

AGRICUTURE PRODUCTION WELL & PUMPING EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE

The work to be performed under this Section includes the furnishing of all labor, materials, equipment, and all other facilities and incidentals necessary to construct one 6-inch agriculture production well.

The work also includes the furnishing of all labor, materials, equipment, and all other facilities and incidentals necessary to conduct a pumping and drawdown test of the production well.

These Specifications are intended to give a general description of what is required, but do not cover all variations that may occur during well construction. These Specifications are intended to cover the successful completion and testing of the production well as herein specified, whether every detail is specifically mentioned or not.

1.2 REFERENCE TO STANDARDS

The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply as referenced herein. Standards shall include, but are not restricted to the following:

- AWWA Deep Well Standards, A100-06
- ANSI Stainless Steel Pipe Standards, B36.19
- ASTM Pipe Standards, A53
- API Pipe Standards, 5L
- ASTM Portland Cement Standards, C150
- FDEP, Chapter 62-532

1.3 REVIEW AND APPROVAL

The Contractor shall submit six (6) sets of shop drawing submittals for all equipment and material proposed for approval by the Engineer prior to ordering.

The Engineer will review and approve with reasonable promptness Shop Drawings, samples, etc.; but the Engineer's review and approval shall be only for conformance with the design concept of the Project and for compliance with the

information given in the Contract Documents.

The Engineer's review and approval shall not relieve the Contractor from responsibility for any deviations from the Contract Documents unless the Contractor has in writing, called the Engineer's attention to such deviation at the time of submission and the Engineer has given written concurrence and approval to the specific deviation.

The Engineer's review and approval shall not relieve the Contractor from responsibility to meet the well acceptance criteria and warranty requirements specified herein.

1.4 PERMITS

The Contractor shall within 5 days following notice of award of Contract, apply for a well construction permit from the Northwest Florida Water Management District to construct the well specified herein, in accordance with the Rules of the Department of Environmental Protection (DEP), Chapter 62-532. The permit shall be available for inspection at the site of the well during construction. The Contractor shall be responsible for obtaining permit time extensions in accordance with the rule specified above if well construction extends beyond the permit validity date.

The Owner shall be responsible for obtaining any additional federal, state, or local permits required for constructing the wells, discharging water from the site and any permits required for clearing the site for work or access.

The Contractor shall not perform any work on the well until these permits are obtained.

The Contractor shall furnish separate copies of all permits to the Owner and the Engineer as the permits are received.

1.5 DESCRIPTION OF WELL

The production well will be a minimum of 6-inches in diameter and cased to a depth of 10 feet into the top of the limestone production aquifer. The production well shall be constructed with a sufficient amount of open hole of 6-inch nominal diameter below the bottom of the casing so as to provide a 125 gallon per minute supply of water with minimal drawdown and an acceptable sand content of less than 1mg/L while the well is being pumped at 125 gallons per minute during a measurement period of five (5) minutes.

1.6 UTILITIES:

The contractor is required to provide his or her own utilities as required for this project. If utilities are available, the Contractor is responsible for securing the use of these local utilities and paying all costs associated with their use.

1.7 QUALIFICATIONS

The Contractor responsible for constructing the well shall be licensed by the Florida Department of Environmental Protection (FAC Chapter 62-531) as a water well contractor employing only competent workers for the execution of this work, and all such work shall be performed under the direct supervision of an experienced well driller satisfactory to the Engineer.

The well driller shall be capable of identifying geologic formations, maintaining complete and current well logs and daily notes for the well completion report, and developing and testing the well.

The Contractor shall furnish satisfactory evidence upon request that all materials to be furnished in performing the specified work are new and all equipment to be used is in good working order.

The Contractor shall complete the work described in this Section in accordance with (a) the American Water Works Association Standard for Deep Wells (AWWA A100-06), and (b) applicable portions of the Rules of the Florida DEP, Chapters 62-532 and 62-550 & 62-555.

1.8 SUBMITTALS

Six (6) copies of all materials required to establish compliance with the Specifications shall be submitted to the Engineer.

1.9 HANDLING OF MATERIALS

All materials shall be properly protected so that no damage or deterioration will occur during a prolonged delay from time of shipment until installation is completed and the

units and equipment are ready for operation.

All materials must be properly protected against damage during storage.

1.10 WELL ACCEPTANCE CRITERIA

The sand content in the water from a completed well, while being pumped at 100 percent of the design capacity, shall not at any time, exceed 1 mg/L after five (5) minutes of continuous pumping.

1.11 WARRANTY

All materials supplied under this Section shall be warranted for a period of 1 year by the Contractor and material manufacturers. The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. The warranty period shall commence on Substantial Completion, as specified in the Contract.

The materials shall be warranted to be free from defects in workmanship and design. Any materials that fail during warranty period shall be replaced and the unit restored to service at no expense to the Owner.

1.12 ADDITIONAL WORK

At the option of the Engineer or the Owner, additional work may be authorized. Additional work shall be completed at prices not exceeding those of comparable work and materials, as determined by the Engineer and as specified by the Bidder in the price schedule.

1.13 MEASUREMENT AND PAYMENT

Payment for work performed shall be on a basis of unit and lump sum prices bid for well and actual work performed. The bid items are intended to cover all costs involved in completing the work specified herein. The Bidder shall include all incidental costs into the applicable unit or lump sum prices.

PART 2 -DRILLED WELL AND TESTING

2.01 GENERAL

- A. Local Conditions: Local conditions are estimated for the well site from well logs in the surrounding areas.
1. Materials to be penetrated in the borehole are expected to consist of sand, clay, flowing sand/mud, and limestone is expected to be encountered in the limestone unit of the Hawthorn formation. Below the Hawthorn formation is consolidated limestone of the Suwannee and Ocala limestone. This limestone may contain extensively developed cavern systems, and caverns up to several feet in height have been recorded in nearby wells.
 2. Unconsolidated material above the upper water bearing limestone formation shall be completely cased off and sealed by so as to prevent contamination of the limestone or corrosion of the casing by soil or water above the water bearing formation.
- B. Guarantee of Information: Information in regard to the nature of the formation is not guaranteed by the Owner; and the Contractor shall satisfy himself regarding all local conditions affecting his work by personal investigation. Neither the information contained in this section nor derived from maps, plans or from the Owner, his agents or employees shall act to relieve the Contractor from any responsibility hereunder or from fulfilling any and all of the requirements of these specifications.
- C. The completed well shall consist of the following principal items:
- 6-inch nominal diameter well casing installed to a minimum depth of 10-feet into the top of the limestone aquifer production formation.
- 6-inch nominal diameter open-hole shall be installed to a minimum depth so as to provide a sufficient amount of open hole below the bottom of the casing to provide a 125 gallon per minute supply of water with minimal drawdown and an acceptable sand content of less than

1mg/L while the well is being pumped at 125 gallons per minute during a measurement period of five (5) minutes.

Other work shall include the 6' x 6' concrete pad at top of well, installation and painting of (4) protective bollards and testing as specified or as directed by the Engineer.

- D. The design capacity of the test well shall be 125 gallons per minute of clean, clear water continuously.
- E. Guarantee: The Contractor shall guarantee the well to be free from sand, limestone particles or other foreign materials whatsoever.

2.02 YIELD

- A. The completed wells shall supply sustained yields of up to 125 gallons per minute of clean water, free of sand, silt, and mud for the specified yield test and drawdown test.

2.03 SAMPLES AND RECORDS

- A. Before installing the casing or materials in the well, a report listing the source and description of the materials to be used and the mill certificates shall be submitted to the Owner.
- B. During drilling of the well, the Contractor shall maintain at the well site a complete log setting forth the following:
 - 1. The reference point for all depth measurements
 - 2. The depth at which changes of formation occur
 - 3. The depth and interval of each cavity encountered during drilling
 - 4. The identification of the material of which each stratum is composed
 - 5. The depth interval from which each formation sample is taken
 - 6. The depth interval from which each water sample is taken
 - 7. The depth at which hole diameters change
 - 8. Depth at which drilling method is changed
 - 9. The quantities of materials dredged during drilling

10. Other pertinent data requested by the Engineer

C. Lithologic samples shall be collected and preserved immediately upon retrieval. Lithologic samples shall be preserved in separate airtight jars or zip lock bags of at least 1.0-pound capacity for each interval specified by the Contractor. Lithologic samples shall be taken during drilling at 5-foot intervals in the siliceous surficial sediments, 10-foot intervals in the Floridan aquifer, and at all lithologic changes. Two samples shall be collected from each interval and each sample shall be clearly and legibly labeled with the following information:

1. Location of the well
2. Name or number of the test well
3. Depth interval represented by the sample
4. Date taken
5. Time taken
6. Split number (1 of 2; or 2 of 2)

D. Lithologic samples shall be submitted to the NFWFMD, if required, within 30 days after completion of drilling of the well. Each sample must be clearly and legibly labeled with the following information:

1. Location of the well
2. Name or number of the test well
3. Depth interval represented by the sample
4. Date taken
5. Time taken

E. Upon completion of the well, the Contractor shall also submit to the Owner a report and as-built drawings to include the following:

1. The total depth of the borehole and the length of each casing installed in the well
2. The nominal hole diameters
3. The depth or location of any lost drilling fluid, drilling materials or tools
4. The type and amount of drilling fluid additives used
5. The depth and diameter of any surface casing
6. The amount of cement (cubic yards) used in grouting the well annulus and/or surface casing

7. The complete description (including length, diameter, depth, and mill certificates) of the well casing
 8. Other pertinent data requested by the Engineer
 9. Any and all other pertinent information for a complete and accurate log (e.g., temperature, pH, and appearance (color) of any water samples taken)
- F. Formation sample jars or bags shall be provided and properly labeled by the Contractor.
- G. Blank well completion report forms can be obtained by written application to the Florida Department of Environmental Protection, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida, 32301, or the Northwest Florida Water Management District website. Well completion reports shall be submitted by the Contractor to the NFWMD and Engineer when drilling is completed.
- H. A daily detailed driller's report shall be maintained and delivered upon request to the Owner or his representative at the well site. The report shall give a complete description of all lithologies encountered, number of feet drilled, number of hours on the job, shutdown time due to breakdown or other cause, the fluid level in the hole measured daily before starting pumps, the properties of the drilling fluid, feet of casing set, and such other pertinent data as requested by the Engineer.

2.04 DEVELOPMENT

- A. The Contractor shall provide a test pump capable of pumping at least 125 gallons per minute under atmospheric conditions to develop the production well.
- B. The sand content in the water pumped from the completed supply and return wells shall not, at any time, exceed 1 mg/L after five (5) minutes of continuous pumping at 125 gallons per minute.

2.05 TESTING FOR YIELD AND DRAWDOWN

- A. When the Contractor has completed development of the well, he shall conduct the aquifer performance test on the production well. The capacity of the test shall be 125 gallons per minute and the production shall run four (4) hours continuously and extend, if necessary, to such time that the hydraulic conditions reach stabilization as shown by the drawdown remaining constant for two (2) consecutive half hour readings.

If the test is interrupted due to faulty equipment or other causes, so that the pump ceases to operate the test will be started over again and the Contractor will not be paid for the additional pumping time to repeat the test. Before the test is started the static level of the water shall be accurately determined and recorded, and during the period of the test the capacity and drawdown shall be determined after 5 minutes of pumping, 10 minutes, 15 minutes, 30 minutes, and then for each one half hour during the whole period of test.

- B. The Contractor shall provide all equipment necessary for performing this test including but not limited to a generator or test engine to power the test pump, discharge pipe to transmit the water to a designated discharge spot, a 1/4-inch diameter NPT threaded tap suitable for the installation of a sand tester, a Rossum Sand Tester and other equipment as required to perform the testing of the well.
- C. All test pumping equipment shall remain the property of the Contractor.

2.06 PROTECTION OF QUALITY OF WATER:

- A. **PRECAUTIONS TO BE TAKEN:** The Contractor shall take precautions to prevent contaminated water or water having undesirable physical or chemical characteristics from entering the well. He shall also take precautions during the construction period to prevent gasoline, oil, or waste products hazardous to health from entering the well either through the opening or by seepage through the ground surface. If used, fuel storage tanks shall be **DOUBLE WALL** constructed and placed in a **LINED BERM** containment area of sufficient size to contain the volume of the fuel tank located in the containment area.

2.07 WELL COVERS

- A. Whenever work on the well is interrupted, such as during an overnight shutdown, the well opening shall be sealed with a substantial cover in accordance with the Rules of the Northwest Florida Water Management District and Department of Environmental Protection (DEP), Chapter 62-532. At all times during construction of the well, the Contractor shall use reasonable precautions to prevent both tampering with the well and entrance of foreign material into the well.
- B. The cover shall be watertight.

2.08 WELL ABANDONMENT

- A. In the event that the Contractor fails to complete the well to the depth specified or to such lesser depth as requested by the Engineer due to equipment failure, or fails to set or grout the casing to Northwest Florida Water Management District and Department of Environmental Protection, or must abandon the well because of loss of tools or for any other cause, he shall, if requested by the Engineer, plug the well in accordance with standards and procedures specified in the Rules of the Northwest Florida Water Management District and Department of Environmental Protection (DEP), Chapter 62-532.
- B. The well casing of any wells to be abandoned may, at the Contractor's option, be salvaged and become the property of the Contractor. Such casing shall not be reused without approval by the Owner.
- C. No hourly rate will be paid for pulling casing or reconditioning the open bore hole unless the Owner directs that the casing be pulled.
- D. If the Contractor must abandon the well through fault of the Contractor or his employees or subcontractors, costs of drilling and abandonment will be borne by the Contractor.

2.09 PROTECTION AND SITE CLEAN UP

- A. At all times during the progress of the Work the Contractor shall use all reasonable precautions to

prevent tampering with the well or entrance of foreign material into it. The Contractor shall also maintain the site in a clean and orderly fashion at all times so that no adverse aesthetic impacts are created upon adjacent private properties or the adjacent public right-of-way. The Owner reserves the right to suspend work and have the site cleaned prior to proceeding, at no additional expense to Owner, if the site is not properly maintained.

- B. Immediately upon completion of the work, the Contractor shall remove all of his equipment, materials, and supplies from the site of the Work, remove all surplus materials and debris, fill in all holes or excavations, and regrade the site to conform to the contours of the land, which existed before work started.

PART 3 - SUBMERSIBLE PUMPING EQUIPMENT

3.01 GENERAL

- A. These specifications are intended to cover the furnishing of complete submersible pump system, including furnishing and installing components shown, implied or specified. The pump to be installed in the supply well shall be of heavy construction throughout and suitable for continuous operation at conditions specified.
- B. The above ground piping design shall be designed to incorporate the use of a Cycle Stop Valve and associated appertences.

3.02 PUMP DESIGN OPERATING CONDITIONS

- A. The following are the operating conditions for the supply well pumping unit:

A. Size of Well Casing	6 inches
B. Well Depth	TBD
C. Well Casing	TBD
D. Pump Capacity	125 GPM
E. Static water level	(+-) 140 feet
F. Pumping water level - Estimated	(+-) 145 feet
G. Above ground pressure requirement	90 PSI
H. Vertical head requirement w/losses	353 feet

The above information is also contained on the plan (drawings) sheets. If any discrepancy occurs between the information in the above paragraph and the drawings, the drawings shall prevail.

3.03 MOTOR

- A. The motor shall be of submersible design and have an operating safety factor equal to 1.15 times the designed operating amperage of the motor and be fitted with a standard NEMA flange. The shell and end bells shall be 304L stainless steel. The motor shall be equipped with Kingsbury-type extra high thrust load bearings and shall have a NEMA splined shaft of type 300 series stainless steel. The motor windings shall be Class "F".
- B. The motor shall be manufactured by WILLO, Franklin or approved equal.

3.04 DISCHARGE HEAD

- A. The discharge head shall be a fabricated assembly for 3-inch drop pipe and a 4-inch ANSI 150 discharge flange for the surface piping connection.

3.05 DISCHARGE COLUMN DROP PIPE

- A. The column shall be A53, Grade B, galvanized, with a diameter such that friction loss shall not exceed 5' per 100' of drop pipe based on the capacity of the pump. The pipe shall be of thread and couple design and have a wall thickness equal to schedule 40.

3.06 PUMP BOWL ASSEMBLY

- A. The pump bowls shall be of stainless steel design with stainless steel water passages.
- B. The impeller shaft shall be of type 400 series stainless steel of not less than 12% chrome content.
- C. The impellers shall be of the enclosed type and shall be a type 300 series stainless steel. The impellers shall be dynamically balanced. The bowls and impellers shall be designed with open and smooth passages to assure efficient operation.
- D. After the well has been drilled and tested, the proper bowl assembly shall be selected to give best operating efficiency and minimum power cost for operation.

E. The pump bowl shall be manufactured by WIL0, Grundfos or approved equal.

3.07 MOTOR CONTROL & WIRING

A. The pump starter and all wiring are included in this Contract and shall be furnished by the Contractor.

B. The motor controls enclosure shall be a NEMA 3R enclosure and shall include properly rated surge lightening arrestors, phase monitor, hour meter and a HOA switch.

3.08 WATER LEVEL INDICATOR

A. A suitable airline of 3/8" red brass piping shall be furnished to extend from the surface to the top of the bowl assembly. A 4.5" diameter altitude gauge, reading in feet, shall be furnished.

3.09 NAMEPLATE

A. Furnish and install in a conspicuous place a standard nameplate showing pump catalog number, serial number, and horsepower rating of the motor, volts, phase and maximum loads amps.

3.10 OPERATION & START-UP

A. The Contractor shall operate the pumping system for a period of not less than twelve hours to demonstrate to the Owner that the water system is in proper operating condition.

B. The Contractor shall furnish a factory authorized service representative to provide on-site training and start-up services of the pumping equipment.

3.11 INSTRUCTION MANUAL

A. The contractor shall provide the Owner with four complete bound sets of installation and maintenance instructions on the pumping equipment furnished.

END OF SECTION