



**Addendum No. 1 to ITB 2022-38
Wakulla County Golf Course Irrigation System Installation**

December 29, 2022

SECTION 1.0 SCHEDULE OF EVENTS - See additional dates below in RED

Failure to comply with this or any other paragraph of this RFQ shall be sufficient reason for rejection of the bid.

All times listed in the Schedule of Events are Eastern Standard Time (EST).

<i>Event</i>	<i>Date/Time</i>
Bid Advertisement Date	December 8, 2022
Release of Invitation to Bid	December 8, 2022
Pre-Bid Conference @ Wakulla Sands Golf Course	December 15, 2022 @ 11:00AM
Bid Questions Due from Prospective Bidder	December 22, 2022
Responses to Bid Questions Due	December 29, 2022
BIDS DUE TO BOCC	January 10, 2023 @ 3:30PM
Posting of Intended Award	January 23, 2023
Board Consideration of Intended Award	February 6, 2023
Posting of Notice of Award	February 7, 2023

This addendum is being posted to provide clarification and responses to the questions that were received.

ITB 2022-38 Wakulla County Golf Course Irrigation System Installation Addendum No. 1

Clarification:

- The excavation of the wet well will be included in ITB 2022-37 Wakulla County Golf Course Construction and the Installation of the wet well will be included in ITB 2022-38 Wakulla county Golf Course Irrigation System Installation.
- There will be no need to specifically remove or cap old irrigation lines. If they are unearthed via regular construction of the course, they are to be ripped out and removed from the site.
- Please see the attached updated Basis of Bid. Revisions are highlighted in yellow.
- Please see the attached updated Project Manual. Revisions are highlighted in yellow.

ITB 2022-38 Wakulla County Golf Course Irrigation System Installation

Addendum No. 1

Questions due December 22nd and responses to proposal questions due on or before December 29th

Questions and Answers

Q1: Can we have the Rain Bird Eagle 900 and 950 IC two wire system actuated sprinkler added as an approved equal? We have a proven two sprinkler that matches specification except below.

This addresses:

2.9 SPRINKLER HEADS

A. MATERIAL

1. The sprinkler heads shall be 2 Wire System actuated, pressure regulating, valve in head, with 1½" inlets. The sprinkler heads shall be full circle and adjustable part circle, and shall be utilized where the arc type permits and where diagrammed on the Irrigation Design. The sprinklers shall have a top serviceable removable cap that allows for all operational components, to include but not be limited to on/off signal decoder, pilot valve assembly, solenoid, and all wire splices are to be located within the cavity of the sprinkler body and sealed with the lid.

A1: Although the Rain Bird Eagle 900 and 950 IC sprinklers performance and nozzling data match the sprinkler(s) specified, it does not satisfy the Owner's desire for a sprinkler to be installed that will not require any excavation or sod removal for service and repair.

Q2: Can we please have Rain Bird Pump Manufacture added as an approved equal for the pumping system? We would like to make it less confusing for potential bidders.

This addresses: On IRRIGATION 32 80 00 – 24 and other areas.

Bids for the Pump Station shall be received from: MCI / WATERTRONICS/OR EQUAL

A2: The Rain Bird pump Station shall be viewed as an equal

Q3: Is there a Bonding Requirement for Irrigation only?

A3: Yes. Please see Section 9.6.2 of the Intent and General Information. A Bid Bond, Performance and Payment Bond are required.

Q4: Are Harco Push Joint Adapters suitable as a substitute for fusible Valves?

A4: Yes.

Q5: Is there a provision for delays due to supply chain issues for materials?

A5: Yes. The County will address any delays when applicable.

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Addendum No. 1

- Q6: Since there is a separate project that dictates the timeline for irrigation, how will delays caused by the other project affect the liquidated damages?
- A6: The County anticipates the two awarded vendors will coordinate the two golf course projects to avoid any delays. The County will address any delay(s) that may occur with either the construction portion or the irrigation portion when applicable.
- Q7: Is it the Owner's intent to purchase the materials after the bid is awarded?
- A7: Yes. The County will take advantage of any sales tax benefits for some materials, but not all materials. Negotiations will be held between the County and the awarded vendor.
- Q8: Is there a new wet well being installed? Or are we using the existing?
- A8: Yes, a new wet well will be installed. No, we are not using the old facility.
- Q9: Is the contractor responsible for removing the old pump station?
- A9: No.
- Q10: Will we need to build a new pump house?
- A10: No. Any renovations to the current pump house building will be completed by the County.
- Q11: What is the sales tax rate for materials?
- A11: The current sales tax rate in Wakulla County is seven percent (7%), however the County would like the option to purchase materials directly in order to benefit from the County's tax exemption.

ITB 2022-38 WAKULLA COUNTY GOLF COURSE IRRIGATION SYSTEM INSTALLATION
BASIS OF BID

The following unit pricing will be used as the quantity guideline for determining the qualification and accuracy of the Base Proposal and will be used as the guideline for determining the cost basis of a Change Order offered by the Irrigation Contractor, or the Owner for any additions or deletions to the original irrigation system design and the original Base Proposal.

ITEM	QTY	INSTALLED UNIT PRICE	EXTENDED TOTAL
SPRINKLERS / VALVES – 2 WIRE SYSTEM			
Please indicate the 2 wire irrigation system manufacturer quoted			
1 ½" Full Circle Sprinkler, 2 Wire, 50 gpm, 80' spacing	420		
1 ½" Part Circle Sprinkler, 2 Wire, 50 gpm, 80' spacing	526		
1" Part Circle Sprinkler, 2 Wire, 37 gpm, 70' spacing	0		
2" Two Wire Actuated Plastic Pressure Reducing Valve	26		
¾" Part Circle Rotor, 5 gpm, 35' spacing (RIBs)	458		
1" Quick Coupler	20		
¾" Swing Joint	458		
1" Swing Joints	20		
1 1/2" Swing Joints	946		
Grounding Assemblies	60		
Irrigation System Central Computer and Software			
Tablet for remote operation	1		
Field Interface Unit	1		
Weather Station			
Campbell Scientific Weather Station OR EQUIVALENT w/ radio modem comm / Solar Power	1		
PIPING			
2" CL 200 PVC BOE PIPE (RIB Irrigation)	18,000 lf		
3" CL 200 PVC BOE PIPE (RIB Irrigation)	1,000 lf		
3" DR 13.5 4710 HDPE Pipe	78,000 lf		
4" DR 13.5 4710 HDPE Pipe	3,600 lf		
6" DR 13.5 4710 HDPE Pipe	9,200 lf		
8" DR 13.5 4710 HDPE Pipe	3,500 lf		
10" DR 13.5 4710 HDPE Pipe	1,600 lf		
12" DR 13.5 4710 HDPE Pipe	1,300 lf		
16" DR 13.5 4710 HDPE Pipe	300 lf		
ISOLATION VALVES (HDPE Type w Integrated HDPE Extensions)			
3" Drain Valve(1 at each lake off lateral)	6		
3"	1		
4"	24		
6"	23		
8"	6		
10"	2		
12"	2		
1" Air Release Valves	6		
WIRE			
#12 2-Trunk Wire Red (Double jacketed)	4,000 lf		

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ITEM	QTY	INSTALLED UNIT PRICE	EXTENDED TOTAL
#12 2- Trunk Wire Blue (Double jacketed)	3,000 lf		
#12 2-Trunk Wire Green (Double jacketed)	7,500 lf		
#12 2- Trunk Wire Purple(Double jacketed)	3,000 lf		
#14 2-Lateral Wire Green (Double jacketed)	78,000 lf		
8' X 5/8" Copper Ground Rod	60 rods		
#6 Bare Copper Wire	2,000 lf		
3M DBR/Y Splice Kits	1,600 lf		
VALVE BOXES			
6" Valve Box w/ Lid QC	21		
10" Valve Box w/ Lid Mainline, Greens, Fairways Iso valves, lake drains	64		
12" Rectangular Valve Box w/Lid 2 wire splices	20		
24" Rectangular Valve Box w/ Lid electric valves, air rel valves	32		
FITTINGS			
DR 11 FITTING LIST TO BE PROVIDED BY THE CONTRACTOR - INSERT TOTAL DOLLAR VALUE IN LAST COLUMN			
PUMP STATION			
Please indicate the pump station manufacturer			
2250 GPM VFD Pump Station			
PROJECT TOTAL			

SECTION 32 80 00
IRRIGATION SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. The scope of work at shall be to supply all material, labor, and equipment necessary to complete the installation of the Irrigation System as shown on the Irrigation Plans and these specifications provided by The Pignato Group, Inc. The requirements and specifications for the installation of this system shall be as documented and stated in these specifications, and any reasonable work required, however not included in the accepted scope of work, shall be considered necessary and should be provided in order to satisfactorily completion of this scope of work.
- B. The following items are included in the irrigation system:
1. The Contractor will be purchasing the Toro, Rain Bird or equivalent whole goods direct-sprinklers, electric valves, controllers, central and associated devices
 2. The Contractor will be responsible for purchasing all required “allied” material, which is understood to be, but not limited to, pipe, wire, fittings, splice kits, machinery required for installation, concrete, all devices/equipment for connection, welding, fusing, or joining pipe.
 3. The Owner shall be responsible for the modifications to the existing pump house building and all electrical to the pump house building.
 4. The Contractor will be contracting directly with the pump station manufacturer to supply and install this new pump station a new 2,250 gpm pump station, consisting of 3 – 75 hp motor and pumps
 5. CONTRACTOR will construct, install, and tie into the new discharge Z pipe which will be constructed of DR 11 HDPE.
 6. All required permitting for the installation of the irrigation system is the responsibility of the CONTRACTOR
 7. CONTRACTOR shall be responsible for all required directional bores
 8. CONTRACTOR shall be responsible for the removal of the existing sprinklers/controllers.
 9. All control pads will be removed by the CONTRACTOR.
 10. All lateral pipe shall be open trenched and all mainline will be open trenched (Refer to Section 31 23 16.13 – Trenching).

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11. CONTRACTOR shall be responsible for the off-site removal of the debris, excess fill, and material scrap.

1.2 DRAWING AND SITE VERIFICATION

- A. The Irrigation Design is scaled and schematic in nature. All equipment detailed on the design is being shown in location that is approximate. Should site conditions require alternate placement, CONTRACTOR shall do so with the intent of best possible location to insure the quality and performance of the final installed system. The Owner, his Representative, or the Consultant shall have final approval before work is to continue on the alternate change that has been proposed by CONTRACTOR to the Owner.
- B. Prior to commencing work, the CONTRACTOR shall check and verify all quantities and measurements, and should any discrepancies occur the Owner shall be notified in writing. Failure to do so will result in the addition and/or relocating of the equipment by the CONTRACTOR at his own expense.
- C. The CONTRACTOR will be responsible for being familiar with site conditions, and will verify the location of all utilities and facilities above and below ground prior to commencing work.
- D. Conform to applicable code for environmental requirements, disposal of debris, and use of herbicides.

1.3 AUTHORIZED REPRESENTATIVES

- A. The Owner shall designate and appoint with his authority, one (1) person to represent, and act in the Owner's behalf. This person known as the Owner's Representative, or the Owner herein, shall work with the CONTRACTOR in the best interest of the project, and it's final satisfactory completion.
- B. CONTRACTOR shall designate as his representative, a Job Superintendent that will dutifully adhere to all project requirements. The Superintendent shall represent the CONTRACTOR in his absence, and any decisions or actions made by the Superintendent that misrepresents these specifications, or diminishes the intended quality of the Irrigation System shall be the responsibility of CONTRACTOR.

1.4 PERMITS, FEES, AND INSPECTIONS

- A. CONTRACTOR should obtain and pay for all permits and licenses required by local governing authority. (City of Crawfordville, County of Wakulla, State of Florida).

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- B. All local, state, and federal laws, regulations, and codes governing or related to any portion of these specifications, shall become incorporated into these specifications, and be followed as intended, by the CONTRACTOR.
 - C. Any inspections by local, state, or federal authority that are to be made, shall be made with the Owner, and/or the Irrigation Consultant, and the CONTRACTOR and/or his Superintendent present. Any fines, penalties, or permit reapplication fees shall be the responsibility of the CONTRACTOR.

1.5 WARRANTY

- A. CONTRACTOR will furnish a written warranty against all workmanship, defects, and materials for ALL COMPONENTS EXCEPT HDPE PIPE/FITTING ASSEMBLY for a period of one (1) year from the date of final acceptance of this project. All pipe and fitting assembly whether HDPE or PVC system is installed shall carry a **5 year workmanship** warranty to include replacement parts, equipment, and labor.
- B. CONTRACTOR shall furnish at his expense all labor and material to make any repairs under warranty.

1.6 PROTECTION OF PROPERTY AND FACILITIES

- A. CONTRACTOR shall exercise due diligence in maintaining and protecting all existing utilities, structures, equipment, and facilities. Any damage done by the CONTRACTOR, shall be repaired and the payment of such shall be the responsibility of the CONTRACTOR. This is to include but not be limited to cart paths, bridges, existing utilities, and existing golf course features.
- B. All utility location shall be the responsibility of the CONTRACTOR. At no time shall the CONTRACTOR rely on the utility location services of anyone other than a professional location service. All other existing equipment that is to be determined at risk of damage and undesirable of such shall be identified and located by the Owner and avoided by the CONTRACTOR. Any damage to this equipment by the CONTRACTOR shall be repaired in a timely manner at his own expense. If this equipment is not located by the Owner and damaged, then the Owner shall be responsible for the repair in a timely manner.
- C. Portions of the golf course that are to be designated as natural habitats, reserves, wetlands, etc. are to be protected by the CONTRACTOR, and any damage caused by the CONTRACTOR, shall be his responsibility, and any fines, penalties, and the repairs of this damage shall also be his responsibility.

1.7 AS-BUILT RECORDS/GPS

- A. CONTRACTOR shall document in a field book format and stake (w/3/4" PVC) the FINAL location of all irrigation equipment, valves, valve boxes, splices, mainlines, lateral lines, satellites, and wiring. He shall also provide a set of station assignments for each satellite, detailing head location, station number, and station responsibility (green, tee, rough, fairway, approach). The Irrigation Consultant will GPS each irrigation sprinkler location during staking visits and issue to the CONTRACTOR "As-Staked Drawings".
- B. CONTRACTOR shall stake, color code, and label the following:
1. MAINLINE: One Stake every 200' and at each change of direction
 2. ISOLATION VALVES : One Stake with denoting size and function (main, fwy, green, tee)
 3. ELECTRIC VALVES: 1 Stake denoting size
 4. AIR RELEASE/DRAIN/QC : 1 Stake denoting type
 5. WIRE SPLICE : 1 Stake denoting Wire Path / Wire Size
 6. SPRINKLER: 1 Stake denoting PC or FC
- C. These stakes shall be placed during installation and be kept in place until the Golf Hole is surveyed with GPS and completely signed off and approved as Final. After completion, all stakes shall be removed by the CONTRACTOR and discarded.
- D. Along with this information and the daily field notes, it will all be sent to the Irrigation Consultant. The Irrigation Consultant to produce the Final As Builts and Irrigation Central Program.
- E. The accumulation and documentation of this data should be done on a daily basis, and submitted Bi-Weekly to the Owner and the Irrigation Consultant.
- F. FINAL AS- BUILTS FOR THAT MONTH'S WORK WILL ACCOMPANY MONTHLY PAY REQUEST FOR ALL HOLES COMPLETED AND INVOICED. Should the Owner, or the Irrigation Consultant conclude that the As-Built is not being properly documented in format, or in timeliness then the Owner reserves the right to stop future work by the CONTRACTOR, until such documents are up to date and in his possession. The time that it takes to complete this shall not be added to the completion time that the CONTRACTOR has agreed to.
- G. Before FINAL payment, or FINAL acceptance of the system by the Owner, the CONTRACTOR shall have provided all As Built information as needed. Final production of the As Built shall be the responsibility of the Irrigation Consultant.

1.8 APPROVAL SCHEDULE

- A. CONTRACTOR and the Owner, understanding the work described herein, will notify the Irrigation Consultant at the phased completion of 3 holes. At that point when the CONTRACTOR has installed all components, as specified, and on a particular golf hole, has backfilled, tamped, and is prepared for a partial release of that hole he shall notify the Irrigation Consultant for a Rough Final. The term “Rough Final” will be understood to mean that all components as designed and specified have been installed, all ditches have been tamped, and filled to grade, and that all mechanical work is complete on the hole. It does not release the CONTRACTOR from the responsibility of workmanship or product warranty issues that may arise after completion. A Rough Final when approved shall relinquish the CONTRACTOR of responsibility for any issues relating to the clean up and backfill of that group of golf holes. All specifications related to ditch settling, workmanship, and mechanical warranties will still remain in effect. However, the erosion of ditch lines, the deterioration of ditch lines, and the displacement of installed irrigation equipment as a result of tractors and mowing equipment shall become the responsibility of the Owner.
- B. A Final Release for a group of golf holes will be at the request of the CONTRACTOR. At that point, all equipment is installed as specified, all equipment is functioning as intended by the manufacturer, all grounds (ohms resistance) have been checked, and it is understood by the Owner and the CONTRACTOR that all work is 100% complete. The term “Final Release” shall be understood to mean that all work performed meets the standards set by all manufacturers, all specifications described herein, and the approval of the Irrigation Consultant and the Owner’s Representative. At that point, all maintenance on that portion of the project shall now become the responsibility of the Owner. It will not release the CONTRACTOR from any warranty, or workmanship issues that may arise.

1.9 SUBCONTRACTORS

- A. The use of subcontract labor, or service is permitted. CONTRACTOR shall supply the Owner with a written list of all subcontractors that are to be used on this project on the General Construction Proposal – Bid Form. Any variations from this list shall be requested to the Owner and the Irrigation Consultant in writing.
- B. All subcontractors will follow all site regulations, specifications stated herein, and any local, state, federal, laws, codes, or regulations as they apply. The CONTRACTOR shall be responsible for any damage to the site or it’s facilities, made by his subcontractor, and the repair and payment for such shall also be the responsibility of the CONTRACTOR. The subletting of any portion of work shall not release the CONTRACTOR from his obligations and responsibilities regarding that

portion of work, and the CONTRACTOR is to be considered to have performed and completed said portion of work. All insurance requirements stated herein shall apply to the subcontractor.

1.10 SITE VISITS

- A. By contract, the Irrigation Consultant is required to make visits every week during the Irrigation Phase of construction. These visits shall be at the request of the Owner. The purpose of these site visits is to include Field Work (head location, valve location, etc.) central programming, as-built information gathering, and site inspections. Should additional visits be required and that are a result from delays caused by the CONTRACTOR, then the CONTRACTOR shall be responsible for payment to the Irrigation Consultant for his services and travel expenses.

1.11 CONTRACTOR QUALIFICATIONS

1. The qualified contractor will have performed and been active in the installation of irrigation systems on Golf Courses for a minimum of 5 years.
2. The qualified contractor will have completed the installation of a minimum of 6 (six) complete Golf Course Irrigation Systems during the past 5 (five) years. A complete golf course irrigation system is understood to be comprised of a minimum of 500 valve in head sprinklers, 14 golf irrigation field controllers, 50,000 lf of lateral piping, 15,000 lf of mainline piping.
3. Of those installations, 4 (four) must have been a complete Two Wire System installations on golf courses with either the Toro, Rain Bird, or equivalent 2 Wire Valve in Head product.
4. The qualified contractor's appointed Project Superintendent will have completed the installation of a minimum of 3 (three) Golf Course Irrigation Systems as the Lead Superintendent in the last 5 years.
5. The Qualified Contractor shall be able to Staff on a daily basis a minimum of 8 (eight) full time employees exclusive of "day labor". Day Labor is defined as unskilled labor resourced from a labor supply company and also as individuals who are not employees of the qualified contractor's company on a permanent basis.
6. The qualified contractor will be able to perform business with all selected vendors on a credit worthy basis if necessary.
7. The qualified contractor will meet all contracting and business licensing requirements as required by Wakulla County and the State of Florida.

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8. The qualified contractor will document and exhibit to the State of Florida all of the above requirements with an attached notarized submittal accompanying the bids.
- A. CONTRACTOR shall have successfully installed high density polyethylene (HDPE) pipe in golf/turf or commercial irrigation projects. References will be required. These reference(s) must provide a satisfactory response or the experience will not be accepted.
 - B. Prior to the commencement of this project the CONTRACTOR will be required to have a qualified fusion technician from Lee Supply, ISCO, CMF Global, or equal, for a period of three to five days (at the expense of the CONTRACTOR). Regardless of the CONTRACTOR's most recent certification on another project by ISCO, CMF Global or any other training facility, for this project the training will be required and on site.
 - C. The Owner, ISCO, CMF Global and the specifier, shall collectively agree to the required time for HDPE pipe (fusion and mechanical) training.
 - D. Training shall provided by a qualified technician and shall include the following:
 - E. Training administered shall be Lee Supply, ISCO, AquaFUSION by CMF Global, or equal
 - 1. Butt fusion
 - 2. Socket fusion
 - 3. Electrofusion
 - 4. Attachment of mechanical saddles
 - 5. If electro and/or sidewall fusion is required, this training must also be completed while the technician is on site.
 - 6. Sidewall saddle fusion (if required for project)
 - 7. Compatible fusion
 - F. CONTRACTOR Equipment Qualifications
 - 1. If the CONTRACTOR owns butt fusion equipment, the equipment must be serviced prior to use for this project. The machine must be environmentally friendly and in good working order. The hydraulic system must be leak free. All fusion equipment with pressure gauges shall be properly calibrated and the heating tool is to be in proper working condition prior to use.
 - 2. Rented butt fusion machines must be rented from a company that has a fusion machine service center or centers certified by the butt fusion machine manufacturer. The fusion equipment supplied shall have

certification that pressure gauges are properly calibrated and the heating tool is to be in proper working condition prior to use.

1.12 PRODUCT WARRANTY

- A. LIMITED WARRANTY: Seller warrants that, for a period of twenty five years from the date of shipment for a Golf /Turf or Commercial irrigation application, it will replace any section of HDPE pipe, fittings and valves product that is defective in materials or workmanship, provided that Buyer, upon discovery of a defect, promptly notifies Seller of the defect and, as instructed by Seller at such time, either returns the product to Seller for inspection or allows Seller to inspect at the place of installation.
- B. If Seller determines the product to be defective, Seller will provide new product of the same specification and same quantity as the defective product and Seller will bear the expense of freight to deliver the replacement product to the jobsite for domestic projects, and to the closest USA port for foreign projects.
- C. Seller does not warrant the installation of product. Any defects introduced after the shipment of product by Seller, whether due to handling, installation or other cause, are not covered by this warranty.
- D. This warranty does not cover labor or other costs of installing products. Buyer's sole remedy for defective product shall be to receive replacement product as provided in this Limited Warranty.
- E. CONTRACTOR'S WARRANTY
 - 1. LIMITED WARRANTY: CONTRACTOR warrants that, for a period of (5) five years from the date of installation, it will re-fuse or repair a fusion connection that is defective in workmanship, provided that Buyer, upon discovery of a defect, promptly notifies CONTRACTOR of the defect and, allows the CONTRACTOR to inspect at the place of installation. If it is determined the fused connection to be defective, CONTRACTOR will re-fuse or repair the connection at the jobsite. CONTRACTOR does not warrant the product itself, only the fused connection. This warranty does not cover labor or other costs, only the fused connection. Buyer's sole remedy for defective connection shall be to receive replacement fusion of the pipe or fitting as provided in this Limited Warranty
 - 2. OTHER THAN THE ABOVE LIMITED WARRANTY, CONTRACTOR MAKES NO WARRANTY AND EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3. CONTRACTOR'S LIABILITY ARISING OUT OF OR RELATED TO THIS CONTRACT OR ANY PRODUCT OR SERVICE SUPPLIED BY CONTRACTOR (WHETHER SUCH LIABILITY IS ALLEGED AS A BREACH OF CONTRACT, BREACH OF WARRANTY, MISREPRESENTATION, NEGLIGENCE, INDEMNIFICATION, PRODUCT LIABILITY OR OTHERWISE) SHALL IN NO EVENT EXCEED THE ORIGINAL PURCHASE PRICE OF THE DEFECTIVE CONNECTION PLUS APPLICABLE FREIGHT COSTS ACTUALLY PAID BY BUYER. CONTRACTOR WILL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, INDIRECT OR PUNITIVE DAMAGES, LOSS OF PROFITS, LOSS OF BUSINESS OPPORTUNITY OR OTHER LOSS EVEN IF CONTRACTOR KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES OR

PART 2 – PRODUCTS

2.1 MATERIAL CONDITION

- A. The materials to be used shall be as designated on the Construction Drawings and the Technical Specifications. All materials to be used shall be new and equal to the specifications set forth herein. No material used on this project shall be imported, as a leftover from a previous project. All materials shall be shipped and received for the sole purpose of installation on this project.

2.2 MATERIAL STORAGE

- A. All materials shall be stored in a manner that will best maintain its' original condition. Store all plastic and PVC material out of the sunlight. Discolored pipe or fittings shall be rejected from installation. All damaged, dented, or scratched materials shall be rejected from installation. The Owner shall provide an area designated for the use of the CONTRACTOR as his staging and storage area. By providing this area, this in no way waives the CONTRACTOR from his responsibility to protect and maintain the materials. All losses to materials due to damage, deterioration, theft or neglect shall be the responsibility of the CONTRACTOR. Any repairs, or service that occurs as a result of improperly cared for materials being installed, shall be the responsibility of the CONTRACTOR.

2.3 MATERIAL SPECIFICATION CHANGES

- A. CONTRACTOR shall follow the specifications for materials that are outlined in the Project Manual. However, should the CONTRACTOR wish to substitute an equivalent material, a request for substitution must be made to the Irrigation Consultant and to the Owner, in writing. Copies of material specification sheets, or product performance sheets must accompany this written request.

2.4 VERIFICATION OF QUANTITIES

- A. The Irrigation Consultant has provided a design that is scaled and schematic in nature. The CONTRACTOR shall be responsible for calculating and verifying all quantities shown on both the Final Design and the Final Materials Quantity Sheet. The CONTRACTOR is not to rely on any quantities from the Irrigation Consultant, Golf Course Builder, General CONTRACTOR, Project Owner, or Local Distributor, as the CONTRACTOR is responsible for installing all components and material to make the irrigation system operational as intended by the Irrigation Consultant and the Manufacturer.

2.5 RECEIVING OF MATERIAL

- A. CONTRACTOR will be held responsible for the receipt of all irrigation equipment that is to be used in the installation of the irrigation system. A representative from the CONTRACTOR shall be designated to receive and verify all material and quantities. Should any discrepancy occur, it must be noted and brought to the attention of the Owner as soon as possible. The Irrigation Consultant shall inspect materials and should the Owner or the Irrigation Consultant deem any material unacceptable, then the CONTRACTOR shall immediately replace those materials at his expense. The materials shall be removed within 72 hours of notification. Once material has been received and signed for by a representative of the CONTRACTOR, it shall become the responsibility of the CONTRACTOR, until installed and approved by the Owner, or the Irrigation Consultant.

2.6 MATERIAL DISPOSAL

- A. CONTRACTOR shall dispose of all material waste and scrap in an area that is to be assigned and provided by the Owner. The term material shall not be limited to what is known as Irrigation Materials, but shall also include dirt, rock, tree stumps and roots, grass, and any other debris or by-product that results from the installation of any part of the irrigation system. The CONTRACTOR shall provide the transport of this to the disposal site.

2.7 HDPE PIPE/FITTING SPECIFICATIONS

- A. PIPE (DR 13.5)
 - 1. Pipe and tubing shall be manufactured from a PE4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The PE 4710 resin material will meet the specifications of ASTM D 3350-09 with a minimum cell classification of PE 445474C. Pipe shall be manufactured to the dimensions and requirements of ASTM F714 or ASTM D3035. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All HDPE pipe

shall be in straight lengths or coils. Manufacturer should be ISO 9001:2008 certified or have a similar quality assurance and control program.

2. The Pipe shall be ISCO, AquaFuse as supplied for CMF Global (hot line) or equal.

Table-1 HDPE Physical Properties per ASTM D 3350-09			
For Cell Class (445474C) Associated Property	Specification	Allowable Values	Typical Values
(4) Density (g/cm ³)	ASTM D 1505	>0.955	>0.960
(4) Melt Index (g/min)	ASTM D 1238	<0.150	<0.150
(5) Flexural Modulus (psi)	ASTM D 790	110,000 to <160,000	125,000
(4) Tensile Strength at Yield (psi)	ASTM D 638	3500 to <4000	3650
(7) Slow Crack Growth Resistance Pent (hours)	ASTM F 1473	500	>2500
(4) Hydrostatic Design Basis at 73.4°F (psi) ⁽¹⁾	ASTM D 2837	1600/1000	1600/1000
(C) Black Color UV stabilizer	ASTM D 3350	Min 2%	Avg. 2.25%
Table Notes: For operating temperatures over 80°F contact an authorized factory representative to obtain a derated working pressure rating.			

3. Pipe, Tubing and Fitting Compliance Requirements
 - a. The supplier must be capable of supplying both the pipe and fittings.
 - b. The supplier must have the capability to train the CONTRACTOR’s employees in butt fusion, electrofusion, socket fusion, sidewall saddle fusion and compatible fusion of HDPE pipe and fittings.
 - c. The supplier must be capable of providing a “Fusion Technical Hot Line” 740-953-0589 to assist in fusion and fusion equipment questions.

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- d. The supplier must be capable of providing a trained representative on site upon the request of the CONTRACTOR, owner or consultant to address any problems that are encountered during the installation.
 - e. The supplier must furnish a written 25-year limited Warranty for HDPE pipe fittings and valves.
 - f. Recommended supplier: ISCO, CMF Global, or equal.
- B. FITTINGS (DR 11 Fittings)
- 1. Socket Fusion Fittings - Fittings shall be PE 4710 with a minimum cell classification of PE 445474C (depending on supplier this may also be PE445575C). Butt Fusion molded Fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have the same minimum pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings are to be manufactured to meet the FM (Factory Mutual) performance standards. Fabricated fittings are to be manufactured using a Data Logger. Reference to the Data Logger quality control records should be referenced from an indented stamp in each fusion bead of each fitting. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.
 - 2. Flanged and Mechanical Joint Adapters - Flanged and Mechanical Joint Adapters shall be PE 4710 resin with a minimum cell classification of PE 445474C. Flange adapters and Mechanical Joint Adapters shall have the same pressure rating as the pipe unless otherwise specified on the plans.
 - a. Main Line Isolation Valves shall be Waterous/ AVK LUG TYPE Isolation Valves.
 - b. All gate valves will have stainless steel stem with HDPE stubs.
 - c. All 3" and 4" pipe for sprinkler connections can be made using Bolt on Stainless Saddles or Side Wall Welded/Fused Saddles with 1½ acme thread outlet, drilling the hole prior to installing the saddle. The pressure rating shall be equal to or greater than 100 PSI PE 4710, or approved equal.

2.8 SWING JOINTS

A. MATERIAL

- 1. All sprinkler heads, quick coupling valves, and air release valves shall be installed on swing joints of required size. The swing joint shall be Pre-Assembled, with O-Rings Seals in each joint. The swing joint shall be manufactured/supplied by Rain Bird , Toro or an approved equal. The swing joint shall meet or exceed all requirements set forth in ASTM D 3139.

2. Acme threads are permissible.

B. INSTALLATION

1. All threads shall be wrapped with Teflon tape (no pipe dope is to be used). The swing joint upon installation shall rest so that the angle between the lateral pipe and the arm of the swing joint is between 30 and 45 degrees. It may be necessary to use riser extensions to increase height rather than vertically placing and setting the swing joint.

2.9 SPRINKLER HEADS

A. MATERIAL

1. The sprinkler heads shall be 2 Wire System actuated, pressure regulating, Valve in head, with 1 ½" inlets. The sprinkler heads shall be full circle and adjustable part circle and shall be utilized where the arc type permits and where diagrammed on the Irrigation Design. The sprinklers shall have a top serviceable removable cap that allows for all operational components, to include but not be limited to on/off signal decoder, pilot valve assembly, solenoid, and all wire splices are to be located within the cavity of the sprinkler body and sealed with the lid.
2. The sprinkler heads performance shall be as noted below (full circles a minimum of 87' radius, adjustable part circles a minimum of 87' radius, minimum of 47 GPM on all heads.)
 - a. 1 ½" FC/PC VIH Sprinklers
 - b. 1" PC VIH Sprinklers
 - c. ¾" Rotors

B. INSTALLATION

1. CONTRACTOR, Irrigation Consultant, and the Owner's representative shall do the spacing and layout of the sprinkler heads. Each hole when staked shall require final approval from the Irrigation Consultant, and the Owner's representative before trenching and installation can begin.
2. In areas where re-grassing will not take place, the CONTRACTOR shall install all heads to final grade. At the time of installation, the CONTRACTOR shall install all sprinkler heads to final grade. If final grassing grade is not yet established at the time of installation, then the CONTRACTOR shall install the sprinkler 6" high and come back at the time final grassing grade is established and lower the sprinkler to its final placement.
3. Placement of the heads will be to the satisfaction of the Owner's Representative. If a head is questioned, it shall be judged for straightness

and elevation by laying a three-foot piece of 2" X 4" sideways across the top of the head. The head should not elevate the 2" X 4" nor should it be any lower than ½" from the 2" X 4".

4. All field wires shall be coiled with an extra 2' of wire and shall be clipped to the side of the swing joint at the bottom of the joint.
5. All sprinkler heads shall be installed in accordance with the manufacturer's recommended installation procedures.

2.10 CENTRAL CONTROL SYSTEM (TO BE SUPPLIED BY OWNER)

- A. Central to Remote Field Decoder Controller VIA Radio, Remote Controller to Field via 2 Wire, Field to Central, Via Hand Held Radio or IPAD

RAIN BIRD CIRRUS / TORO LYNX OR EQUIVALENT

- B. The central controller shall utilize a personal-computer-based, Microsoft Windows 7 Ultimate platform, user-friendly irrigation management and control program. The central controller shall utilize a client/server architecture. Computer shall include 2 video outputs and allow map graphic to be floated onto secondary monitor.
- C. The central controller shall utilize site graphics with 64-bit software, including site graphics at the station level. The software shall be presented in a "flat" display, where all of the information needed is available to the user for a given operation, without having to open and close additional windows.
- D. The central controller shall have programs based on a hierarchy organized the same as the golf course. Course(s), Areas (greens, tees, fairways, etc.) followed by holes (1 through 48), followed by individual sprinklers. The central controller shall have the ability to view the system at any of the four levels (course, area, hole, sprinkler) by Dynamic Drill down (simply clicking on a plus/minus box) to give the user intuitive control. A graphic red "Water Drop" will identify areas and holes that have stations turned off. A graphic green "Water Drop" will identify areas, holes and stations set to run automatically. A graphic blue "Water Drop" will identify areas not scheduled to water.
- E. The central controller shall allow the user to schedule areas to irrigate by either entering runtimes in minutes, or by entering amount of water to apply. If the amount is utilized, the corresponding minutes will automatically be calculated and displayed. If minutes are utilized, the corresponding amount of application shall be calculated and displayed. Runtimes shall be calculated and executed to the minute.

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- F. The central controller shall have a “Course Report” to allow the user to determine the status of each sprinkler station on the golf course. The Course Report shall auto generate after each night’s watering to allow confirmation of all sprinkler runtimes at a glance. The Course Report will display all Automatic, Manual, and Group Multi-Manual Irrigation as well as stations that are currently running. Stations that have not operated as scheduled shall be identified with a graphic red “Water Drop”. The Course Report / Alert Panel shall display feedback from the Gateway(s) to indicate station status. The Course Report will utilize the Area, Hole, Station layout with Dynamic Drill down to quickly navigate to exceptions.
- G. The central controller shall support the creation of a customized site map displaying multiple layers. The central controller shall allow the user to quickly create a map from any digital image (jpeg, bmp or tif format). The control system will allow the user to edit the locations of sprinklers, Turf Guard Sensors, and switches on the map. The central controller shall provide system status at the station level and display changes in status. The central controller shall be capable of creating user-defined work orders. If a scaled CAD map is utilized, the central controller will display area and distance measurements.
- H. The central controller shall be capable of graphically displaying projected flow on the map at the station level and displaying station activation utilizing a color-coding system that shows how stations will activate during the next 24 hours. The central controller shall be capable of creating irrigation programs through the map and making station level percentage adjustments. When programming or manually running stations, the map shall be capable of automatically zooming into the stations, holes, and areas selected.
- I. The central controller shall automatically calculate sunrise and sunset based on longitude, latitude and date, and provide this information for starting or stopping a program in relation to sunrise or sunset. The central controller shall permit true random access of all stations in the system and allow Instant Programs to be constructed with any combination of stations regardless of wiring sequences or satellite designation. The central controller shall have the ability to manually adjust (percentage increase/decrease) by course, area, hole, station, and/or the entire system. System adjustment factors may be input via actual percentage or operational ET. The central controller shall have the ability to connect to a weather station. The weather station will measure and store temperature, relative humidity, dew point, wind speed and direction, and solar radiation for use in the calculation of evapo-transpiration. The central shall have the ability to automatically calculate and adjust watering times based on evapo-transpiration. The central controller shall also have the ability to reduce the automatically calculated runtime by the rainfall measured over the preceding 24 hours. Further,

the central controller shall have the ability to adjust calculated runtimes after they have been scheduled utilizing a Rain Re-Flow alarm response.

- J. The central controller shall include the Soil Sensor software. Individual sensor data can be assigned to specific sprinklers to allow the user to view current soil moisture on the Watering Plan, allowing the user to choose to skip watering if moisture levels are above user-defined thresholds, or to activate stations if moisture levels are below defined thresholds.
- K. The central controller shall employ advanced hydraulic/electrical systems management, allowing the user to specify hydraulic system design (sources and pipes representing mainlines, branches and flow groups) and the hydraulic limits of each entity. The central controller shall manage system flow by automatically generating the appropriate station start times based on the program priority and hydraulic limits set for each source and pipe, and for the simultaneous station limit set for each wire path. The central controller shall incorporate the ability to use Precipitation Management Groups to specific which stations are allowed to operate simultaneously when hydraulic capacity is available.
- L. The central controller shall display projected flow by source, course, area, program and hole using colors to differentiate. The graph will calculate and display the maximum instantaneous flow as well as the total volume. Maximum flow and volume will be displayed in user-selected units. When pump integration is configured, the actual flow reported by the pump station can be displayed simultaneously with the projected flow for up to the last 7 days. The central controller shall have the ability to manually start programs for an entire area or for an individual hole/area. Manual programs may be started in normal program time or a manually selected time. The central controller shall have the ability to start a multi-manual cycle on a wire path, running up to 100 stations simultaneously with a run time of up to 99 minutes.
- M. The central controller shall have the ability to independently suspend (hold) the automatic operation of an individual station, a course or the entire system. The station hold duration shall be programmable for the current irrigation day up to 30 days, or may be permanent. The central controller shall have the ability to control non-irrigation devices through switch outputs. Each switch (up to 50) will have an independent seven-day calendar schedule and start times for up to 24 starts. Switch outputs may run from one minute to 23 hours and 59 minutes (programmable in one-minute increments), with individual start times for each station (switch output). Switches may also be scheduled to run with any program and include the ability to offset the start time prior to or after the start of the program.

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- N. The central controller shall provide reports detailing the following information: 1) projected schedule activity, 2) contents of the database constructed while programming the central controller, 3) overview of scheduled irrigation activity including start time, end time and area information, flow and program, 4) report stations that did not acknowledge a message to run, 5) stations that are assigned to more than one program.
- O. The central controller shall be capable of integrating with up to 10 pump stations manufactured by MCI, Watertronics or equal. The central controller shall be capable of displaying key pump station data including flow and pressure. The central controller shall be capable of responding to “alarm” conditions based on data received from the MCI, Watertronics or equal pump stations. When alarms are activated, the irrigation system will respond in one of the following ways: log only no response, pause irrigation, resume irrigation, turn a switch on/off, cancel a program or station, initiate a rain hold or cancel, start a program or initiate a Re-Flow response. The central controller will be able to limit flow during specified times with the configuration of a pump profile with or without pump station integration. These features allow savings in markets where the utility companies have adopted tiered electricity rates for peak use periods.
- P. The system shall require a personal computer which has been certified by the manufacturer for use with the central control system. The system shall come with a one-year dedicated support program provided by the manufacturer which includes extended warranties, 24-hour component replacement, toll-free help-line support and remote diagnostics by a licensed irrigator.
- Q. The system shall include GSP for secure remote access to allow the user to operate the Lynx system from any computer connected to the internet. This will also allow GSP to do remote diagnostics and support of the central controller. The system shall include one year of GSP, a service that will allow GSP to remotely monitor the computer 24/7/365 and will alert the user to internal computer hardware and software issues.

2.11 REMOTE 2 WIRE CONTROL SYSTEM

- A. The irrigation satellites shall be installed and mounted on a concrete slab no less than 6” in thickness. A 4” sweep (field wires), and a 2” sweep (power wires) shall be incorporated into the construction of each Remote Controller (RC) pad. All slabs will be brush finished, with smooth trim, and rounded edge.
- B. The satellite cabinets shall be constructed of Plastic, with locking doors. All control devices shall be enclosed and installed as per manufacturer’s recommended installation procedures.

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- C. Each satellite shall have a power disconnect, with receptacle installed. This disconnect shall meet all local electrical codes.
 - D. The power supply will be 120 VAC, and 24 VAC power for the field wire. Each RC location, shall be connected with # 6 bare copper wire, via a CadWeld to a minimum of three 5/8" ground rods in a grid triangle distanced 16' apart, and surrounding the satellite group. A resistance to Ohms of 10 or less is required at each location before it can be approved and signed off. Should additional grounding rods be required, it shall be considered an extra, and the Owner shall be responsible for payment as outlined in the unit pricing section of the Bid form.
 - E. Each RC shall have installed surge protection for the 120 VAC power wires, 40 VAC field wires. This surge protection shall include any fuses, chokes, gap relays, MOV's or resistors that are typically part of timing mechanism, transformer construction, or satellite construction.
 - F. The irrigation controller shall be supplied by Rain Bird, Toro or equal, supplied by the Owner.
 - G. All RCs shall be sized to accommodate the required number of station present in each hydrozone.

2.12 WEATHER STATION

- A. The weather station for the irrigation system shall be a Campbell Scientific Weather Station or equal powered by solar and capable of monitoring and reporting via cellular or radio to the Central Computer the following atmospheric conditions: 1- Temperature, 2- Humidity, 3- Solar Radiation, 4- Rainfall, 5- Wind Speed all via radio to the central.
- B. CONTRACTOR shall install the Weather Station at a location to be selected by the Irrigation Consultant. This location shall be in an open area and completely surrounded by turfgrass. No pavement should be within 50' of the Weather Station. The Weather Station should be installed on a poured concrete footing, 3' x 3' x 3', with a bolt pattern to match that of the Weather Station tower. It shall be grounded in the immediate area with three 8' copper ground rods in a triangle pattern 12' apart.
- C. CONTRACTOR will be responsible for the installation of a 2" PVC sleeve across any parking or paved areas from the weather station to the Superintendent's office.

2.13 ISOLATION VALVES

- A. MAINLINE, LATERAL, TEES & GREENS ISOLATION VALVES

1. All Isolation Valves shall follow the following specifications with the exception that the bid for the HDPE SYSTEM shall include Lug Type HDPE Ball valves with integrated HDPE stubs on each side of the valve no less than 18" in length.
2. All isolation valves shall be sized as specified on the irrigation design, and no variation shall be allowed unless approved by the Irrigation Consultant. All isolation valves on the project shall be of the same manufacturer.
3. All greens isolation valves shall be installed within fifty (50) feet from the green's edge. If this is not possible, then the Owner shall select the valve location.
4. All mainline pipe supplying green's loops are 4", and all green's loops are 3" in diameter.
5. CONTRACTOR will provide to the Owner, four (4) valve-adjusting wrenches, each shall be 5' in length.

B. VALVE BOXES

1. Valve boxes shall be placed over all isolation valves, quick coupling valves, drain valves, air release valves, electrical wire splices, communication cable splices, and ground rod locations. Valve boxes shall be of high strength plastic, and valve lids shall be green (unless otherwise required by local code) for irrigation components. Electrical splices shall be installed in rectangular valve boxes gray or black in color.
2. All Mainline/Lateral irrigation valve boxes shall be 24" Rectangular Boxes, all Lateral electric valve boxes shall be 24" rectangular, and quick couplers and ground rod valve boxes 6" in diameter, and electrical splices 24" rectangular.
3. Valve box extensions must be used where necessary.
4. Valve boxes are to be manufactured by Brooks, Carson or equal.

C. QUICK COUPLERS

1. All quick coupling valves shall be constructed of brass and they shall be 1-inch in size. They are to be manufactured by Rain Bird, Toro Company or equal.
2. All quick coupling valves will be supplied via the green loop. Each quick coupling valve will be enclosed in a 6" valve box, with a green lid.
3. All quick coupling valves shall be connected to the Lasco Snap-Lok swing joint with a brass male stabilizer elbow (G14S-212).
4. Quick Coupling valves shall be located at the back right head of each green.

2.14 AIR RELEASE VALVES/DRAIN VALVES

A. AIR RELEASE VALVES

1. The irrigation system shall have a minimum of six (6) 1" Air Release Valves. The locations shall be determined during construction depending on site conditions. Bermad, Model 4405, or an approved equal shall manufacture the air releases valves.
2. Each Air Release Valve shall have a gate valve to allow service.

B. DRAIN VALVES

1. The irrigation system shall have a 2" Lug Type Valve at each lake on the golf course. These drain valves shall be attached to the nearest fairway lateral via and housed in a valve box 10-15' from the lake's edge.

2.15 WIRE

A. 2-WIRE COMMUNICATION WIRE

1. Trunk Wire shall refer to the wire path that parallels the mainline and Lateral Wire shall refer to the wire that leaves the Trunk Wire and runs with the sprinkler lateral pipe to each sprinkler. All wire shall be Polyvinyl Chloride (PVC) thermoplastic-coated underground feeder (UF) wire and rated to 600 volts. All 120 VAC wire shall be installed as per all Local and National Electric Codes. All wire shall be tested by Underwriter's Laboratories and bear all UL labels.
2. CONTRACTOR shall follow all color schemes and sizes as shown on the Irrigation Plans and in this Specification.
3. The 2-WIRE TRUNK Soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8. Insulation shall be low density high molecular weight polyethylene and a thickness of 0.045". The two conductors (black and yellow) shall be twisted with a minimum lay of 4". All wire is to be manufactured by Regency or equal. An optional Mylar tape may be used over the conductors. A rip cord shall be placed directly below the outer jacket. Overall jacket shall be high density polyethylene with a thickness of 0.035". Colors shall be as defined in the Qty Section of the PM and on the drawings. The jacket shall be sufficiently round, and loose, to facilitate its removal when being stripped. Colors are as displayed in the drawings.
4. The 2 WIRE LATERAL WIRE Soft drawn bare copper meeting the requirements of ASTM specification B-3 or B-8. Insulation shall be low density high molecular weight polyethylene and a thickness of 0.045". The two conductors (black and yellow) shall be twisted with a minimum lay of 4". All wire is to be manufactured by Regency or equal. An optional Mylar tape may be used over the conductors. A rip cord shall be placed directly below the outer jacket. Overall jacket shall be high density polyethylene

with a thickness of 0.035". Colors shall be as defined in the Qty Section of the PM and on the drawings. The jacket shall be sufficiently round, and loose, to facilitate its removal when being stripped.

5. Wire colors for the Lateral Wires shall be as follows:
 - a. All Trunk wires shall be as defined in the Irrigation Plans. All Fairway and Greens shall be GREEN/BLACK.
 - b. All wires shall be installed in lengths so that splicing can be avoided. However, both the Irrigation Consultant and the Owner understand that in some cases this will not be possible. When a splice is necessary, all 2 Wire splices should be at the closest sprinkler with 3M DBY/DBR , or an approved equal.
 - c. All bare copper wire splices in the field shall be joined via a split bolt to ground rod at that point where the spool empties. All wire splices are to be buried in a valve box. (See Valve Box section). All wire splices will be made as per the manufacturer's instruction.

B. GROUND WIRE

1. The irrigation satellites shall be connected to the ground rods with a #6 BARE copper wire. This same wire will travel the length of all power wire runs. The wire shall be attached to the rods with a CadWeld. All splices shall be made with a ground rod and CADWELD. The ground wires from a group of two or more satellites may be unioned together, and connected to the ground rods via a single #6 bare copper wire.

2.16 SERVICE & REPAIR KITS

A. SERVICE & REPAIR KITS

1. CONTRACTOR will provide to the Owner four (4) complete sets of service and repair tools. This is to include but not be limited to, snap ring tools, adjustment tools, nozzle replacement tools, valve insertion tools, hex nut drives, Allen wrenches. The CONTRACTOR should reference the manufacturer, and provide the tools recommended as part of the service kits.

B. SERVICE, OPERATION, AND MAINTENANCE MANUALS

1. CONTRACTOR will provide four (4) complete sets of operation and service manuals that pertain to all the products used in the installation of the irrigation system. Schematic diagrams, performance charts, part catalogs, and repair catalogs shall be included.

PART 3 – EXECUTION

3.1 EXECUTION

- A. Pipe and Fittings: Size as indicated on the plans. Install as shown in accordance with manufacturer's recommendations
- B. HAULING, UNLOADING and DISTRIBUTING PIPE:
 - 1. During loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe. No pipe shall be dropped from cars or trucks, or allowed to roll down slides without proper retaining ropes.
 - 2. During transportation pipe shall rest on suitable pads, strips, skids or blocks securely wedged or tied in place.
 - 3. Any pipe damaged shall be replaced.

3.2 FUSION

- A. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground, when ever possible. The joining method shall be the butt fusion and or socket fusion method and shall be performed in strict accordance with the pipe supplier's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe supplier, including, but not limited to, temperature requirements of 425 +/- 15 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 +/- 15 psi for hydraulic .
- B. The fusion equipment used shall be manufactured by McElroy Manufacturing, or equal. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself.
- C. Electrofusion or socket fusion (500°F +/-25 may be used where the butt fusion method cannot be used. Electrofusion couplings and fittings shall be PE 4710 with a minimum cell classification of PE 445474C. Electro-fusion couplings or fittings shall have a manufacturing standard of ASTM F1055. Couplings and fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.
- D. Mechanical connection to other types of pipe shall be made by one of the following methods:
 - 1. Flange, using HDPE flange adapter with ductile iron back up ring, and zinc-plated bolt pack.
 - 2. Mechanical joint, using HDPE Mechanical Joint (MJ) adapter kit.
 - 3. Bell MJ adapter with kit (4"- 12)

4. INSPECTION: Inspect the pipe for defects before installation and fusion. Pipe shall not exhibit scratches or gouges greater than Defective, damaged or unsound pipe will be rejected.
5. TESTING if pressure testing is required testing shall be done hydrostatically.

3.3 QUALITY CONTROL TESTING (ON SITE BEND BACK TEST)

- A. Prior to HDPE pipe being installed in the trench, at the beginning of the job, the CONTRACTOR shall cut out the first butt fusion of each pipe size. The CONTRACTOR shall prepare the sample for the test in accordance with the "Bend Back Testing" procedure in accordance with ASTM F 2620.
- B. The samples shall be tested in the presence of the Owner's representative and / or the irrigation consultant, all in accordance with testing procedures outlined. All samples shall be labeled and saved. Testing must be done at 73 degrees F plus or minus 5 degrees. The test temperature and sample size are critical to testing.
- C. The purpose of the test is to determine if the weld meets specified standards. A pass means no failures during the bend back test. This means a good weld. A break means a bad weld. Any failure shall require additional testing.

3.4 GOLF COURSE PUMP STATION - 2250 GPM, 110 PSI (3 – 75 HP MOTORS)

MANUFACTURER REQUIREMENTS

The pump station manufacturer shall supply a prefabricated pumping station, with all equipment fabricated and mounted on a **structural steel base**. The pump station shall be shipped as a complete unit. All equipment used to construct and assemble the pump station shall be warranted by the Pump Station Manufacturer, and no "3rd Party" Primary Warranties shall exist. The Pump Station Manufacturer shall have installed a minimum of 100 VFD pump stations on golf courses.

The submittal data for the pumping station, shall include, but not be limited to:

- Curves (Efficiency Rating)
- Technical Data Sheet
- System Drawings
- Manufacturer's U.L., E.T.L. Authorization Letters
- Certificate of Liability Insurance
- Listing of All Warranties

Bids for the Pump Station shall be received from:

MCI / WATERTRONICS OR EQUAL

GOLF STATION PERFORMANCE

The pump station shall be responsible as the sole source of supplying water to the Golf Course Irrigation System. The required volume of flow, to be measured at the discharge connection, shall be 2,250 GPM, at a delivery pressure of 110 PSI, 254 feet of head.

The station shall have THREE (3) 75 HP horsepower vertical turbine motors, w/ pumps that shall be built to a length of 15' each, and a Five (5) horsepower submersible line maintenance pump. The power that is to be supplied by the Owner, shall be 460 VAC, three (3) phase.

PRIOR TO ORDERING ALL IN-FIELD MEASUREMENTS MUST BE CONFIRMED

The pump station shall have as components:

- 1800 RPM Motors on All Pumps
- Mechanical Seals on all Pump Assemblies
- Variable Frequency Drive with crossover to each of the Main Motors
- Programmable Controller
- Air/Water Heat Exchanger (No Air Conditioner)
- Motor Condensation Space Heaters
- Operator Interface on Panel Door
- Main Power Disconnect on Panel Door
- Panel Door Alarm Lights and Control Switches
- System Pressure Relief Valve
- Pump Check Valves on All Pumps
- Individual Main Pump Air In/Out Relief Valve
- 1/16" Wye Strainer Filtration w/automatic self flushing valve
- Pump Intake and Discharge Isolation Valves
- System Pressure Relief Valve Isolation Valve
- Pump Station/Field Isolation Valve
- Line Maintenance Pump Isolation Valve
- Air Release Valve on Discharge Manifold
- **8" x 10' Discharge Line Size** Flanged on both ends Spool Piece for Discharge Extension through PumpHouse Wall
- 3/16" Diamond Plate Base
- NEMA 3 Enclosure
- 7.5 KVA Transformer
- Fluid Filled Pressure Gauges
- 2 Operation/Service Manuals

- Cellular Modem for Remote Communication
 - Control and Communication Software for Remote Analysis and Adjustment with the Central Irrigation Software Package
- ANY MANUFACTURER PROPRIETARY ALTERNATES THAT MAY BE OFFERED FOR CONSIDERATION SHALL BE PRESENTED AS ALTERNATES BY LINE ITEM AND NOT INCLUDED WITHIN THE BASE BID TENDERED

The above requirements are to be viewed as minimum, and should these specifications be limiting in nature to the standard specification of the manufacturer for a Vertical Turbine, 3 Pump, VFD Pump Station delivering 2,250 GPM at 110 PSI, then the manufacturer's standard specification shall supersede these written specifications ONLY in those areas where the manufacturer's standard specification improves the performance, reliability, and durability of the pump station.

PUMP STATION SHIPMENT, PLACEMENT, INSTALLATION

The Pump Station Manufacturer shall be responsible for loading, shipping, and unloading the pump station, inclusive of trucking and crane expenses, also for the pump station start up and calibration.

The **Irrigation Contractor** shall be responsible for constructing and installing the HDPE Z Pipe and connecting to the new pump station. This connection shall be made on the Flanged spool piece that is shipped separately for existing the side wall of the pump house. Upon arrival to the jobsite, the Pump Station shall be unloaded and placed with assistance of the **Irrigation Contractor and the local Pump Station Service Company**. The **Pump Station Manufacturer** shall have a representative/technician on site during the installation of the station. The **Pump Station Manufacturer** shall give 30 days prior notice to the **Irrigation Consultant as to the final delivery schedule**.

The **Pump Station Manufacturer** shall provide a 24-month warranty on the entire station. All warranties shall not commence until the final start up by the Local Service Representative has been performed and completed and this new station is made operational. The **Pump Station Manufacturer** will provide a technician/representative to be responsible for the Start-Up of the Pump Station.

PUMP INSTALLATION

All electrical shall be installed along the ceiling to the pump station skid. A new discharge z pipe shall be constructed by the Irrigation Contractor from DR 11 HDPE and allow for the attachment to 16" DR 13.5 HDPE Pipe. The discharge z pipe shall have 3 fertigation taps

located outside the building. The connection to the irrigation mainline shall be performed by the irrigation contractor.

UNDERGROUND

A new wet well, intake and box screen shall be installed. Please see other engineering plans for details and scope.

ELECTRICAL (BY OWNER)

All new electrical for this new location shall be routed from the existing service. The electrical requirements for this new building shall be to supply the cooling fan, 110 vac lights and wall outlets per local code, the fertigation system, the installation of the power disconnects and service for the main pump station.

3.5 IRRIGATION QUANTITIES

SPRINKLERS / VALVES – 2 WIRE SYSTEM

DESCRIPTION

1 ½" Full Circle Sprinkler, 2 Wire, 50 gpm, 80' spacing	420
1 ½" Part Circle Sprinkler, 2 Wire, 50 gpm, 80' spacing	526
1" Part Circle Sprinkler, 2 Wire, 37 gpm, 70' spacing	0
2" Two Wire Actuated Plastic Pressure Reducing Valve	26
¾" Part Circle Rotor, 5 gpm, 35' spacing (RIBs)	458
1" Quick Coupler	20
¾" Swing Joint	458
1" Swing Joints	20
1 ½" Swing Joints	946
Grounding Assemblies	60
Campbell Scientific Weather Station w/ radio modem comm / Solar Power	1

III. PIPING

2" CL 200 PVC BOE PIPE (RIB Irrigation)	18,000 lf
3" CL 200 PVC BOE PIPE (RIB Irrigation)	1,000 lf
3" DR 13.5 4710 HDPE Pipe	78,000 lf
4" DR 13.5 4710 HDPE Pipe	3,600 lf
6" DR 13.5 4710 HDPE Pipe	9,200 lf
8" DR 13.5 4710 HDPE Pipe	3,500 lf
10" DR 13.5 4710 HDPE Pipe	1,600 lf
12" DR 13.5 4710 HDPE Pipe	1,300 lf
16" DR 13.5 4710 HDPE Pipe	300 lf

IV. ISOLATION VALVES (HDPE Type w Integrated HDPE Extensions)

3" Drain Valve (1 at each lake off lateral)	6
3"	1
4"	24
6"	23
8"	6
10"	2
12"	2
1" Air Release Valves	6

VI. WIRE

#12 2-Trunk Wire Red (Double jacketed)	4,000 LF
#12 2- Trunk Wire Blue (Double jacketed)	3,000 LF

#12 2-Trunk Wire Green (Double jacketed)	7,500 LF
#12 2- Trunk Wire Purple(Double jacketed)	3,000 LF
#14 2-Lateral Wire Green (Double jacketed)	78,000 LF
8' X 5/8" Copper Ground Rod	60
#6 Bare Copper Wire	2,000 lf
3M DBR/Y Splice Kits	1,600

VII. VALVE BOXES

6" Valve Box w/ Lid QC	21
10" Valve Box w/ Lid Mainline, Greens, Fwys Iso valves, Lake Drains	64
12" Rectangular Valve Box w/Lid 2 wire splices	20
24" Rectangular Valve Box w/ Lid Elec Valves, Air Rel Valves	32

VIII. PUMP STATION

a. SEE SPECIFICATIONS AND INFORMATION IN SECTION 3.4 1

IX. ALL FITTINGS

BY CONTRACTORS

It is understood that all items for which there is no specific breakdown, are to be considered as necessary and integral parts to other items, of which when combined, form a complete and understood component.

THE IRRIGATION MANUFACTURER, DISTRIBUTOR, AND CONTRACTOR MUST EXAMINE THE IRRIGATION DESIGN AND PROJECT SPECIFICATIONS AND BASE THE BID PROPOSAL ON THEIR OWN CALCULATIONS

CONTRACTOR UNIT PRICING PROPOSAL

The following is a Unit Pricing Proposal for the Irrigation System at **Wakulla Sands Golf Course**, Crawfordville, Florida. It is understood that the pricing quoted includes all material, labor, and equipment for the complete installation and functional operation of that specific

component (except where noted). It is understood that all items for which there is no specific breakdown, are to be considered as necessary and integral parts to other items, of which when combined, form a complete and understood component.

The following unit pricing will be used as the quantity guideline for determining the qualification and accuracy of the Base Proposal and will be used as the guideline for determining the cost basis of a Change Order offered by the Irrigation Contractor, or the Owner for any additions or deletions to the original irrigation system design and the original Base Proposal.

**MATERIAL
UNIT PRICE LIST**

	DESCRIPTION	UNIT PRICE
I.	PIPE	
	4" DR 13.5 HDPE Pipe	\$ _____ /FT
	6" DR 13.5 HDPE Pipe	\$ _____ /FT
	8" DR 13.5 HDPE Pipe	\$ _____ /FT
	12" DR 13.5 HDPE Pipe	\$ _____ /FT
	16" DR 13.5 HDPE Pipe	\$ _____ /FT
II.	SPRINKLER HEADS	
	1 ½" FC Sprinkler	\$ _____ (Materials / Labor)
	1 ½" PC Sprinkler	\$ _____ (Materials / Labor)
	1" PC Sprinkler	\$ _____ (Materials / Labor)
	1 1/2" Pressure Reducing Valve	\$ _____ (Materials / Labor)
	1" QC	\$ _____ (Materials / Labor)

Central System / Software – Central to field interface via radio; to sprinkler via wire; tablet to central from field (Rain Bird Cirrus, Toro Lynx or equivalent with all software, computer system, radio base station, radio antenna, site surveys, 5 year manufacturer support subscription.

\$ _____
Tablet for remote operation \$ _____

Field Interface Unit \$ _____

Campbell Scientific Weather Station **OR EQUIVALENT** w/ radio
modem comm / Solar Power \$ _____

III. ISOLATION VALVES

2" (Lake Drain Valves)	\$ _____/EA(labor/material)
3"	\$ _____/EA(labor/material)
4"	\$ _____/EA(labor/material)
6"	\$ _____/EA(labor/material)
8"	\$ _____/EA(labor/material)
10"	\$ _____/EA(labor/material)
12"	\$ _____/EA(labor/material)
1" Air Release Valves	\$ _____/EA(labor/material)

IV. GROUNDING

2 Wire Grounding Device	\$ _____ -EA (labor/material)
Copper Plates	\$ _____ -EA (labor/material)
GEM Wells	\$ _____ -EA (labor/material)
Ground Rods	\$ _____ -EA (labor/material)

It is understood that all items for which there is no specific breakdown, are to be considered as necessary and integral parts to other items, of which when combined, form a complete and understood component. THE IRRIGATION MANUFACTURER, DISTRIBUTOR, AND CONTRACTOR MUST EXAMINE THE IRRIGATION DESIGN AND PROJECT SPECIFICATIONS AND BASE THE BID PROPOSAL ON THEIR OWN CALCULATIONS

V. Pump Station

a. 2250 GPM VFD Pump Station _____ \$ _____
(manufacturer)

END OF SECTION 32 80 00