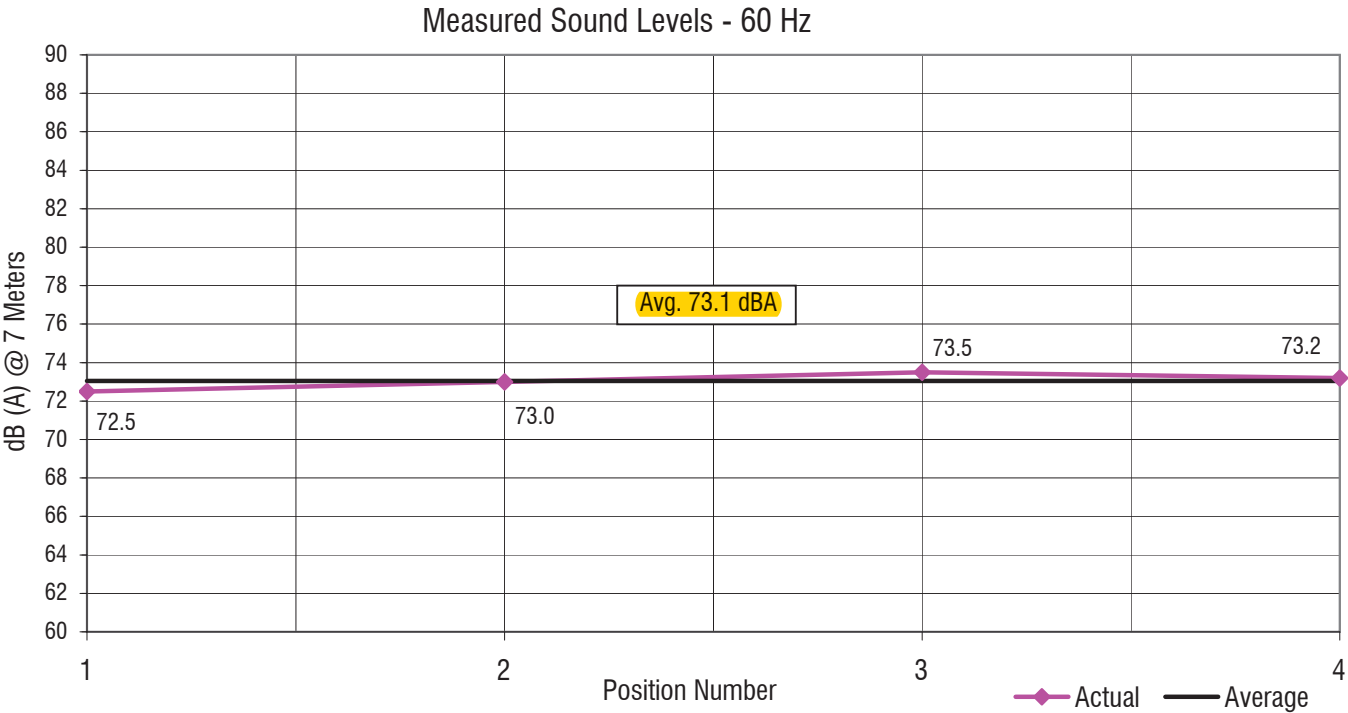
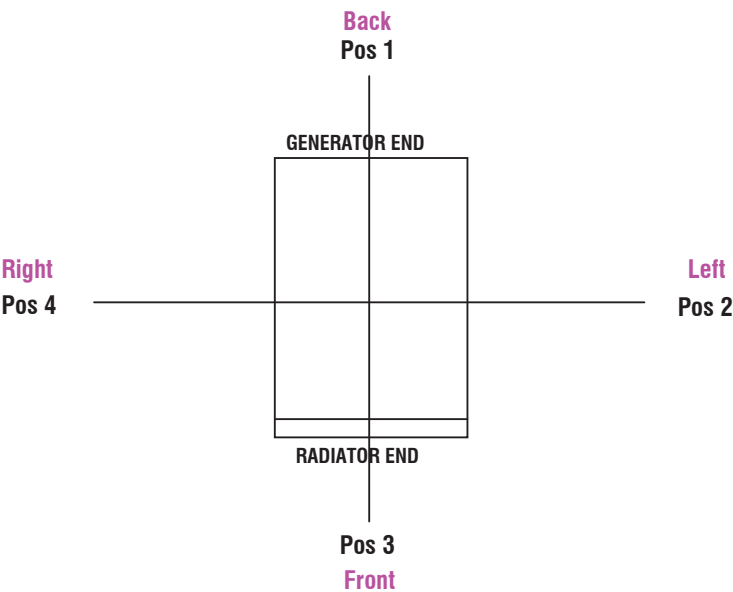
### Notes:

1. Spare Outputs are Standard on Industrial Product Only.  
GenLink® Required for Programming. Contacts Rated at 5A at 30VAC/30VDC
2. TB4 Max Wire Size: #10 AWG,  
Recommended Tightening Torque: 14 LB-IN
3. TB1, TB2, TB9 & RB3 Max Wire Size: #14 AWG,  
Recommended Tightening Torque: 12 LB-IN
4. Refer to H-Panel Manual for Instructions on Enabling HTS Transfer Switch. Refer to HTS Transfer Switch Manual for Dip Switch Settings for Multiple HTS Application
5. Connect the RS-485 Overall Shield at Genset Connection Terminal Only



LEVEL 2 ACOUSTIC ENCLOSURE

SD175 6.7L IVECO



- Notes:
- 1. All positions 23 ft (7M) from side faces of generator set.
  - 2. Generator operating at full load.
  - 3. Test conducted on a 100 foot diameter asphalt surface.
  - 4. Non-enclosed sets do not include exhaust sound during testing.

## STATEMENT OF EXHAUST EMISSIONS

### 2020 FPT DIESEL FUELED GENERATOR

The measured emissions values provided here are proprietary to Generac and its authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc. The data provided shall not be meant to include information made public by Generac.

Generator Model:	<b>SD175</b>	EPA Certificate Number:	<b>LFPXL06.7DGS-005</b>
kW <sub>e</sub> Rating:	<b>175</b>	CARB Certificate Number:	<b>Not Applicable</b>
Engine Family:	<b>LFPXL06.7DGS</b>	SCAQMD CEP Number:	<b>511717</b>
Engine Model:	<b>F4HE9685A*J</b>	Emission Standard Category:	<b>Tier 3</b>
Rated Engine Power (BHP)*:	<b>279</b>	Certification Type:	<b>Stationary Emergency CI</b>
Fuel Consumption (gal/hr)*:	<b>13.5</b>		<b>(40 CFR Part 60 Subpart IIII)</b>
Aspiration:	<b>Turbo/Aftercooled</b>		
Rated RPM:	<b>1800</b>		

\*Engine Power and Fuel Consumption are declared by the Engine Manufacturer of Record and the U.S. EPA.

#### Emissions based on engine power of specific Engine Model. (These values are actual composite weighted exhaust emissions results over the EPA 5-mode test cycle.)

CO	NOx + NMHC	PM	
<b>1.20</b>	<b>3.80</b>	<b>0.08</b>	Grams/kW-hr
<b>0.90</b>	<b>2.80</b>	<b>0.06</b>	Grams/bhp-hr

- The stated values are actual exhaust emission test measurements obtained from an engine representative of the type described above.
- Values based on 5mode testing are official data of record as submitted to regulatory agencies for certification purposes. Testing was conducted in accordance with prevailing EPA protocol, which is typically accepted by SCAQMD and other regional authorities.
- No emissions values provided above are to be construed as guarantees of emission levels for any given Generac generator unit.
- Generac Power Systems, Inc. reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emission performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and local agencies must be consulted by the permit application/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generating set.

## Certification of Quality

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Generac Power Systems certifies that the products we manufacture have been built and tested in accordance with strict internal and external standards for quality. Our quality management system has been registered with the internationally recognized ISO 9001:2008 standard and our products comply with external standards that include, but are not limited to, CSA, NEMA, EGSA, ISO, and UL.

The Generac Quality Management System (GQMS) ensures the highest standards of quality at every level of production, from raw materials to the finished product. This includes receiving inspection, in-process checks, product and process audits, testing, final inspections, and shipping standards.

Tests of our products are performed in accordance with our internal procedures and controlled through the GQMS to ensure accuracy and effectiveness. The testing process and product designs comply with external standards which may include, but are not limited to: ISO 8528-5, ISO 3046, NFPA 99, NFPA 110, BS 5514, SAE J1349, and DIN 6271.

Generac Power Systems has over one million square feet of manufacturing space and over 2000 employees dedicated to designing and manufacturing power generation equipment in our multiple State of Wisconsin, USA factories. All of our installed and mobile generators are built with pride by our skilled American workforce to ensure our customers receive the quality that they expect from Generac.

We are committed to producing quality products for both our internal and external customers. We will continuously improve our processes and diligently measure all aspects of our business.

### **Daniel Waschow**

Vice President of Quality  
Generac Power Systems, Inc.  
Waukesha, Wisconsin USA

## Generac Power Systems 2 Year (2C) Extended Limited Warranty for Industrial Standby Generators

For the period of warranty noted below, which begins upon the successful start-up and/or on-line activation of the unit, Generac Power Systems, Inc. "Generac" warrants that its Generator will be free from defects in material and workmanship for the items and period set forth below. Generac will, at its discretion, repair or replace any part(s) which, upon evaluation, inspection and testing by Generac or an Independent Authorized Service Dealer, is found to be defective. Any equipment that the purchaser/owner claims to be defective must be evaluated by the nearest Independent Authorized Service Dealer. Emissions components are excluded from coverage under this extended warranty. Emissions warranty coverage is detailed in a separate emissions warranty.

**Warranty Coverage:** Warranty coverage period is for Two (2) years or two-thousand (2,000) hours, whichever occurs first.

Warranty Coverage in Year(s) 1-2
Parts, Labor and Limited Travel

### Limited Gearbox Coverage:

Year(s): 1-5 Coverage	Year(s): 6-10 Coverage
Limited Parts and Labor	Limited Parts Only

### Guidelines:

- Unit must be registered and proof of purchase available.
- Any and all warranty repairs and/or concerns must be performed and/or addressed by an Independent Authorized Service Dealer, or branch thereof. Repairs or diagnostics performed by individuals other than an Independent Authorized Service Dealer not authorized in writing by Generac will not be covered.
- This Warranty is transferable between ownership of original install site.
- Generac supplied engine coolant heaters (block-heaters), heater controls and circulating pumps are only covered during the first year of the warranty provision.
- Generac may choose to repair, replace or refund a piece of equipment in its sole discretion.
- Enclosures are warranted against rust for the first year of ownership only. Damage caused after receipt of generator is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents or scratches to the painted enclosure should be repaired promptly by the owner.
- Warranty only applies to permanently wired and mounted units.
- Damage to any covered components or consequential damages caused by the use of a non-OEM part will not be covered by the warranty.
- Proof of performance of all required maintenance must be available.
- Travel allowance is limited to 300 miles maximum and seven and one half (7.5) hours maximum (per occurrence, whichever is less) round trip from the nearest Independent Authorized Service Dealer. Any additional travel required will not be covered.
- Engines, driven components and fuel tanks used in Generac's standby power products system can carry a separate manufacturer's (OEM) warranty (the "OEM Warranties"), unless otherwise expressly stated. OEM Warranties are in addition to this Warranty. All warranty claims for defects in material and/or workmanship on Generac product OEM components, may be directed through the OEM distributor/dealer network. OEM Warranties may vary and are subject to change. Generac shall have no liability under OEM warranties.

### The following will NOT be covered by this warranty:

- Costs of normal maintenance (i.e. tune-ups, associated part(s), adjustments, loose/leaking clamps, installation and start-up).
- Damage/failures to the generator caused by accidents, shipping, handling, or improper storage.
- Damage/failures caused by operation with improper fuels, speeds, loads or installations other than what's recommended or specified by Generac Power Systems.
- Damage to the generator due to the use of non-Generac parts and/or equipment, contaminated fuels, oils, coolants/antifreeze or lack of proper fuels, oil or coolants/antifreeze.
- Failures due to normal wear and tear, accident, misuse, abuse, neglect, improper installation, improper sizing, or rodent, reptile, and/or insect infestation.
- Rental equipment used while warranty repairs are being performed and/or any extraordinary equipment used for removal and/or reinstallation of generator (i.e. cranes, hoists, lifts, et. al.).
- Planes, ferries, railroad, buses, helicopters, snowmobiles, snowcats, off-road vehicles or any other mode of transport deemed not standard by Generac.
- Products that are modified or altered in a manner not authorized by Generac in writing.
- Starting batteries, fuses, light bulbs, engine fluids and any related labor.
- Steel enclosures that rust as a result of improper installation, location in a harsh or salt water environment, or are scratched where the integrity of applied paint is compromised.
- Units sold, rated or used for "Prime Power", "Trailer Mounted" or "Rental Unit" applications as defined by Generac. Contact an Independent Authorized Service Dealer for definitions.
- Shipping costs associated with expedited shipping.
- Additional costs for overtime, holiday or emergency labor costs for repairs outside of normal business hours.
- Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
- Failures caused by any act of God or external cause including without limitation, fire, theft, freezing, war, lightning, earthquake, windstorm, hail, water, tornado, hurricane, or any other matters which are reasonably beyond the manufacturer's control.

**THIS WARRANTY SUPERSEDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH ARE ALLOWED BY LAW, SHALL BE LIMITED IN DURATION TO THE TERMS OF THE EXPRESS WARRANTY PROVIDED HEREIN. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU ALSO HAVE OTHER RIGHTS UNDER APPLICABLE LAW.**

**FOR AUSTRALIA ONLY:** Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

**FOR NEW ZEALAND ONLY:** Nothing in this warranty statement excludes, restricts or modifies any condition, warranty right or remedy which pursuant to the New Zealand Legislation (Commonwealth or State) including the Fair Trading Practices Act of 1986 or the Consumer Guarantees Act 1993 ("CGA") applies to this limited warranty and may not be so excluded, restricted or modified. Nothing in this statement is intended to have the effect of contracting out of the provisions of the CGA, except to the extent permitted by that Act, and these terms are to be modified to the extent necessary to give effect to that intention. If you acquire goods from Generac Power Systems or any of its authorized resellers and distributors for the purposes of a business, then pursuant to section 43(2) of the CGA, it is agreed that the provisions of the CGA do not apply.

GENERAC POWER SYSTEMS, INC. • P.O. BOX 8 • Waukesha, WI, USA 53187  
Ph: (888) GENERAC (436-3722) • Fax: (262) 544-4851

To locate the nearest Independent Authorized Service Dealer and to download schematics, exploded views and parts lists  
visit our website: [www.generac.com](http://www.generac.com)



## Garantía limitada extendida de 2 años (2C) de Generac Power Systems para los generadores de respaldo industriales

Durante el período de garantía indicado abajo, que comienza desde la puesta en marcha y/o activación exitosa en línea de la unidad, Generac Power Systems, Inc. "Generac" garantiza que generador estará libre de defectos de material y/o mano de obra para los ítems y el período indicados a continuación. Generac, a su discreción, reparará o sustituirá cualquier pieza o piezas que, por medio de la evaluación, inspección y prueba efectuada por Generac o un Concesionario de servicio autorizado independiente de Generac, se determine que es o son defectuosa(s). Todo equipo que el comprador o propietario reclame como defectuoso debe ser evaluado por el Concesionario de servicio autorizado independiente de Generac más cercano. Los componentes relacionados con emisiones están excluidos de la cobertura bajo esta garantía extendida. La cobertura de la garantía de emisiones se detalla por separado en una garantía de emisiones.

**Cobertura de la garantía:** El período de cobertura de la garantía es de dos (2) años o dos mil (2000) horas, lo que ocurra primero.

Cobertura de la garantía en año(s) 1-2
Sobre piezas, mano de obra y gastos de viaje limitados

**Cobertura limitada sobre la caja de engranajes:**

Año(s) de cobertura: 1-5 Cobertura	Año(s) de cobertura: 6-10 Cobertura
Limitada sobre piezas y mano de obra	Limitada solo sobre piezas

**Directrices:**

- La unidad debe estar registrada y tener prueba de compra disponible.
- Cualquiera y todas las reparaciones y/o preocupaciones por garantía deben ser efectuadas y/o dirigidas por un Concesionario de servicio autorizado independiente de Generac, o una sucursal de este. No serán cubiertas las reparaciones o los diagnósticos efectuados por personas diferentes del Concesionario de servicio autorizado independiente de Generac no autorizados por escrito por Generac.
- Esta garantía es transferible entre propietarios del sitio de instalación original.
- Los calentadores de refrigerante de motor (calentadores de bloque), los controles del calentador y las bombas de circulación suministrados por Generac solo están cubiertos durante el primer año de prestación de la garantía.
- Generac puede elegir reparar, sustituir o reembolsar una pieza del equipo a su exclusiva discreción.
- Los gabinetes están garantizados contra corrosión solamente durante el primer año de propiedad. El daño causado después de la recepción del generador es responsabilidad del comprador y no está cubierto por esta garantía. Las muescas, raspaduras, abolladuras o rayaduras de gabinete pintado deben ser reparadas sin demora por el propietario.
- La garantía corresponde solamente a las unidades conectadas y montadas en forma permanente.
- Los daños a cualquier componente o los daños emergentes causados por el uso de una pieza que no sea OEM no estarán cubiertos por la garantía.
- Debe haber disponible prueba de la ejecución de todo el mantenimiento requerido.
- Las asignaciones para viaje están limitadas a 300 millas como máximo y siete horas y media (7.5) horas como máximo (por ocurrencia, lo que sea menor), viaje de ida y vuelta, desde el Concesionario de servicio autorizado independiente de Generac más cercano. Todo gasto de viaje adicional requerido no será cubierto.
- Los motores, los componentes accionados y los tanques de combustible usados en los productos de respaldo de Generac pueden llevar una garantía de fabricante (OEM) separada (las "Garantías de OEM"), a menos que se estipule expresamente lo contrario. Las garantías de OEM son un agregado a esta garantía. Todos los reclamos de garantía por defectos de material y/o mano de obra en los componentes OEM del producto Generac, pueden ser dirigidos a través de la red de distribuidores/concesionarios OEM. Las garantías de OEM pueden variar y están sujetas a cambios. Generac no tendrá responsabilidad bajo las garantías de OEM.

**Lo siguiente NO será cubierto por esta garantía:**

- Costes del mantenimiento normal (es decir: afinaciones, pieza[s] relacionada[s], ajustes, abrazaderas sueltas o con fugas, instalación y puesta en marcha).
- Daños/fallos del generador causados por accidentes, transporte, manejo o almacenamiento incorrecto.
- Los daños/fallos causados por la operación con combustibles, velocidades, cargas, o instalaciones incorrectas diferentes de las recomendadas o especificadas por Generac Power Systems.
- Los daños al generador debidos al uso de piezas y/o equipos que no sean de Generac; combustibles, aceites, refrigerantes/ anticongelantes contaminados; o falta de combustibles, aceites, refrigerantes/anticongelantes apropiados.
- Fallos debidos a: desgaste y daño normal, accidente, uso indebido, abuso, negligencia, instalación incorrecta, dimensionamiento incorrecto, o plagas de roedores y/o insectos.
- Equipos arrendados usados mientras se llevan a cabo reparaciones de garantía y/o todos los equipos extraordinarios usados para retirar y/o reinstalar el generador, (esto es: grúas, malacates, elevadores, etc.).
- Aeronaves, transbordadores, ferrocarril, autobuses, helicópteros, motocicletas para nieve, camiones para nieve, vehículos fuera de ruta o cualquier otro modo de transporte no considerado estándar por Generac.
- Productos que se modifiquen o alteren en forma no autorizada por Generac por escrito.
- Baterías de arranque, fusibles, bombillas de luz, fluidos para el motor y mano de obra relacionada.
- Los gabinetes de acero que se corroen debido a instalación incorrecta, ubicación en un entorno agresivo o con agua salada, o se rayen donde esté comprometida la integridad de la pintura aplicada.
- Las unidades vendidas, calificadas para, o usadas en aplicaciones de "Alimentación eléctrica principal", "Montada en remolque" o "Unidad en alquiler" como las define Generac. Comuníquese con un Concesionario de servicio autorizado independiente para las definiciones.
- Costes de envío asociados con envío urgente.
- Costes adicionales por horas extra y feriados o los costes de mano de obra de emergencia por reparaciones fuera del horario de trabajo normal.
- Todos los daños accesorios, emergentes o indirectos causados por defectos en los materiales o mano de obra o toda demora en la reparación o sustitución de la(s) pieza(s) defectuosa(s).
- Los fallos causados por cualquier acto de fuerza mayor o causa externa, que incluyen, sin limitaciones, incendio, robo, congelamiento, guerra, rayos, terremoto, tormenta de viento, granizo, agua, tornado, huracán, o cualesquiera otros asuntos que estén fuera del control razonable del fabricante.

**ESTA GARANTÍA SUSTITUYE CUALQUIER OTRA GARANTÍA, EXPRESA O IMPLÍCITA. ESPECÍFICAMENTE, GENERAC NO EXTIENDE NINGUNA OTRA GARANTÍA ACERCA DE LA COMERCIALIZACIÓN O APTITUD PARA UN PROPÓSITO EN PARTICULAR. LA DURACIÓN DE TODAS LAS GARANTÍAS IMPLÍCITAS PERMITIDAS POR LA LEY ESTARÁ LIMITADA A LAS CONDICIONES DE LA GARANTÍA EXPRESA ESTIPULADA EN LA PRESENTE. ALGUNAS JURISDICCIÓNES NO PERMITEN LIMITACIONES DE LA DURACIÓN DE UNA GARANTÍA IMPLÍCITA; POR LO TANTO, LA LIMITACIÓN PRECEDENTE PUEDE NO APLICARSE A USTED. LA ÚNICA RESPONSABILIDAD DE GENERAC SERÁ REPARAR O SUSTITUIR LA(S) PIEZA(S) COMO SE ESTIPULÓ PRECEDENTEMENTE. GENERAC NO SERÁ RESPONSABLE EN NINGÚN CASO POR NINGÚN DAÑO ACCESORIO O EMERGENTE, AUN CUANDO TAL DAÑO SEA RESULTADO DIRECTO DE LA NEGLIGENCIA DE GENERAC. ALGUNAS JURISDICCIÓNES NO PERMITEN LA EXCLUSIÓN O LIMITACIÓN DE DAÑOS ACCESORIOS O EMERGENTES, DE MANERA QUE LA LIMITACIÓN PRECEDENTE PUEDE NO APLICARSE A USTED. ESTA GARANTÍA LE OTORGA DERECHOS LEGALES ESPECÍFICOS. TAMBIÉN TIENE OTROS DERECHOS BAJO LA LEY CORRESPONDIENTE.**

**SOLO PARA AUSTRALIA:** Nuestros productos se entregan con garantías que no pueden ser excluidas según la Australian Consumer Law (Ley australiana de consumidores). Usted tiene derecho a sustitución o reembolso por un fallo mayor y a compensación por cualquier otra pérdida o daño razonable previsible. Usted también tiene derecho a que los bienes sean reparados o sustituidos si los bienes no son de calidad aceptable y la falla no llega a ser un fallo mayor.

**SOLO PARA NUEVA ZELANDA:** Nada de esta declaración de garantía excluye, restringe o modifica ninguna condición, derecho de garantía o solución que, conforme a la legislación de Nueva Zelanda (Comunidad o Estado), incluso la Fair Trading Practices Act (Ley de transacciones comerciales justas) de 1986 o la Consumer Guarantees Act (Ley de garantías de los consumidores, "CGA") de 1993, se aplique a esta garantía limitada y por lo tanto no puede ser sometida a exclusiones, restricciones o modificaciones. Nada de esta declaración tiene el propósito de tener efecto de contratar fuera de las previsiones de la CGA, excepto con el alcance permitido por la ley y estos términos se deben modificar con el alcance necesario para hacer efectiva esta intención. Si adquiere bienes de Generac Power Systems o alguno de sus revendedores y distribuidores autorizados con propósitos comerciales, entonces, conforme a la sección 43(2) de la CGA, se acuerda que no se aplican las previsiones de la CGA.

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Para ubicar el Concesionario de servicio autorizado independiente más cercano y descargar diagramas esquemáticos, despieces y listas de piezas visite nuestro sitio Web: [www.generac.com](http://www.generac.com)

Núm. de pieza. 0J4299

Revisión J (02/16)

## Garantie limitée prolongée de 2 ans (2C) de Generac Power Systems sur les générateurs de secours industriels

Pendant la période de garantie mentionnée ci-bas, qui débute dès le démarrage réussi de l'appareil ou l'activation en ligne de l'appareil, Generac Power Systems, Inc. (Generac) garantit que son générateur sera exempt de vices de matériaux et fabrication en ce qui concerne les éléments et la période indiqués ci-dessous. À sa seule discrétion, Generac réparera ou remplacera toute pièce qui est jugée défectueuse après l'évaluation, l'inspection et la mise à l'essai par Generac ou un fournisseur de services d'entretien agréé indépendant. Tout équipement que l'acheteur/propriétaire prétend être défectueux doit être évalué par le fournisseur de services d'entretien agréé indépendant le plus près. Les composants relatives aux émissions ne sont pas couvertes en vertu de la présente garantie. La couverture des composants relatives aux émissions est détaillée dans une garantie distincte.

**Couverture de la garantie :** La période de garantie est de deux (2) ans ou de deux mille (2000) heures, selon la première éventualité.

Période de garantie de 1 à 2 ans
Pièces, main-d'œuvre et couverture limitée des déplacements

Couverture limitée de la boîte à engrenages :

Période : couverture de 1 à 5 ans	Période : couverture de 6 à 10 ans
Couverture limitée – pièces et main-d'œuvre	Couverture limitée – pièces seulement

Lignes directrices :

1. L'appareil doit être enregistré et la preuve d'achat doit être présentée sur demande.
2. Toute réparation sous garantie doit être effectuée par un fournisseur de services d'entretien agréé indépendant ou l'une de ses succursales, et toute préoccupation doit être également traitée par un fournisseur de services d'entretien agréé indépendant de Generac ou l'une de ses succursales. Toute réparation ou évaluation effectuée par des personnes autres qu'un fournisseur de services d'entretien agréé indépendant qui n'a pas été autorisée par écrit par Generac ne sera pas couverte.
3. La présente garantie est transférable conjointement à la propriété du site d'installation d'origine.
4. Les chauffe-frettes à liquide de refroidissement du moteur (chauffe-moteur), les commandes de chauffage et les pompes de circulation fournies par Generac ne sont couvertes que pendant la première année de la période de garantie.
5. Generac peut choisir, à sa seule discrétion, de réparer, de remplacer ou de rembourser une pièce d'équipement.
6. Les boîtiers sont garantis contre la rouille pendant la première année de possession seulement. Les dommages causés après la réception du générateur sont la responsabilité du propriétaire et ne sont pas couverts par la présente garantie. Les entailles, éraflures, bosses ou égratignures au boîtier peint doivent être réparées sans délai par le propriétaire.
7. La garantie s'applique uniquement aux appareils montés et câblés en permanence.
8. Aucun dommage ou dommage indirect à toute pièce couverte découlant de l'utilisation de pièces non fabriquées par un fabricant d'équipement d'origine ne sera couvert par la garantie.
9. Une preuve d'exécution de tous les travaux d'entretien requis doit être présentée sur demande.
10. La présente garantie couvre les déplacements aller-retour d'un maximum de 480 km (300 miles) et de sept heures et demie (7,5) (par déplacement, selon le moindre des deux) à partir du fournisseur de services d'entretien agréé indépendant le plus près. Tout déplacement supplémentaire requis ne sera pas couvert.
11. Les moteurs, les pièces d'entraînement et les réservoirs de carburant utilisés dans les systèmes d'alimentation de secours de Generac peuvent être protégés au titre de la garantie d'un fabricant d'équipement distinct (les « garanties des fabricants d'équipement d'origine »), sauf indication expresse à l'effet contraire. Les garanties des fabricants d'équipement d'origine s'ajoutent à la présente garantie. Toute réclamation au titre de la garantie pour vices de matériaux ou de fabrication de pièces d'un fabricant d'équipement d'origine sur un produit Generac peut être faite auprès du distributeur ou du réseau de fournisseurs de ce fabricant d'équipement d'origine. Les garanties des fabricants d'équipement d'origine peuvent varier et faire l'objet de modifications. Generac n'a aucune responsabilité découlant des garanties offertes par les fabricants d'équipement d'origine.

Les éléments suivants ne seront PAS couverts par la présente garantie :

1. Les coûts d'entretien normal (c'est-à-dire mises au point, réglages de pièces associées, ajustements, resserrage de fixations, installation et démarrage).
2. Les dommages ou défaillances du générateur causés par un accident, le transport, la manutention ou un entreposage inadéquat.
3. Les dommages/défaillances causés par l'utilisation de carburants inappropriés ou l'utilisation à des vitesses, avec des charges ou selon une installation autres que ce qui est recommandé ou spécifié par Generac Power Systems.
4. Les dommages au générateur causés par l'utilisation de pièces ou d'équipement non fabriqués par Generac, de carburant, d'huile, de liquide de refroidissement et d'antigel contaminé ou encore du manque de carburant, d'huile, de liquide de refroidissement et d'antigel.
5. Les défaillances causées par l'usure normale, un accident, une utilisation inappropriée, une utilisation abusive, une négligence, une installation inadéquate, un dimensionnement inadéquat ou une infestation de rongeurs, de reptiles ou d'insectes.
6. L'équipement de location utilisé pendant que des réparations sous garantie sont effectuées et/ou tout équipement extraordinaire utilisé pour retirer ou réinstaller le générateur (c'est-à-dire grues, appareils de levage, élévateurs, etc.).
7. Les avions, les traversiers, les trains, les autobus, les hélicoptères, les motoneiges, les dameuses, les véhicules hors route ou tout autre moyen de transport jugé non standard par Generac.
8. Les produits modifiés ou altérés d'une manière qui n'a pas été autorisée par écrit par Generac.
9. Les batteries de démarrage, les fusibles, les ampoules électriques, les fluides de moteur et toute main-d'œuvre connexe.
10. Les boîtiers en acier qui rouillent en raison d'une installation inadéquate, d'une installation dans un environnement difficile ou salin ou d'égratignures qui compromettent l'intégrité de la peinture appliquée sur le boîtier.
11. Les appareils vendus, cotés ou utilisés selon les applications suivantes, telles qu'elles sont définies par Generac : « puissance électrique de base », « monté sur remorque » ou « unité de location ». Veuillez communiquer avec un fournisseur de services d'entretien agréé indépendant pour obtenir les définitions.
12. Les coûts d'expédition liés à l'expédition accélérée.
13. Les coûts supplémentaires liés aux heures supplémentaires, aux jours fériés ou aux services d'urgence pour toute réparation effectuée en dehors des heures normales de bureau.
14. Tout dommage accessoire, subséquent ou indirect causé par un défaut de matériau et de fabrication ou par tout retard dans la réparation ou le remplacement de pièces défectueuses.
15. Les défaillances causées par un cas de force majeure ou une cause externe y compris, sans toutefois s'y limiter, le feu, le vol, le gel, la guerre, la foudre, un tremblement de terre, une tempête, la grêle, la pluie, une tornade, un ouragan ou toute autre situation raisonnablement hors du contrôle du fabricant.

**LA PRÉSENTE GARANTIE REMPLACE TOUTES LES AUTRES GARANTIES, EXPLICITES OU IMPLICITES. EN PARTICULIER, GENERAC N'OFFRE AUCUNE AUTRE GARANTIE QUANT À LA QUALITÉ MARCHANDE OU À LA CONVENANCE À UN USAGE PARTICULIER. TOUTE GARANTIE IMPLICITE AUTORISÉE PAR LA LOI SERA LIMITÉE À LA DURÉE DE LA PÉRIODE DE LA PRÉSENTE GARANTIE EXPLICITE. CERTAINS ÉTATS OU PROVINCES NE PERMETTENT PAS LES LIMITATIONS SUR LA DURÉE D'UNE GARANTIE IMPLICITE ET, PAR CONSÉQUENT, LA PRÉSENTE LIMITATION PEUT NE PAS S'APPLIQUER. LA RESPONSABILITÉ DE GENERAC SE LIMITERA À LA RÉPARATION OU AU REMPLACEMENT DES PIÈCES, COMME INDICÉ PRÉCÉDEMMENT. EN AUCUN CAS GENERAC NE POURRA ÊTRE TENUE RESPONSABLE DE DOMMAGES ACCESSOIRES OU SUBSÉQUENTS, MÊME SI LES DOMMAGES RÉSULTENT DIRECTEMENT DE LA NÉGLIGENCE DE GENERAC. CERTAINS ÉTATS OU PROVINCES N'AUTORISENT PAS L'EXCLUSION NI LA LIMITATION DES DOMMAGES ACCESSOIRES OU INDIRECTS ET, PAR CONSÉQUENT, LA LIMITATION ÉNONCÉE CI-DESSUS PEUT NE PAS S'APPLIQUER. CETTE GARANTIE VOUS CONFÈRE DES DROITS LÉGAUX PRÉCIS. VOUS POUVEZ ÉGALEMENT JOUIR D'AUTRES DROITS EN VERTU DES LOIS APPLICABLES.**

**POUR L'Australie UNIQUEMENT :** Nos produits sont fournis avec des garanties qui ne peuvent être exclues en vertu de la loi australienne sur la consommation (Australian Consumer Law). Vous avez droit à un remplacement ou à un remboursement pour une défaillance majeure et à une indemnisation pour toute autre perte ou tout dommage raisonnablement prévisible. Vous disposez également d'un droit à la réparation ou au remplacement si les produits ne sont pas d'une qualité acceptable et si cette défaillance n'est pas considérée comme majeure.

**POUR LA NOUVELLE-ZÉLANDE UNIQUEMENT :** Cette garantie n'exclut, ne restreint ni ne modifie aucune condition, aucun droit de garantie ou recours qui, conformément à la législation de Nouvelle-Zélande (Commonwealth ou État), y compris la loi sur la pratique commerciale loyale de 1986 (Fair Trading Practices Act) ou la loi sur la protection du consommateur de 1993 (CGA ou Consumer Guarantees Act), s'applique à cette garantie limitée et ne peut pas être exclue, restreinte ou modifiée. Cette garantie ne vise en aucun cas à contourner les dispositions de la CGA, sauf dans la mesure permise par cette loi, et ces termes doivent être modifiés dans la mesure nécessaire pour donner effet à cette intention. Si vous faites l'acquisition d'un produit de Generac Power Systems ou d'un de ses distributeurs et revendeurs autorisés à des fins commerciales, alors, conformément à l'article 43(2) de la CGA, il est convenu que les dispositions de la CGA ne s'appliquent pas.

GENERAC POWER SYSTEMS, INC. • C.P. 8 • Waukesha, WI (É.-U.) 53187  
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Pour trouver le fournisseur de services d'entretien agréé indépendant le plus près et pour télécharger les schémas, les vues éclatées et les listes de pièces visitez notre site Web : [www.generac.com](http://www.generac.com)

## Generac Power Systems 2 Year (2C) Extended Limited Warranty for Industrial Transfer Switch Systems

For the period of warranty noted below, which begins upon the successful start-up and/or on-line activation of the unit, Generac Power Systems, Inc. "Generac" warrants that its transfer switch will be free from defects in material and workmanship for the items and period set forth below. Generac will, at its discretion, repair or replace any part(s) which, upon evaluation, inspection and testing by Generac or an Independent Authorized Service Dealer, is found to be defective. Any equipment that the purchaser/owner claims to be defective must be evaluated by the nearest Independent Authorized Service Dealer.

Warranty Coverage in Year(s) 1-2
Parts, Labor and Limited Travel

### Guidelines:

1. Unit must be registered and proof of purchase available.
2. Any and all warranty repairs and/or concerns must be performed and/or addressed by an Independent Authorized Service Dealer, or branch thereof. Repairs or diagnostics performed by individuals other than Independent Authorized Service Dealers not authorized in writing by Generac will not be covered.
3. Warranty is transferable between ownership of original installation site.
4. Generac may choose to repair, replace or refund a piece of equipment in its sole discretion.
5. Warranty only applies to permanently wired and mounted units.
6. Enclosures are warranted for the first year of ownership only. Damage caused after receipt of generator is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents or scratches to the painted enclosure should be repaired promptly by the owner.
7. Proof of performance of all required maintenance must be available.
8. Travel allowance is limited to 300 miles maximum or seven and one half (7.5) hours maximum (per occurrence, whichever is less) round trip from the nearest Independent Authorized Service Dealer. Any additional travel required will not be covered.

### The following will NOT be covered by this warranty:

1. Costs of normal maintenance (i.e. associated part(s), adjustments, installation and start-up).
2. Damage to the transfer switch system caused by accidents, shipping, handling or improper storage.
3. Damage/failures caused by operation with loads or installations other than what's recommended or specified by Generac. Unauthorized modification/misapplication will not be warranted unless authorized by Generac in writing.
4. Rental equipment used while warranty repairs are being performed and/or any extraordinary equipment used for removal and/or reinstallation of generator (i.e. cranes, hoists, lifts, et. al.).
5. Planes, ferries, railroad, buses, helicopters, snowmobiles, snow-cats, off-road vehicles or any other mode of transport deemed not standard by Generac.
6. Failures due to normal wear and tear, accident, misuse, abuse, neglect, improper installation, or improper sizing.
7. Damage to any covered components or consequential damages caused by the use of a non-OEM part will not be covered by this warranty.
8. Damage related to rodent, reptile, and/or insect infestation.
9. Repairs or diagnostics performed by individuals other than Independent Authorized Service Dealers not authorized in writing by Generac.
10. Steel enclosures that rust as a result of improper installation, location in a harsh or salt water environment, or are scratched where the integrity of applied paint is compromised.
11. Fuses, light bulbs and any related labor.
12. Units sold, rated or used for "Prime Power", "Trailer Mounted" or "Rental Unit" applications as defined by Generac. Contact an Independent Authorized Service Dealer for definitions.
13. Failures caused by any act of God or external cause including without limitation, fire, theft, freezing, war, lightning, earthquake, windstorm, hail, water, tornado, hurricane, or any other matters which are reasonably beyond the manufacturer's control.
14. Shipping costs associated with expedited shipping.
15. Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
16. Any unit built/manufactured prior to 2014 models.
17. Overtime, holiday or emergency labor.
18. Living or travel expenses of person(s) performing service, except as specifically included within the terms of a specific unit warranty period.

**THIS WARRANTY SUPERSEDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH ARE ALLOWED BY LAW, SHALL BE LIMITED IN DURATION TO THE TERMS OF THE EXPRESS LIMITED WARRANTY PROVIDED HEREIN. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU COULD ALSO HAVE OTHER RIGHTS UNDER APPLICABLE LAW.**

**FOR AUSTRALIA ONLY:** Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

**FOR NEW ZEALAND ONLY:** Nothing in this warranty statement excludes, restricts or modifies any condition, warranty right or remedy which pursuant to the New Zealand Legislation (Commonwealth or State) including the Fair Trading Practices Act of 1986 or the Consumer Guarantees Act 1993 ("CGA") applies to this limited warranty and may not be so excluded, restricted or modified. Nothing in this statement is intended to have the effect of contracting out of the provisions of the CGA, except to the extent permitted by that Act, and these terms are to be modified to the extent necessary to give effect to that intention. If you acquire goods from Generac Power Systems or any of its authorized resellers and distributors for the purposes of a business, then pursuant to section 43(2) of the CGA, it is agreed that the provisions of the CGA do not apply.

GENERAC POWER SYSTEMS, INC. • P.O. BOX 8 • Waukesha, WI, USA 53187  
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To locate the nearest Independent Authorized Service Dealer and to download schematics, exploded views and parts lists  
visit our website: [www.generac.com](http://www.generac.com)

## Garantía limitada extendida de 2 años (2C) de Generac Power Systems para los sistemas de interruptores de transferencia industriales

Durante el período de garantía indicado abajo, que comienza desde la puesta en marcha y/o activación exitosa en línea de la unidad, Generac Power Systems, Inc. "Generac" garantiza que su sistema de interruptor de transferencia estará libre de defectos de material y/o mano de obra para los ítems y el período indicados a continuación. Generac, a su discreción, reparará o sustituirá cualquier pieza o piezas que, por medio de la evaluación, inspección y prueba efectuada por Generac o un Concesionario de servicio autorizado independiente de Generac, se determine que es o son defectuosa(s). Todo equipo que el comprador o propietario reclame como defectuoso debe ser evaluado por el Concesionario de servicio autorizado independiente de Generac más cercano.

Cobertura de la garantía en año(s) 1-2
Sobre piezas, mano de obra y gastos de viaje limitados

### Directrices:

1. La unidad debe estar registrada y tener prueba de compra disponible.
2. Cualquiera y todas las reparaciones y/o preocupaciones por garantía deben ser efectuadas y/o dirigidas por un Concesionario de servicio autorizado independiente de Generac, o una sucursal de este. No serán cubiertas las reparaciones o los diagnósticos efectuados por personas diferentes de los Concesionarios de servicio autorizados independientes de Generac no autorizados por escrito por Generac.
3. La garantía es transferible entre propietarios del sitio de instalación original.
4. Generac puede elegir reparar, sustituir o reembolsar una pieza del equipo a su exclusiva discreción.
5. La garantía corresponde solamente a las unidades conectadas y montadas en forma permanente.
6. Los gabinetes están garantizados contra corrosión solamente durante el primer año de propiedad. El daño causado después de la recepción del generador es responsabilidad del comprador y no está cubierto por esta garantía. Las muescas, raspaduras, abolladuras o rayaduras de gabinete pintado deben ser reparadas sin demora por el propietario.
7. Debe haber disponible prueba de la ejecución de todo el mantenimiento requerido.
8. Las asignaciones para viaje están limitadas a 300 millas como máximo o siete horas y media (7.5) horas como máximo (por ocurrencia, lo que sea menor), viaje de ida y vuelta, desde el Concesionario de servicio autorizado independiente de Generac más cercano. Todo gasto de viaje adicional requerido no será cubierto.

### Lo siguiente NO será cubierto por esta garantía:

1. Los costes del mantenimiento normal (es decir: pieza[s] relacionada[s], ajustes, instalación y puesta en marcha inicial).
2. Los daños al sistema de interruptor de transferencia causados por accidentes, envío, manipulación o almacenamiento incorrecto.
3. Los daños/fallos causados por la operación con cargas o instalaciones incorrectas diferentes de las recomendadas o especificadas por Generac. Las modificaciones/aplicaciones incorrectas no autorizadas no estarán garantizadas salvo que sean autorizadas por Generac por escrito.
4. Equipos arrendados usados mientras se llevan a cabo reparaciones de garantía y/o todos los equipos extraordinarios usados para retirar y/o reinstalar el generador, (esto es: grúas, malacates, elevadores, etc.).
5. Aeronaves, transbordadores, ferrocarril, autobuses, helicópteros, motocicletas para nieve, camiones para nieve, vehículos fuera de ruta o cualquier otro modo de transporte no considerado estándar por Generac.
6. Fallos debidos a: desgaste y daño normal, accidente, uso indebido, abuso, negligencia, instalación incorrecta o dimensionamiento incorrecto.
7. Los daños a cualquier componente o los daños emergentes causados por el uso de una pieza que no sea OEM no estarán cubiertos por esta garantía.
8. Daños relacionados con plagas de roedores, reptiles y/o insectos.
9. Las reparaciones o los diagnósticos efectuados por personas diferentes de los Concesionarios de servicio autorizados de Generac no autorizados por escrito por Generac.
10. Los gabinetes de acero que se corroen debido a instalación incorrecta, ubicación en un entorno agresivo o con agua salada, o se rayen donde esté comprometida la integridad de la pintura aplicada.
11. Fusibles, bombillas de luz y mano de obra relacionada.
12. Las unidades vendidas, calificadas para, o usadas en aplicaciones de "Alimentación eléctrica principal", "Montada en remolque" o "Unidad en alquiler" como las define Generac. Comuníquese con un Concesionario de servicio autorizado independiente para las definiciones.
13. Los fallos causados por cualquier acto de fuerza mayor o causa externa, que incluyen, sin limitaciones, incendio, robo, congelamiento, guerra, rayos, terremoto, tormenta de viento, granizo, agua, tornado, huracán, o cualesquiera otros asuntos que estén fuera del control razonable del fabricante.
14. Costes de envío asociados con envío urgente.
15. Todos los daños accesorios, emergentes o indirectos causados por defectos en los materiales o mano de obra o toda demora en la reparación o sustitución de la(s) pieza(s) defectuosa(s).
16. Toda unidad fabricada/construida antes de los modelos de 2014.
17. Horas extra, trabajo en días festivos o de emergencia.
18. Gastos de estadía o viaje de la(s) persona(s) que efectúe(n) el servicio, excepto como se incluya específicamente dentro de los términos del período de garantía de una unidad específica.

ESTA GARANTÍA SUSTITUYE CUALQUIER OTRA GARANTÍA, EXPRESA O IMPLÍCITA. ESPECÍFICAMENTE, GENERAC NO EXTIENDE NINGUNA OTRA GARANTÍA ACERCA DE LA COMERCIALIZACIÓN O APTITUD PARA UN PROPÓSITO EN PARTICULAR. LA DURACIÓN DE TODAS LAS GARANTÍAS IMPLÍCITAS PERMITIDAS POR LA LEY ESTARÁ LIMITADA A LAS CONDICIONES DE LA GARANTÍA LIMITADA EXPRESA ESTIPULADA EN LA PRESENTE. ALGUNAS JURISDICCIONES NO PERMITEN LIMITACIONES DE LA DURACIÓN DE UNA GARANTÍA IMPLÍCITA; POR LO TANTO, LA LIMITACIÓN PRECEDENTE PUEDE NO APLICARSE A USTED. LA ÚNICA RESPONSABILIDAD DE GENERAC SERÁ REPARAR O SUSTITUIR LA(S) PIEZA(S) COMO SE ESTIPULÓ PRECEDENTEMENTE. GENERAC NO SERÁ RESPONSABLE EN NINGÚN CASO POR NINGÚN DAÑO ACCESORIO O EMERGENTE, AUN CUANDO TAL DAÑO SEA RESULTADO DIRECTO DE LA NEGLIGENCIA DE GENERAC. ALGUNAS JURISDICCIONES NO PERMITEN LA EXCLUSIÓN O LIMITACIÓN DE DAÑOS ACCESORIOS O EMERGENTES, DE MANERA QUE LA LIMITACIÓN PRECEDENTE PUEDE NO APLICARSE A USTED. ESTA GARANTÍA LE OTORGA DERECHOS LEGALES ESPECÍFICOS. TAMBIÉN PUEDE TENER OTROS DERECHOS BAJO LA LEY CORRESPONDIENTE.

**SOLO PARA AUSTRALIA:** Nuestros productos se entregan con garantías que no pueden ser excluidas según la Australian Consumer Law (Ley australiana de consumidores). Usted tiene derecho a sustitución o reembolso por un fallo mayor y a compensación por cualquier otra pérdida o daño razonable previsible. Usted también tiene derecho a que los bienes sean reparados o sustituidos si los bienes no son de calidad aceptable y la falla no llega a ser un fallo mayor.

**SOLO PARA NUEVA ZELANDA:** Nada de esta declaración de garantía excluye, restringe o modifica ninguna condición, derecho de garantía o solución que, conforme a la legislación de Nueva Zelanda (Comunidad o Estado), incluso la Fair Trading Practices Act (Ley de transacciones comerciales justas) de 1986 o la Consumer Guarantees Act (Ley de garantías de los consumidores, "CGA") de 1993, se aplique a esta garantía limitada y por lo tanto no puede ser sometida a exclusiones, restricciones o modificaciones. Nada de esta declaración tiene el propósito de tener efecto de contratar fuera de las previsiones de la CGA, excepto con el alcance permitido por la ley y estos términos se deben modificar con el alcance necesario para hacer efectiva esta intención. Si adquiere bienes de Generac Power Systems o alguno de sus revendedores y distribuidores autorizados con propósitos comerciales, entonces, conforme a la sección 43(2) de la CGA, se acuerda que no se aplican las previsiones de la CGA.

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Tel.: (888) GENERAC (436-3722) • Fax: (262) 544-4851

Para ubicar el Concesionario de servicio autorizado independiente más cercano y descargar diagramas esquemáticos, despieces y listas de piezas visite nuestro sitio Web: [www.generac.com](http://www.generac.com)



## Garantie limitée prolongée de 2 ans (2C) de Generac Power Systems sur les commutateurs de transfert industriels

Pendant la période de garantie mentionnée ci-bas, qui débute dès le démarrage réussi de l'appareil ou l'activation en ligne de l'appareil, Generac Power Systems, Inc. (Generac) garantit que son commutateur de transfert sera exempt de vices de matériaux et fabrication en ce qui concerne les éléments et la période indiqués ci-dessous. À sa seule discrétion, Generac réparera ou remplacera toute pièce qui est jugée défectueuse après l'évaluation, l'inspection et la mise à l'essai par Generac ou un fournisseur de services d'entretien agréé indépendant. Tout équipement que l'acheteur/propriétaire prétend être défectueux doit être évalué par le fournisseur de services d'entretien agréé indépendant le plus près.

Période de garantie de 1 à 2 ans
Pièces, main-d'œuvre et couverture limitée des déplacements

### Lignes directrices :

1. L'appareil doit être enregistré et la preuve d'achat doit être présentée sur demande.
2. Toute réparation sous garantie doit être effectuée par un fournisseur de services d'entretien agréé indépendant ou l'une de ses succursales, et toute préoccupation doit être également traitée par un fournisseur de services d'entretien agréé indépendant de Generac ou l'une de ses succursales. Toute réparation ou évaluation effectuée par des personnes autres que des fournisseurs de services d'entretien agréés indépendants qui n'a pas été autorisée par écrit par Generac ne sera pas couverte.
3. La présente garantie est transférable conjointement à la propriété du site d'installation d'origine.
4. Generac peut choisir, à sa seule discrétion, de réparer, de remplacer ou de rembourser une pièce d'équipement.
5. La garantie s'applique uniquement aux appareils montés et câblés en permanence.
6. Les boîtiers sont garantis pendant la première année de possession seulement. Les dommages causés après la réception du générateur sont la responsabilité du propriétaire et ne sont pas couverts par la présente garantie. Les entailles, éraflures, bosses ou égratignures au boîtier peint doivent être réparées sans délai par le propriétaire.
7. Une preuve d'exécution de tous les travaux d'entretien requis doit être présentée sur demande.
8. La présente garantie couvre les déplacements aller-retour d'un maximum de 480 km (300 miles) et de sept heures et demie (7,5) (par déplacement, selon le moindre des deux) à partir du fournisseur de services d'entretien agréé indépendant le plus près. Tout déplacement supplémentaire requis ne sera pas couvert.

### Les éléments suivants ne seront PAS couverts par la présente garantie :

1. Les coûts d'entretien normal (c'est-à-dire pièces associées, ajustements, installation et démarrage).
2. Les dommages au commutateur de transfert causés par un accident, le transport, la manutention ou un entreposage inadéquat.
3. Les dommages/défaillances causés par des charges ou selon une installation autres que ce qui est recommandé ou spécifié par Generac. Les modifications ou les utilisations non autorisées ne seront pas couvertes, sauf si Generac les autorise par écrit.
4. L'équipement de location utilisé pendant que des réparations sous garantie sont effectuées et/ou tout équipement extraordinaire utilisé pour retirer ou réinstaller le générateur (c'est-à-dire grues, appareils de levage, élévateurs, etc.).
5. Les avions, les traversiers, les trains, les autobus, les hélicoptères, les motoneiges, les dameuses, les véhicules hors route ou tout autre moyen de transport jugé non standard par Generac.
6. Les défaillances causées par l'usure normale, un accident, une utilisation inappropriée, une utilisation abusive, une négligence, une installation inadéquate ou un dimensionnement inadéquat.
7. Aucun dommage ou dommage indirect à toute pièce couverte découlant de l'utilisation de pièces non fabriquées par un fabricant d'équipement d'origine ne sera couvert par la présente garantie.
8. Les dommages causés par une infestation de rongeurs, de reptiles ou d'insectes.
9. Toute réparation ou évaluation effectuée par des personnes autres que des fournisseurs de services d'entretien agréés indépendants qui n'a pas été autorisée par écrit par Generac.
10. Les boîtiers en acier qui rouillent en raison d'une installation inadéquate, d'une installation dans un environnement difficile ou salin ou d'égratignures qui compromettent l'intégrité de la peinture appliquée sur le boîtier.
11. Les fusibles, les ampoules électriques et toute main-d'œuvre connexe.
12. Les appareils vendus, cotés ou utilisés selon les applications suivantes, telles qu'elles sont définies par Generac : « puissance électrique de base », « monté sur remorque » ou « unité de location ». Veuillez communiquer avec un fournisseur de services d'entretien agréé indépendant pour obtenir les définitions.
13. Les défaillances causées par un cas de force majeure ou une cause externe y compris, sans toutefois s'y limiter, le feu, le vol, le gel, la guerre, la foudre, un tremblement de terre, une tempête, la grêle, la pluie, une tornade, un ouragan ou toute autre situation raisonnablement hors du contrôle du fabricant.
14. Les coûts d'expédition liés à l'expédition accélérée.
15. Tout dommage accessoire, subséquent ou indirect causé par un défaut de matériau et de fabrication ou par tout retard dans la réparation ou le remplacement de pièces défectueuses.
16. Tout appareil construit/fabriqué avant les modèles 2014.
17. Les heures supplémentaires, les jours fériés ou les salaires de la main-d'œuvre d'urgence.
18. Les frais d'hébergement ou de transport des personnes réalisant l'entretien, sauf s'ils sont spécifiquement compris en vertu des conditions d'une période de garantie d'un appareil spécifique.

**LA PRÉSENTE GARANTIE REMPLACE TOUTES LES AUTRES GARANTIES, EXPLICITES OU IMPLICITES. EN PARTICULIER, GENERAC N'OFFRE AUCUNE GARANTIE QUANT À LA QUALITÉ MARCHANDE OU À LA CONVENANCE À UN USAGE PARTICULIER. TOUTE GARANTIE IMPLICITE AUTORISÉE PAR LA LOI SERA LIMITÉE À LA DURÉE DE LA PÉRIODE DE LA PRÉSENTE GARANTIE LIMITÉE EXPLICITE. CERTAINS ÉTATS OU PROVINCES NE PERMETTENT PAS LES LIMITATIONS SUR LA DURÉE D'UNE GARANTIE IMPLICITE ET, PAR CONSÉQUENT, LA PRÉSENTE LIMITATION PEUT NE PAS S'APPLIQUER. LA RESPONSABILITÉ DE GENERAC SE LIMITERA À LA RÉPARATION OU AU REMPLACEMENT DES PIÈCES, COMME INDIQUÉ PRÉCÉDEMMENT. EN AUCUN CAS GENERAC NE POURRA ÊTRE TENUE RESPONSABLE DE DOMMAGES ACCESSOIRES OU SUBSÉQUENTS, MÊME SI LES DOMMAGES RÉSULTENT DIRECTEMENT DE LA NÉGLIGENCE DE GENERAC. CERTAINS ÉTATS OU PROVINCES N'AUTORISENT PAS L'EXCLUSION NI LA LIMITATION DES DOMMAGES ACCESSOIRES OU INDIRECTS ET, PAR CONSÉQUENT, LA LIMITATION ÉNONCÉE CI-DESSUS PEUT NE PAS S'APPLIQUER. CETTE GARANTIE VOUS CONFÈRE DES DROITS LÉGAUX PRÉCIS. VOUS POUVEZ ÉGALEMENT JOUIR D'AUTRES DROITS EN VERTU DES LOIS APPLICABLES.**

**POUR L'Australie UNIQUEMENT :** Nos produits sont fournis avec des garanties qui ne peuvent être exclues en vertu de la loi australienne sur la consommation (Australian Consumer Law). Vous avez droit à un remplacement ou à un remboursement pour une défaillance majeure et à une indemnisation pour toute autre perte ou tout dommage raisonnablement prévisible. Vous disposez également d'un droit à la réparation ou au remplacement si les produits ne sont pas d'une qualité acceptable et si cette défaillance n'est pas considérée comme majeure.

**POUR LA NOUVELLE-ZÉLANDE UNIQUEMENT :** Cette garantie n'exclut, ne restreint ni ne modifie aucune condition, aucun droit de garantie ou recours qui, conformément à la législation de Nouvelle-Zélande (Commonwealth ou État), y compris la loi sur la pratique commerciale loyale de 1986 (Fair Trading Practices Act) ou la loi sur la protection du consommateur de 1993 (CGA ou Consumer Guarantees Act), s'applique à cette garantie limitée et ne peut pas être exclue, restreinte ou modifiée. Cette garantie ne vise en aucun cas à contourner les dispositions de la CGA, sauf dans la mesure permise par cette loi, et ces termes doivent être modifiés dans la mesure nécessaire pour donner effet à cette intention. Si vous faites l'acquisition d'un produit de Generac Power Systems ou d'un de ses distributeurs et revendeurs autorisés à des fins commerciales, alors, conformément à l'article 43(2) de la CGA, il est convenu que les dispositions de la CGA ne s'appliquent pas.

**GENERAC POWER SYSTEMS, INC. • C.P. 8 • Waukesha, WI (É.-U.) 53187**  
Téléphone : (888) GENERAC (436-3722) • Télécopieur : (262) 544-4851

Pour trouver le fournisseur de services d'entretien agréé indépendant le plus près et pour télécharger les schémas, les vues éclatées et les listes de pièces  
visitez notre site Web : [www.generac.com](http://www.generac.com)



# CERTIFICATE



This is to certify that

## Generac Power Systems, Inc.

S45 W29290 Hwy. 59  
Waukesha, WI 53189  
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

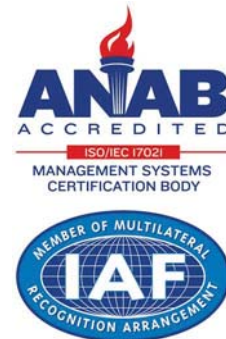
Scope:

Design, Manufacturing, and Distribution of Generators and Power Products.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

## ISO 9001 : 2015

Certificate registration no.	10012920 QM15
Date of original certification	2013-12-09
Date of certification	2018-07-16
Valid until	2021-07-15



**DQS Inc.**

Brad McGuire  
Managing Director



**Annex to certificate**  
**Registration No. 10012920 QM15**

**Generac Power Systems, Inc.**

S45 W29290 Hwy. 59  
Waukesha, WI 53189  
United States of America

**Location**

**Scope**

**10012920**  
**Generac Power Systems, Inc.**  
**S45 W29290 Hwy. 59**  
**Waukesha, WI 53189**  
**United States of America**

Design, Manufacturing of Generator Components and Distribution of Service Parts.

**10012922**  
**Generac Power Systems, Inc.**  
**211 Murphy Dr.**  
**Eagle, WI 53119**  
**United States of America**

Manufacturing and Distribution of Generators.

**10012923**  
**Generac Power Systems, Inc.**  
**757 N. Newcomb St.**  
**Whitewater, WI 53190**  
**United States of America**

Manufacturing and Distribution of Generators and Manufacture of Generator components.

**10012924**  
**Generac Power Systems, Inc.**  
**900 N. Parkway**  
**Jefferson, WI 53549**  
**United States of America**

Manufacturing of Generators and Power Products.

**10013528**  
**Generac Power Systems**  
**3815 Oregon St.**  
**Oshkosh, WI 54902**  
**United States of America**

Manufacturing of Generators.

**Remote Location**

**Scope**

**10014175**  
**Generac Power Systems, Inc.**  
**351 Collins Road**  
**Jefferson, WI 53549**  
**United States of America**

The remote location at Jefferson, WI performs the following primary functions: Parts and Components Receiving, Inventory, and Distribution to Generac Locations.

This annex (edition: 2018-07-16) is only valid in connection with the above-mentioned certificate.




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2019 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** FPT Industrial S.p.A.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** KFPXL06.7DGS-007

**Effective Date:**  
07/16/2018  
**Expiration Date:**  
12/31/2019

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
07/16/2018  
**Revision Date:**  
N/A

**Model Year:** 2019

**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** KFPXL06.7DGS

**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 130<=kW<225  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** No Non-After Treatment Devices Installed

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.



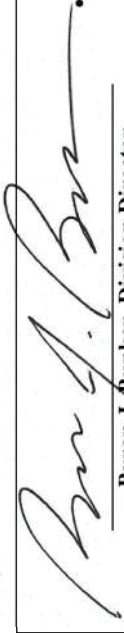


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2020 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** FPT Industrial S.p.A.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** LFPXL06.7DGS-005

**Effective Date:**  
07/11/2019  
**Expiration Date:**  
12/31/2020

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
07/11/2019  
**Revision Date:**  
N/A

**Model Year:** 2020

**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** LFPXL06.7DGS

**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 130<=kW<225  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** No Non-After Treatment Devices Installed

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

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This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.

## Warranty

### **United States Environmental Protection Agency Warranty Statement (Stationary Emergency Compression-Ignition Generators)**

#### **Warranty Rights, Obligations and Coverage**

Your emission-related warranty covers only components whose failure would increase an engine's emissions of any regulated pollutant where they are designed, built, and equipped to be free from defects in materials and workmanship under applicable regulations of section 213 of the clean air act. To receive information about how to make an emission-related warranty claim, and how to make arrangements for authorized repairs call **1-800-333-1322** or **[www.generac.com](http://www.generac.com)**. Emission-related warranty claims may be denied without proof of proper maintenance or use, accidents beyond the control of the manufacturer, or act of God. Proper maintenance is specified in the Owner's Manual. Usage is limited to stationary emergency operations and 100 hours per year for maintenance and readiness testing. The warranty period begins when the engine is placed into service. Warranty periods for compression ignition engines greater than 25 horsepower is five years. This warranty is applicable to compression-ignition generator models; equal to and larger than an SD80 starting 1/1/2011, equal to and larger than an SD35 starting 1/1/2012, and all compression-ignition generator models starting 1/1/2013.

#### **Important Note**

This warranty statement explains your rights and obligations under the Emission Control System Warranty, which is provided to you by Generac pursuant to federal law. Note that this warranty shall not apply to any incidental, consequential or indirect damages caused by defects in materials or workmanship or any delay in repair or replacement of the defective part(s). This warranty is in place of all other warranties, expressed or implied. Specifically, Generac makes no other warranties as to the merchantability or fitness for a particular purpose. Any implied warranties which are allowed by law, shall be limited in duration to the terms of the express warranty provided herein. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

## Solution Summary

<b>Contact Information</b>	
Project :	General
Solution Name :	LS 082
Spec Ref# :	
Description :	
Contact :	
Email :	

<b>Environment</b>	
Ambient Temperature :	100 F / 38 C
Elevation :	1000 ft / 305 m

<b>Electrical Configuration</b>	
Phase :	Three Phase
Frequency (Hz) :	60 Hz
Voltage (Nominal) :	480/277V (High Wye)
Voltage (Specific) :	480 volts

<b>Maximum Allowable Transients</b>	
Maximum Running Load :	100 %
Voltage Dip :	35.00 %
Frequency Dip :	15 hertz

<b>Load Sequence Configuration</b>	
Cyclic #1:	75 % After Largest
Cyclic #2:	75 % After Largest

<b>Prepared By</b>	
Name :	John Agnes
Company :	ACF Standby Systems
Phone :	352-277-6403
Email :	j.agnes@acpower.com

<b>Units</b>	
Units :	English

<b>Engine</b>	
Duty :	Standby
Fuel :	Diesel

<b>Regulatory Information</b>	
Regulatory Filters :	US EPA
Application:	General

<b>Generator Configuration</b>	
Sound (desired) :	No Requirement
Fuel Tank :	Sub Base UL 142
Run Time (desired) :	24 hr

<b>Max Allowable Voltage Distortion (% THVD)</b>	
Continuous :	11 %
Momentary :	13 %

## Generator and Load Summary

Selected Generator & Alternator	
Product Family Method :	Auto Select
Product Family :	SD/MD Diesel
Sizing Method :	Auto Select
Generator :	1 x 175 kW, 6.7L
Quantity :	1
Alternator :	K0300124Y21-300kW

175 kw, Diesel Genset -- Site rated 175 kw 6.7 L Engine with Upsized (K0300124Y21-300kW) Alternator			
Load Level		Transients	Harmonics
Running :	65 %	Fdip (Hz): 0.6	THVD Cont: 9.8 %
Peak :	62	Vdip (%): 1.7	THVD Peak : 9.8 %
Solution Limits			
Max Loading :	100 %	Fdip (Hz): 15	THVD Cont: 11 %
		Vdip (%): 35	THVD Peak : 13 %

Load Summary -- Connected Load of 113.56 kW				
Running	Transients		Harmonics	
kW:	113.56	kW (Step ):	15.31	kVA: 129
kVA:	129.06	kW (Peak ):	113.56	THID Cont: 30%
PF:	0.88	kVA (Step ):	17.4	THID Peak : 30%

Load List		Starting		Running		Harmonic Current Distortion			Limits	
Sequence	Description	kW	kVA	kW	kVA	Peak	Cont.	kVA	Vdip	Fdip
Step 1 (Concurrent)	Motor : Motor #1 1 X 60.00 HP Code G (6 kVA/HP) 6 Pulse Rectifier VFD Commercial(115%) Rated torque at start running at 100% ,	15.31	17.4	56.78	64.53	30 %	30 %	64.5	25.00 %	5 Hertz
Step 1 (Concurrent) Summary	All loads on (sequence starting) 56.8kW All loads on (sequence starting) 56.8 kW Application Peak	15.31	17.4	56.78	64.53	30 %	30 %	64.5	25 % 120 volts	8.3 % 5 hertz
Step 2 (Concurrent)	Motor : Motor #2 1 X 60.00 HP Code G (6 kVA/HP) 6 Pulse Rectifier VFD Commercial(115%) Rated torque at start running at 100% ,	15.31	17.4	56.78	64.53	30 %	30 %	64.5	15.00 %	5 Hertz
Step 2 (Concurrent) Summary	All loads on (sequence starting) 56.8kW All loads on (sequence starting) 113.6 kW Application Peak	15.31	17.4	56.78	64.53	30 %	30 %	64.5	15 % 72 volts	8.3 % 5 hertz

## Transient Analysis

Most difficult alternator transient requirements (Vdip)			
Sequence :	Step 2 (Concurrent)		
Load :	Motor #2		
Starting kVA:	17.4		
Vdip Tolerance :	15.00 %		
Vdip Expected :	*1.7 %		

Most difficult engine transient requirements (Fdip)			
Sequence :	Step 1 (Concurrent)		
Load :	Motor #1		
Starting kVA:	15.31		
Fdip Tolerance :	5		
Fdip Expected :	0.59		

Alternator Transient Analysis (Vdip)				
Sequence	Allowable Vdip	Expected Vdip	Sequence Starting kVA	Largest Transient Load
Step 1 (Concurrent)	25.0 %	*1.72 %	17.4	Motor #1
Step 2 (Concurrent)	15.0 %	*1.72 %	17.4	Motor #2

Engine Transient Analysis (Fdip)				
Sequence	Allowable Fdip	Expected Fdip	Sequence Starting kW	Largest Transient Load
Step 1 (Concurrent)	5	0.59	15.31	Motor #1
Step 2 (Concurrent)	5	0.59	15.31	Motor #2

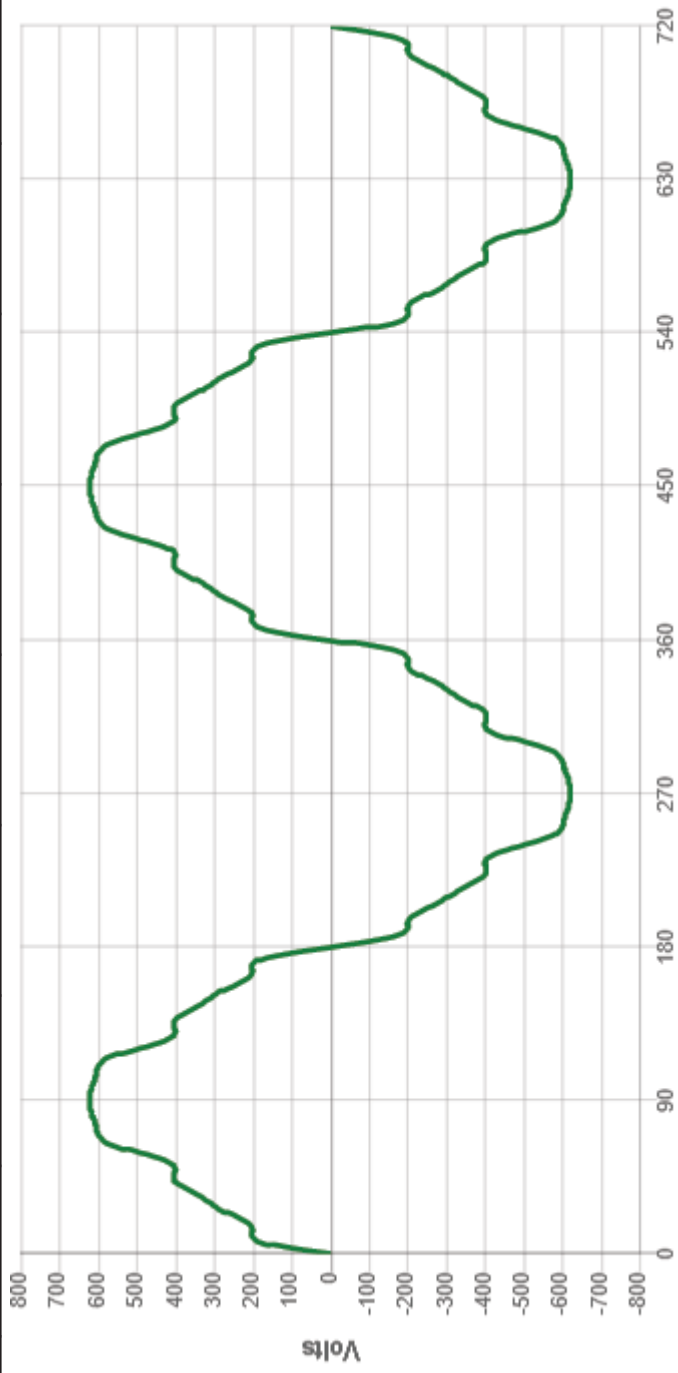
Note: UPS that revert to battery on system transients do not establish a sequence frequency dip limit through they may impact the sizing. The sizing algorithm verifies the engine can accept the UPS within its frequency tolerance.

## Harmonic Analysis

Harmonic Profile : Application Total (running) Sequence (Total)  
kVA Nonlinear Load: 129.1 THID: 30 % THVD: 9.8 %  
kVA Base (all non-linear): 129 Selected sequence(s) harmonic alternator loading: 40 %

Selected Harmonic Current and Voltage Profiles

Profile	3rd	5th	7th	9th	11th	13th	15th	17th	19th
Current	0 %	26.1 %	10.4 %	0 %	7.7 %	4.9 %	0 %	3.8 %	3.6 %
Voltage	0 %	6.7 %	3.8 %	0 %	4.4 %	3.3 %	0 %	1.7 %	3.6 %



## Harmonic Analysis

Harmonic Profile :

kVA Nonlinear Load:

kVA Base (all non-linear):

Application Total (peak)

129

129

Sequence

THID: 30 %

(Total)

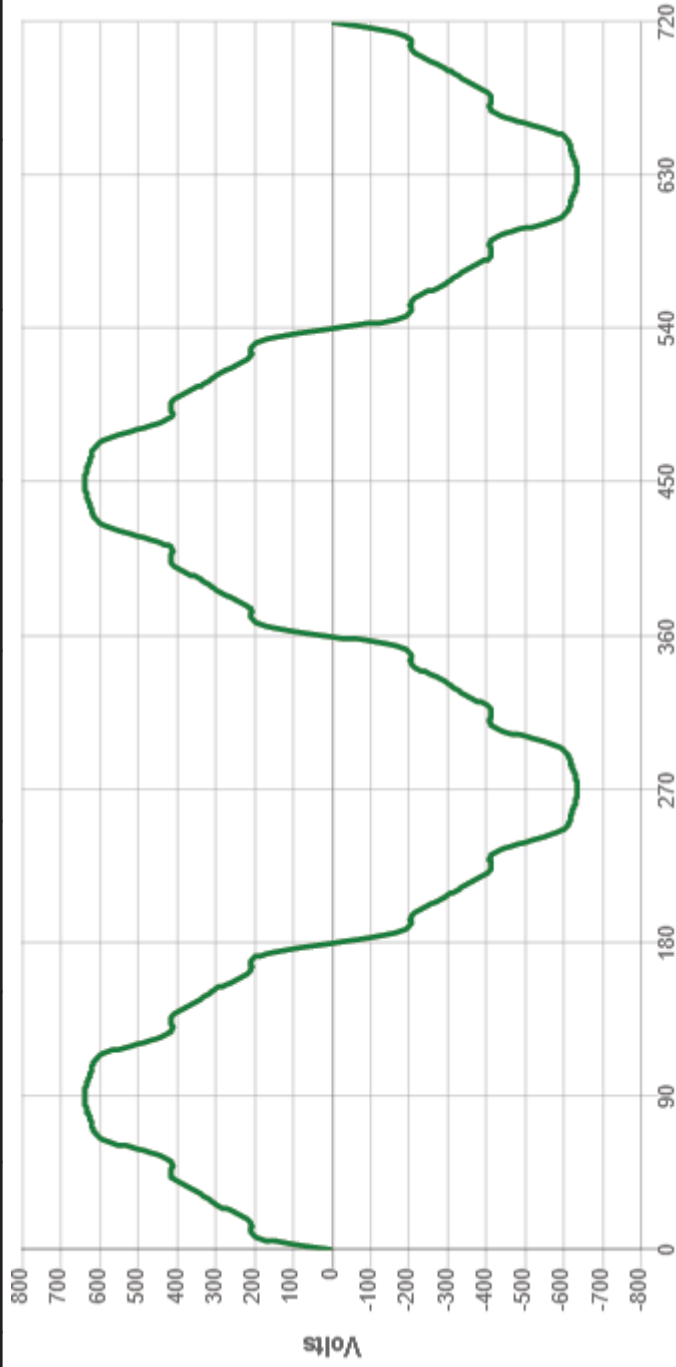
THVD: 9.8 %

40 %

Selected sequence(s) harmonic alternator loading:

### Selected Harmonic Current and Voltage Profiles

Profile	3rd	5th	7th	9th	11th	13th	15th	17th	19th
Current	0 %	26.1 %	10.4 %	0 %	7.7 %	4.9 %	0 %	3.8 %	3.6 %
Voltage	0 %	6.7 %	3.8 %	0 %	4.4 %	3.3 %	0 %	1.7 %	3.6 %





S45W29290 Hwy 59 Waukesha, WI 53189

## Gas Piping

Gas Pipe size only applies to gaseous fuel.



## Exhaust Piping

Generator Summary	
Sizing Method :	Auto Select
Pipe Size :	2.00"
Product Family :	SD/MD Diesel
Generator :	175 kW, 6.7L
Total Exhaust Flow (ft3 / Min):	1212
Maximum Back Pressure (inches of water) :	13.6

Inputs	
Length of run (ft):	1
Number of Standard Elbows :	0
Number of Long Elbows (radius > 1.5 dia):	0
Number of 45 elbows :	0

Pressure Drop (inches of water) :	0
Solution	

\*Piping pressure drop calculations only. Verify installation is performed per code requirements