



BLACK BROOK GOLF COURSE IRRIGATION SYSTEM

PROPOSED 18-HOLE AUTOMATIC IRRIGATION SYSTEM

PREPARED FOR:

Finance Department
The City of Mentor
8500 Civic Center Boulevard
Mentor, Ohio 44060

PREPARED BY:

Irrigation Consulting, Incorporated
Brian E. Vinchesi, Design Engineer

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June 2023

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Bid Set

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ADVERTISEMENT FOR BIDS/PUBLIC NOTICE TO BIDDERS

Sealed proposals will be received at the Purchasing Department, City of Mentor, 8500 Civic Center Boulevard, Mentor, Ohio until 12 noon on **August 11, 2023** and will be opened and read immediately thereafter for the following roadway resurfacing project:

**BLACK BROOK GOLF COURSE IRRIGATION SYSTEM
INSTALLATION SPECIFICATIONS**

Non-Mandatory pre-bid meeting Friday, August 4, 2023 @ 10:00 a.m.

Bids must be in accordance with specifications advertised on the City of Mentor website: www.cityofmentor.com/category/rfp or RFP's will be available for pick-up at the Purchasing Office for the cost of printing. Bidders shall be responsible for checking for Addenda.

BY ORDER OF

Kenneth J. Filipiak, City Manager

Publish: *News-Herald*

July 28, 2023
August 4, 2023

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INSTRUCTIONS TO BIDDERS

I. Sealed bids for the IRRIGATION SYSTEM AT BLACK BROOK GOLF COURSE will be received at The City of Mentor, 2nd Floor, Purchasing Department 12:00 p.m. NOON Friday, August 11, 2023.

II. Bids shall be complete, and no interlineations, exclusions, or special conditions shall be made or included on the Bid Form by the Contractor. The City of Mentor, at its discretion, may consider as irregular any bid in which there is an alternation, change, or departure from the Bid Form included in these documents, and as such may reject the bid. Erasures or other changes in the bid shall be explained or noted with the initials of the Contractor.

Bid Form shall be typewritten or completed in ink. Pencil entries on the bid will not be accepted.

III. Each proposal must be accompanied by a cashier's or certified check, an irrevocable letter of credit, or by a proposal bond, signed by a surety company authorized to do business in the State of Ohio, in the amount of ten (10) percent of the proposal and made payable to the City of Mentor, as a guarantee that the contract will be honored in the event it is awarded to the Bidder, and as a guarantee that the Bidder to whom the contract is awarded will sign all documents necessary to formalize the contract, if any.

If the Bidder to whom the contract is awarded shall fail to honor the contract, or fail to sign the documents necessary to formalize the contract, if any, the deposit accompanying the proposal shall thereupon be forfeited to the City for and as liquidated damages. The work may then be readvertised or awarded to the deemed second best Bidder as the City may determine.

IV. Bids shall be made upon the Bid Form provided, in the manner requested. Blank spaces shall be filled in and prices submitted for items requested.

Bids shall be in strict accordance with the drawings and specifications. Any deviations from the drawings and/or specifications shall be quoted as voluntary alternates only.

V. Bidders shall carefully examine the specifications and project drawings. Each Bidder may visit the site and acquaint themselves with the existing conditions and equipment relating to the proposed irrigation system. Contractor through execution of the contract shall not be relieved from any obligation under the contract due to their failure to acquaint themselves with the existing conditions.

- VI. A non-mandatory pre-bid meeting will be held on Friday, August 4, 2023, at 10:00 a.m. at Black Brook Golf Course Clubhouse.
- VII. Addenda issued during the time of bidding shall be considered as part of the Project Documents. Addenda received shall be signed off on the Bid Form.
- VIII. Bids will be opened publicly by The City of Mentor at the time stated in the bid documents. The City of Mentor reserves the right to reject any bids submitted; to award the Contract to any bidder, whether or not such bidder is the low bidder, to modify, extend or withdraw this invitation; to negotiate the terms of a contract for installation with any bidder or any other person; and otherwise, to provide for the construction of the irrigation system in such a manner as The City of Mentor sees fit.
- IX. Direct questions concerning the Project Documents to the Finance Department, email: Veronica Fetsko, fetsko@cityofmentor.com. Replies will be issued as addenda if necessary. Addenda will be emailed to persons to whom drawings and specifications have been issued, but it shall be the Contractor's responsibility to make inquiries as to, and to obtain, addenda issued. Bidders shall be bound to each addendum whether or not received by the Contractor. Bidders shall acknowledge receipt of addenda on the Bid Form. Black Brook Golf Course and The City of Mentor will not be responsible for oral clarifications.
- X. Black Brook Golf Course is an existing 18-hole public golf course. Installation of the irrigation system is expected to begin Fall, 2024, or as negotiated. Contractor shall keep the existing system operational at the end of each day as the new system is installed until November 26, 2024. This will consist of a combination of old automatic irrigation, manual new irrigation and automatic new irrigation working closely with the Owner's Representative and the golf course maintenance staff. Contractor shall meet a water to greens requirement of March 13, of each year. Completion shall be no later than April 17, 2025 or as negotiated.

The proposed enhanced double row irrigation system is to be installed as an eighteen hole centrally controlled 2-wire system supplied water from a new pump station.

- XI. For bidding purposes the project is considered tax exempt.

Extra work shall be assigned a value by any of the following ways:

1. By an estimate and acceptance of a lump sum bid.
2. By unit prices either provided in the original bid or negotiated at a later date.
3. By a negotiated time and materials fee.

Two lump sum price, along with unit prices, and alternates are requested for the work described under the Project Documents. If the quantities shown on the drawings differ

from those shown on the unit pricing quantities, the drawing quantities shall dictate. Contractors shall supply materials as required by the irrigation design for the lump sum prices quoted unless an item is specifically indicated as being supplied by others. Changes to the work made in the field requiring extra material shall be paid for by The City of Mentor per unit prices.

Contract will be paid in lump sums, on an end of the month basis, **Net 30** days, work complete to date, less 5% retention, provided the project work is progressing per submitted schedule and a to scale progress Record Drawing, work completed to date, is submitted with the payment request as well as a complete Release of Lien forms each month from the irrigation supplier and Contractor. As staked drawings are not acceptable. Payment requests shall be made using original AIA forms G702 and G703.

- XII. The 5% retainage of invoiced amounts will be held by The City of Mentor until the installation has been accepted by The City of Mentor and the Owner's Representative. On acceptance, Contractor shall submit the invoice for retainage which shall be paid within 30 days. The City of Mentor, at its discretion, may lower the retainage on the issuance of a punch list providing the estimated value of the punch listed items does not exceed the amount retained.
- XIII. Material delivered to the site and verified by City of Mentor, Black Brook, Greens Superintendent, Nick Fortunato, fortunato@cityofmentor.com and the Owner's Representative and will be paid for by The City of Mentor provided the requisition is accompanied by copies of invoices involving said material, indicating count/amount and actual cost to the Contractor. No markup shall be allowed on material invoices. Supplier invoices shall match the amount billed.
- XIV. The City of Mentor without invalidating the contract documents may order extra work or make changes altering, adding, or deleting work adjusting the contract price accordingly. Such work shall be performed and executed as if it were part of the original contract except that an extension of time may be granted depending on the nature of the change in work.
- XV. Final acceptance of the work will be considered when 100% of the system is operating to the satisfaction of The City of Mentor and the Owner's Representative. The system will be accepted as a whole and not in parts. Final payment will be provided when the Contractor has demonstrated to The City of Mentor that claims arising from the agreement including claims by suppliers and subcontractors have been released and the Contractor has delivered and had approved Record Drawings and Maintenance and Operating Manuals as specified.
- XVI. If the work is not completed by the negotiated date, the Contractor shall pay to The City of Mentor \$500.00 liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each working day after the required date, in addition to attorneys' fees and costs incurred in rectifying the delay. Contractor and his Sureties shall be liable to The City of Mentor for the amount thereof.

Working days can include Saturdays, but not Sundays or holidays.

XVIII. Right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due:

1. To any acts of the U.S. Government, including controls on requisitioning of materials, equipment, tools, or labor by reason of war, National Defense, or any other national emergency;
2. To any acts of Black Brook Golf Course/The City of Mentor which materially interfere with the Contractors ability to perform the work;
3. To causes not reasonably foreseeable by the parties of this Contract at the time of the execution of the Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of another contract with The City of Mentor, fires, floods, epidemics, quarantine, restrictions, strikes, hurricanes, tornadoes, cyclones and other weather conditions; and
4. To any delay of any subcontractor occasioned by any of the causes specified in subparagraphs (1), (2), and (3) of this paragraph.

Provided, however, that the **Contractor promptly notifies The City of Mentor within ten (10) days in writing of the cause of the delay.** Upon receipt of such notification, The City of Mentor shall ascertain the facts and the cause and extent of delay. If upon the basis of the facts and the terms of this Contract, the delay is properly excusable, The City of Mentor shall extend this time for completing the work for a period of time commensurate with the period of excusable delay.

XVIII. Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the City of Mentor; provided however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the City of Mentor. No assignment or novation of this Contract shall be valid unless the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

XIX. CONTRACT BONDING

As security for faithful performance and payment of all obligations under the Contract, the Owner shall require, and the successful Bidder shall furnish either:

1. "Bid Guarantee and Contract Bond" (AKA "rollover bond") per ORC sections 153.54 and 153.571;
2. Contract Bond per Ohio Revised Code Sections 153.54 and 153.57, in the amount of 100% of the Contract Price.
3. The bond shall be underwritten by a Surety Company authorized to transact business in the State of Ohio having an Ohio agent and listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds."

The contract bond shall cover correction of the work for the period stated in the specifications and the correction period shall start upon Final Acceptance of the entire project and final payment by Owner.

XX. AWARD AND EXECUTION OF CONTRACT

After the Owner's legislative body awards the project, the successful bidder will receive the unsigned contract documents. Within 10 days of receipt, the successful Bidder shall sign and deliver to the Owner said contract documents including any certifications, certificates or additional bonds required by the contract.

The Owner shall execute the Contract within 60 days after the day of the bid opening. When necessary and my mutual consent between Owner and the Successful Bidder, this 60 day period may b extended.

The date of the Owner's signature on the Contract Agreement shall be the effective contract date.

The Owner shall execute and deliver to the successful Bidder one set of fully executed contract documents.

XXI. NON-COLLUSION AFFIDAVIT

Each bid must be accompanied by a completed Non-Collusion Affidavit provided within the contract documents.

Where there is reason to believe collusion or combination among bidders exists, the owner reserves the right to reject the bid of those concerned.

XXIII. DELINQUENT PERSONAL PROPERTY STATEMENT

Included with the contract documents is a Delinquent Personal Property Statement to be filled out by the successful Bidder. The statement shall remain in the contract documents.

BID FORM

(This form is also available electronically by email upon request)

(Name)

(Address)

(City and State)

(Phone)

(Fax)

To furnish, deliver and install irrigation materials and equipment and to do and perform work in accordance with the Bid Documents for the Irrigation System at Black Brook Golf Course, being located in Mentor Ohio.

TO: City of Mentor
Finance Department, 2nd Floor
8500 Civic Center Blvd
Mentor, Ohio 44060

To Whom It May Concern:

The undersigned bidder has carefully examined the Bid Documents and also the site of the work and will provide necessary labor, machinery, equipment, tools, apparatus, and other means of construction, and do the work and furnish material called for by the Bid Documents in the manner prescribed therein, and in accordance with the requirements of The City of Mentor under them, for the lump sum prices for base bids enclosed.

The undersigned bidder agrees:

FIRST: To begin work on a negotiated time table with a signed contract and "Notice to Proceed", and to diligently prosecute said work in such a manner as to complete work in the Bid Documents in a timely manner. Contractor shall adhere to the established timetable and should it become necessary to meet such requirements shall add such personnel or crews to achieve fulfillment of the timetable.

SECOND: The undersigned bidder acknowledges the receipt of the following Addenda:

Addendum Number.

1. _____ Dated _____

2. _____ Dated _____

3. _____ Dated _____

(If an individual, partnership, or non-incorporated organization.)

Signature of Bidder: _____

By: _____

Address of Bidder: _____

NAMES AND ADDRESSES OF FIRM MEMBERS:

(If a Corporation)

Signature of Bidder: _____

By: _____

Business Address: _____

Incorporated under the laws of the state of _____

President: _____

Secretary: _____

Treasurer: _____

FORM OF NONCOLLUSION AFFIDAVIT

STATE OF _____)
) SS
COUNTY OF _____)

_____, being first duly sworn, deposes and says
(Individual Name)

that he/she is _____ of _____
(Sole Owner, Partner, President, Secretary, etc.) (Corporation Name)

the party making the proposal or bid; that such bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly with any Bidder or person, to put in a sham bid, or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly sought by agreement or collusion or communication or conference, with any person, to fix the bid price of affiant or any other Bidder, or to fix any overhead, profit, or cost element of said Bid price, or of that of any other Bidder, or to secure any advantage against the Owner, or any person interested in the proposed Contract; and that all statements contained in said proposal or bid are true; and further, that such Bidder has not, directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

Affiant

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public

My Commission Expires: _____

CORPORATE RESOLUTION

I, _____, Secretary of
(Individual Name)

_____ an _____ Corporation hereby
(Corporation Name) (State)

certify that the Board of Directors of said Corporation on the _____ day of _____,

20____, adopted a resolution authorizing the _____ of this
(Corporation Title, i.e., President, Vice President, etc.)

Company, namely, _____, to sign bid proposals, sign and
(Individual Name)

enter into any and all contracts and other instruments, sign and/or authorize bid guaranty and

performance bonds for the purpose of furnishing labor and materials at such price and upon such

terms and conditions, including any amendments or modifications thereto, as said

_____ in his sole discretion shall deem best, and that said actions
(Corporation Title, i.e., President, Vice President, etc.)

shall be binding upon the Corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said

Corporation at _____, _____ this _____ day
(City) (State)

of _____, 20____, and I further certify that said resolution is still in

full force and effect.

Corporate Secretary

BIDDER'S INSURANCE AGENT'S AFFIDAVIT

PROJECT: _____

OWNER: _____

I, _____, _____, first
being duly (Name) (Title)
sworn do state the following:

- (a) that I am an Insurance Agent licensed to transact business in the State of Ohio;
- (b) that I have reviewed the insurance requirements in the bid documents and have noted therein the requirements on insurance including any policy modifications, cancellation and non-renewal provisions, and any additional policies or endorsements needed;
- (c) that I am familiar with the insurance that _____
(Bidder's Company Name)
has in force, and that its insurance meets the contract requirements or that it can be amended or endorsed to meet the contract requirements (with standard industry exclusions) until the current policy expiration or until cancelled with notice per the specifications or additional policies and/or endorsements can be provided to the Contractor;
- (d) that all additional policies and/or endorsements required in the specifications are available;
- (e) that if an award of contract is made to the Bidder an insurance certificate(s) [most current version ACORD 25] and/or binder(s) which fully complies with all insurance requirements in the contract will be issued within three (3) business days of notification from the contractor and the contractor approving any additional policies or endorsements needed to fully comply with the insurance requirements in the contract;
- (f) that I have advised my client of the cost of all additional policies, amendments, and/or endorsements so that he can include same in his bid;
- (g) that the cancellation clause in the policy meets the specifications or that it can be amended by an endorsement;
- (h) that this document neither affirmatively or negatively amends, extends or alters the terms of or coverage afforded by the policy referenced herein.

Further, Affiant sayeth naught.

(Agent's Signature)

Agency Name

(Agent's Name)

Agency Address

Agency City, State and Zip Code

SUPPLEMENTAL BOND ACKNOWLEDGEMENT

PROJECT: _____

OWNER: _____

If the bidder submits a Bid Guaranty and Contract Bond (AKA Rollover or Bid/ Performance/ Payment/ Warranty Bond) per O.R.C. Sections 153.54 and 153.571 the following shall be completed, signed, and submitted with the bid:

By submission of the attached bid and these presents, the undersigned bidder and his surety hereby acknowledge that the attached bond shall cover and warrant all work for the correction period per the General Conditions and as supplemented or amended elsewhere in these Contract Documents, which period is one year(s) commencing on the final acceptance of the work by Owner. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the project or part of the project is located and shall be instituted within one year from the last day of the correction period under the project or within one year after the Surety refuses or fails to perform its obligations under this Bond, whichever first occurs.

BIDDER

SURETY

SIGNATURE: _____	SIGNATURE: _____
NAME: _____	NAME: _____
TITLE: _____	TITLE: _____
DATE: _____	DATE: _____
PHONE NO.: _____	PHONE NO.: _____

*Attach Power of Attorney

If the Bidder submits a Certified or Cashier's check, Irrevocable Letter of Credit and is awarded a contract by the Owner, the following shall be completed, signed, and submitted with the Contract Bond (AKA Performance/Payment/Warranty Bond) per ORC Sections 153.54 and 153.57.

By signature of the attached Contract and these presents the undersigned contractor and his surety acknowledge that the attached Bond shall cover and warrant all work for the correction period per the General Conditions and as supplemented or amended elsewhere in these Contract Documents, which period is one year(s) commencing on the final acceptance of the work by Owner. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the project or part of the project is located and shall be instituted within one year from the last day of the correction period under the project or within one year after the Surety refuses or fails to perform its obligations under this Bond, whichever first occurs.

BIDDER

SURETY

SIGNATURE: _____	SIGNATURE: _____
NAME: _____	NAME: _____
TITLE: _____	TITLE: _____
DATE: _____	DATE: _____
PHONE NO.: _____	PHONE NO.: _____

BID SECURITY

**CONTRACTOR SHALL STAPLE ONE OF THE FOLLOWING FORMS
OF BID SECURITY TO THE FRONT OF THIS PAGE AND
SUBMIT WITH THE BID.**

CERTIFIED OR CASHIER'S CHECK FOR 10% OF THE AMOUNT BID

OR

IRREVOCABLE LETTER OF CREDIT FOR 10% OF THE AMOUNT BID

OR

**BOND (BID/PERFORMANCE/PAYMENT" BOND, a.k.a., "ROLLOVER BOND") FOR
100% OF THE AMOUNT BID PER ORC SECTIONS 153.54 AND 153.571**

BASE BID I – 18 HOLE RAIN BIRD IRRIGATION SYSTEM

To furnish and install specified Rain Bird irrigation equipment and appurtenances, wet well, intake and pump station pad and install a City of Mentor supplied pump station in accordance with the Project Documents the lump sum price of:

_____ (Dollars)

\$ _____
(in figures)

BASE BID II – 18 HOLE TORO IRRIGATION SYSTEM

To furnish and install specified Toro irrigation equipment and appurtenances, wet well, intake and pump station pad and install a City of Mentor supplied pump station in accordance with the Project Documents the lump sum price of:

_____ (Dollars)

\$ _____
(in figures)

ALTERNATE BID I – 5 YEARS NSN/GSP

To furnish 5 years of NSN/GSP as opposed to the specified 1 year in accordance with the Project Documents for the lump sum price of:

_____ (Dollars)

\$ _____
(in figures)

ALTERNATE BID II – EXTENDED WARRANTY

To provide a two-year parts and labor warranty as opposed to the specified 1-year warranty in accordance with the Project Documents for the lump sum price of:

_____ (Dollars)

\$ _____
(in figures)

List subcontractors to be used on this project.

Contractor: _____ Item: _____

Contractor: _____ Item: _____

If the Contractor cannot install the Irrigation System on the schedule outlined in the Bid Documents, please provide a preferred start date and completion date below:

Start Date (month/day/year): _____

Completion Date (month/date/year): _____

IRRIGATION REFERENCES: Rain Bird IC System references should be as geographically close to Mentor, Ohio as possible. (References shall be for the name of the firm bidding, installing and bonding the project.)

1. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

2. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

3. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

4. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

5. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

IRRIGATION REFERENCES: Toro LSM System references should be as geographically close to Mentor, Ohio as possible. (References shall be for the name of the firm bidding, installing and bonding the project.)

1. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

2. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

3. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

4. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

5. Course Name: _____

Address: _____

Club Manager: _____

Superintendent: _____

Phone: _____

Irrigation Equipment Manufacturer: _____ Cost: _____

Year Installed: _____ New/Existing _____

EQUIPMENT LIST: Please furnish a complete listing of anticipated equipment to be used on this project. Equipment information should include manufacture, model number, year manufactured and a true rating of the equipment's condition. Contractor's standard equipment list may be substituted for this form.

1. Excavator/Trencher, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

2. Pullers, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

3. Backhoes, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

4. Excavator, Make and Model No.'s

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

5. Trucks, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

6. Compactors, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

7. Rollers, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

8. Other Equipment, Make and Model No.'s:

Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___
Year: _____ Condition: Excellent ___ Good ___ Fair ___ Poor ___

SUPPLEMENTAL UNIT PRICES

The following unit prices, to be filled out by bidders, shall be used for additions or deletions to the irrigation system due to field changes. Prices shall include said material and installation labor and necessary equipment costs complete in place, along with any supervision and delivery charges. Fitting prices shall be provided as a lump sum and shown as a percentage off of list price for future additions or deletions. Contractors are required to indicate the material quantities required for the complete irrigation system shown on the drawings and to bid the irrigation system as a lump sum, complete. Items with zero quantity shall be priced for field changes.

MATERIAL QUANTITIES AND UNIT PRICES

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
1.	___	80' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
2.	___	80' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
3.	<u>0</u>	75' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
4.	<u>0</u>	75' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
5.	___	70' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
6.	___	70' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
7.	___	65' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
8.	___	65' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
9.	___	50' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
10.	___	50' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
11.	___	35' Full Circle Sprinkler, w/ACME swing joint	\$_____/each
12.	___	35' Part Circle Sprinkler, w/ACME swing joint	\$_____/each
13.	___	Toro LSM	\$_____/each
14.	___	Rain Bird ICI+	\$_____/each
15.	___	Toro Smart Hub	\$_____/each
16.	___	Rain Bird Tipping Bucket Rain Gauge	\$_____/each

MATERIAL QUANTITIES AND UNIT PRICES (continued)

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
17.	___	Toro Rain Sensor	\$_____/each
18.	___	Toro Sensor Kit	\$_____/each
19.	___	Central Control Hardware/Computer/Software Package	\$_____/each
20.	___	iPads	\$_____/each
21.	___	Uninterruptable Power Source	\$_____/each
22.	___	Zap Trap	\$_____/each
23.	___	1 Inch Bronze Ball Valve	\$_____/each
24.	___	1-Inch Bronze Wye Strainer	\$_____/each
25.	___	2 Inch Bronze Gate Valve	\$_____/each
26.	___	2 Inch Gate Valve Assembly	\$_____/each
27.	___	3 Inch Gate Valve Assembly	\$_____/each
28.	___	10 Inch Valve Box w/detection	\$_____/each
29.	___	12 Inch Valve Box w/detection	\$_____/each
30.	___	18 Inch Valve Box w/detection	\$_____/each
31.	___	5-1/4 Inch Polyiron Valve Box	\$_____/each
32.	___	3 Inch Extension for 10 Inch Valve Box	\$_____/each
33.	___	6 Inch Extension for 12 Inch Valve Box	\$_____/each
34.	___	6 Inch Extension for 18 Inch Valve Box	\$_____/each
35.	___	Grounding Plate (4" x 96" x 0.06" w/#6 AWG wire)	\$_____/each
36.	___	Grounding Plate (4" x 36" x 0.06" w/#10 AWG wire)	\$_____/each

MATERIAL QUANTITIES AND UNIT PRICES (continued)

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
37.	___	Grounding Rod (5/8 Inch x 10 Foot)	\$_____/each
38.	___	Grounding Rod (5/8 Inch x 8 Foot)	\$_____/each
39.	___	#6 AWG Bare, Solid Copper Wire	\$_____/foot
40.	___	#10 AWG Bare, Solid Copper Wire	\$_____/foot
41.	___	Cadweld Connector (GT1161G Plus)	\$_____/each
42.	___	Cadweld Connector (PG11L Plus)	\$_____/each
43.	___	50 lb. Bag PowerSet Material	\$_____/each
44.	___	Rain Bird MGP-1 Grounding Plate	\$_____/each
45.	___	Rain Bird MSP-1 Surge Pipe	\$_____/each
46.	___	Rain Bird Integrated Control Surge Device	\$_____/each
47.	___	Rain Bird IC-IN	\$_____/each
48.	___	Toro Communication Line Surge Unit	\$_____/each
49.	___	P7072D #14/#14 AWG Communication Cable	\$_____/1000'
50.	___	P7072D #12/12 AWG Communication Cable	\$_____/1000'
51.	___	3M DBR/Y-6 Wire Connector	\$_____/each
52.	___	Antenna Surge Arrestor	\$_____/each
53.	___	2 Inch Drain Assembly	\$_____/each
54.	___	1 Inch PVC Swing Joint w/Brass Insert	\$_____/each
55.	___	1 Inch PVC ACME Swing Joint	\$_____/each
56.	___	1-1/4 Inch PVC ACME Swing Joint	\$_____/each
57.	___	1-1/2 Inch PVC ACME Swing Joint	\$_____/each

MATERIAL QUANTITIES AND UNIT PRICES (continued)

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
58.	___	1 Inch Quick Coupling Valve	\$_____/each
59.	___	1 Inch Acme Quick Coupling Key	\$_____/each
60.	___	1 Inch, 6-Inch Long Key Extender	\$_____/each
61.	___	1 Inch x 1 Inch Swivel Hose Ell	\$_____/each
62.	___	1 Inch Air Vacuum/Release Valve Assembly	\$_____/each
63.	<u>Price</u>	HDPE Electro-Fusion Saddles	\$_____% off list
64.	<u>Price</u>	HDPE Molded Fittings (Attach List)	\$_____% off list
65.	<u>Price</u>	HDPE Compression Fittings (Attach List)	\$_____% off list
66.	<u>Price</u>	Mechanical Joint Fittings (Attach List)	\$_____% off list
67.	<u>Price</u>	Schedule 80 Nipples (Attach List)	\$_____% off list
68.	<u>Price</u>	Brass Nipples (Attach List)	\$_____% off list
69.	<u>Price</u>	Brass Fittings (Attach List)	\$_____% off list
70.	___	3 Inch MJ Gate Valve	\$_____/each
71.	___	4 Inch MJ Gate Valve	\$_____/each
72.	___	6 Inch MJ Gate Valve	\$_____/each
73.	___	8 Inch MJ Gate Valve	\$_____/each
74.	___	2 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot
75.	___	3 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot
76.	___	4 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot
77.	___	6 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot

MATERIAL QUANTITIES AND UNIT PRICES (continued)

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
78.	___	8 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot
79.	___	10 Inch DR13.5, 160 Psi, HDPE Pipe	\$_____/foot
80.	___	6 Inch PVC, Class 200 Valve Sleeving Pipe	\$_____/foot
81.	___	6 Inch PVC, Class 200 Sleeving Pipe	\$_____/foot
82.	___	8 Inch PVC, Class 200 Sleeving Pipe	\$_____/foot
83.	___	10 Inch PVC, Class 200 Sleeving Pipe	\$_____/foot
84.	___	1 Inch PVC Sweep Elbow	\$_____/each
85.	___	1-1/2 Inch PVC Sweep Elbow	\$_____/each
86.	___	2 Inch PVC Sweep Elbow	\$_____/each
87.	___	1 Inch PVC Electrical Conduit	\$_____/foot
88.	___	1-1/2 Inch PVC Electrical Conduit	\$_____/foot
89.	___	2 Inch PVC Electrical Conduit	\$_____/foot
90.	___	4 Inch Detectable Grated Plastic Cover	\$_____/each
91.	___	4 Inch ADS Drainage Pipe	\$_____/foot
92.	___	2 Inch Pond Fill Assembly	\$_____/each
93.	___	Identification Tags	\$_____/each
94.	___	Set of Tools for Sprinklers	\$_____/each
95.	___	5 Foot, 2 Inch Box Gate Valve Wrenches	\$_____/each
96.	___	McElroy Pit Bull 14 Fusion Machine	\$_____/each
97.	___	Other Spare Parts	\$_____/sum
98.		Pavement Cutting and Patching	\$_____/sq ft

MATERIAL QUANTITIES AND UNIT PRICES (continued)

<u>No.</u>	<u>Quantity</u>	<u>Description</u>	<u>Unit Price</u>
99.		Hammering, Rock Removal, Hauling, Bedding and Disposal	\$_____/lf
100.		Rock Sawing including Teeth	\$_____/lf
101.		Deleterious Material Removal, Hauling and Disposal	\$_____/cy
102.		Supply and Installation of Bedding Material (Deleterious Only)	\$_____/cy
103.		Sod Replacement	\$_____/sq yd
104.		Crew Supervisor	\$_____/hour
105.		Laborer	\$_____/hour
107.		Excavator w/operator	\$_____/hour
107.		Trencher w/operator	\$_____/hour
108.	_____		\$_____/
109.	_____		\$_____/
110.	_____		\$_____/

INSURANCE & BONDING

INSURANCE:

Black Brook Golf Course/The City of Mentor, its successors and assignees to be named as additional insured on Automobile and General Liability, including products/completed operations, insurance policies and a Certificate of Insurance.

The required Certificate of Insurance shall be in a form satisfactory to the Owner (most current version of ACORD 25 or approved equal). If the Contractor fails to procure and maintain any specified and/or required insurance, the Owner shall have the right to procure and maintain the said insurance for and in the name of the Contractor and the Contractor shall pay the cost thereof and shall furnish all necessary information to make effective and maintain such insurance.

Certificates as furnished shall bear the policy numbers, the expiration date of the policy and the limit or limits of liability thereunder. The certificates shall be non-cancellable and non-amendable with respect to Black Brook Golf Course/The City of Mentor and such designees of The City of Mentor without thirty (30) days' prior notice to The City of Mentor.

Contractor and each sub-contractor shall, until the completion of the Contract, procure and maintain at their expense, the following insurance coverages in companies acceptable to The City of Mentor in the following MINIMUM value or greater value where required by laws and regulations:

- | | | |
|------|--|---|
| I. | <u>Workers' Compensation</u>
(Including coverage for Occupational Disease)
State:
Applicable Federal: | Ohio Statutory Limits
Statutory Limits |
| II. | Employer's Liability | \$1,000,000 |
| III. | <u>All Other Liabilities</u> | |
| 1. | <u>Commercial General Liability</u>
(Contractual Liability and <u>Products/Completed Operations Coverage</u>).
Include Explosion Collapse and Underground coverage. | |
| | General Aggregate
(Other than Products/Completed Operations) | \$2,000,000 |
| | Products/Completed Operations Aggregate Limit | \$2,000,000 |
| | Personal and Advertising Injury | \$1,000,000 |
| | Each Occurrence Limit | \$2,000,000 |

2. Business Automobile Liability
(Including Coverage for Hired, Non-Owned Automobiles)

Combined Single Limit	\$2,000,000
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Above policies shall include Waiver of Subrogation in favor of Black Brook Golf Course/The City of Mentor and all additional insureds.

IV. Umbrella Liability

The limit of Contractor shall provide combined primary and excess limit liability in the amounts as follows:

Each Occurrence	\$5,000,000
General Aggregate	\$5,000,000

Each subcontract entered into by the Contractor shall impose the obligations of the Contractor hereunder, so far as the same are relevant to the work being performed by such Subcontractor. Without limiting the foregoing, the following shall be expressly incorporated in each subcontract.

The Contractor shall purchase and provide an "Owner's and Contractor's Protective Policy" with the Owner listed as the insured for the following limits:

Each Occurrence	\$1,000,000
General Aggregate	\$2,000,000

Contractor shall carry full Builders Risk or Installation Floater insurance for materials and equipment, including theft of materials. Said policies shall include the appropriate limits of special coverage insurance on materials delivered to the job site as the Contractor shall be liable for any loss or damage to said materials until installed and accepted by Black Brook Golf Course/The City of Mentor. Additionally, any loss or damage to materials invoiced, or to be installed, or completed work, unless caused by a willful act or omission by The City of Mentor shall be the responsibility of the Contractor to repair or replace. Although the materials shall be paid for by The City of Mentor after invoicing and acceptance, the burden of insurance, storage and security of the materials shall rest on the Contractor until final acceptance of the installation.

Contractor and each Subcontractor shall indemnify and hold harmless Black Brook Golf Course/The City of Mentor and the Owner's Representative. Contractor agrees to indemnify and save Black Brook Golf Course/The City of Mentor, its agents, officers and employees harmless for any and losses, claims, actions, costs, liabilities, expenses (including attorney fees), judgments, subrogation's or other damages resulting from injury to any person (including injury resulting in death), or damage (including loss, loss of use or destruction) to property of any nature

belonging to or in the custody of, any person, corporation, partnership, association or other entity, (including, but not limited to, the Contractor's employees, officers, agent, subcontractors, and others designated by Contractor to perform work or services in, about, or attendant to, the work and services under the terms of this Contract). The provisions of this paragraph will survive the completion of performance under this Contract. Contractor will not be held responsible for any losses, expenses, claims, subrogation's, actions, costs, judgments or other damages due to the sole willful misconduct of Black Brook Golf Course/The City of Mentor, its agents, officers or employees.

The City of Mentor shall have the right to review and approve the content of subcontracts entered into by the Contractor.

COMPLIANCE:

The failure of the Contractor to submit the required insurance certificates within 10 days or the time period required by the Bond, after the prescribed forms are requested, or within such extended period as The City of Mentor may allow in writing, based upon reasons determined sufficient solely by The City of Mentor shall constitute default and forfeiture of the Contract. The City of Mentor may award the Contract to any responsible Contractor of their choice. The defaulting Contractor shall have no claim against Black Brook Golf Course/The City of Mentor's agents, officers and employees and/or the Owner's Representative.

BONDING:

As security for faithful performance and payment of all obligations under the Contract, the Owner shall require, and the successful Bidder shall furnish either:

1. "Bid Guarantee and Contract Bond" (AKA "rollover bond") per O.R.C. sections 153.54 and 153.571.
2. Contract Bond per Ohio Revised Code Sections 153.54 and 1153.57, in the amount of 100% of the Contract Price.
3. The bond shall be underwritten by a Surety Company authorized to transact business in the State of Ohio having an Ohio agent and listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds"

The contract bond shall cover correction of the work for the period stated in the specifications and the correction period shall start upon Final Acceptance of the entire project and final payment by Owner.

NOTICE OF AWARD

TO: Contractor

PROJECT: BLACK BROOK GOLF COURSE IRRIGATION SYSTEM
INSTALLATION SPECIFICATIONS

You are notified that your Bid which was opened on _____ has been accepted for items in the amount of \$0.00 at the unit bid prices as reflected in the bid tabulation contained herein for Base Bid and Alternates.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Bonds, Certificates of Insurance, and other documents within 10 calendar days from the date of receipt of this Notice.

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

The Owner will return to you one (1) fully signed set of the contract documents.

CITY OF MENTOR

Kenneth J. Filipiak, City Manager

Date

ACKNOWLEDGMENT

CONTRACTOR

Contractor, President

Date

CONTRACT

FOR BLACK BROOK GOLF COURSE IRRIGATION SYSTEM
INSTALLATION SPECIFICATIONS

THIS AGREEMENT, made and entered into at Mentor, Ohio, this _____ day of _____, 2023, by and between the City of Mentor (“OWNER”), Ohio and Contractor (“CONTRACTOR”).

WITNESSETH: That the said CONTRACTOR has agreed and by this presents does agree with the OWNER for the consideration hereinafter mentioned and contained, and under penalty expressed in a bond given with these presents, and herein contained or hereunto annexed, to furnish at its own cost and expense, all the necessary tools, equipment, materials, labor, and tests in an expeditious, substantial and workmanlike manner, the equipment and appurtenances herein contemplated, commencing work within 20 days from the date of the Notice to Proceed and executing the work within the time and in the manner specified and in conformity with the requirements set forth in this Contract.

The following form essential parts of the Contract (may vary with project).

1. Advertisement for Bids/Public Notice to Bidders
2. Instruction to Bidders
3. Bid Forms and Proposal
4. Contract Forms and Exhibits
5. Contract Bond – ORC 153.571 or ORC 153.57
6. Contract Provisions
7. General Conditions
8. Supplementary Conditions
9. Specifications
10. Specific Project Requirements
11. Prevailing Wage Rate Schedule
12. Contract Drawings; if any.

The CONTRACTOR agrees and understands that the work on this contract shall be subject to the acceptance of the OWNER based upon and in accordance with the contract specifications and contract plans and drawings on file in the office of the OWNER.

The Contractor agrees that each individual employed by the Contractor or any Subcontractor and engaged in work on the project under this contract shall be paid by prevailing wage established by the Department of Industrial Relations of the State of Ohio or the U.S. Department of Labor (Davis-Bacon Act) as detailed in the section titled "Wage Rates." This shall occur regardless of any contractual relationship which may be said to exist between the Contractor or any Subcontractor and such individual.

The CONTRACTOR shall proceed with the said work in a prompt and diligent manner and shall do the several parts thereof. Further he shall complete the whole of said work in accordance with the specifications and contract drawings to the satisfaction of the OWNER on or before the time stated, and in default of completion within the time as fixed, the CONTRACTOR shall pay to the

OWNER as liquidated damages, an amount equal to \$500.00 Per Day, for each and every day (Sundays and legal holidays excepted) the completion of the work may be delayed beyond the date fixed in the manner and as stipulated.

It is hereby mutually agreed that the OWNER is to pay and the CONTRACTOR is to receive, as full compensation for furnishing all materials and labor in building, constructing and testing and in all respect completing the herein described work and appurtenances in the manner and under the conditions herein specified, the prices stipulated in the proposal herein contained or hereto annexed and the total contract sum is \$0.00.

This Contract shall be in full force and effect from the date of execution by the parties.

IN WITNESS WHEREOF: The parties hereunto affixed their signature the day and year first mentioned above.

CONTRACTOR

Contractor, President

CITY OF MENTOR

Kenneth J. Filipiak, City Manager

I hereby certify that funds in the amount of 00/100 Dollars (\$0.00) necessary for the foregoing Contract have been appropriated and are in the Treasury, or are in the process of collection, or are available through grants and/or loans from other funding sources.

David W. Malinowski, Finance Director

APPROVED AS TO FORM:

Joseph P. Szeman, Law Director

**THE CONTRACTOR SHALL FURNISH THE FOLLOWING ITEMS
WITHIN 10 DAYS OF NOTIFICATION OF AWARD:**

- A) **CERTIFICATE OF INSURANCE FOR
CONTRACTOR'S PUBLIC LIABILITY INSURANCE POLICY
AND AUTOMOTIVE INSURANCE POLICE**
- B) **CERTIFICATE OF INSURANCE FOR
OWNER'S AND CONTRACTOR'S PROTECTIVE POLICY**
- C) **CERTIFICATE OF WORKER'S COMPENSATION**
- D) **CONTRACT BOND THAT COMPLIES WITH ORC 153.54 AND 153.57**
Submitted bond complying with ORC 153.54 and 153.571 (rollover bond) with Bid
- * D above is not required if a bond complying with ORC 153.54 and 153.571 (rollover bond) was submitted at time of bid.
- E) **DRUG-FREE SAFETY OR COMPARABLE PROGRAM**
- E) **EEO CERTIFICATE OF COMPLIANCE**

DELINQUENT PERSONAL PROPERTY STATEMENT

Contractor, having been awarded a contract by the City of Mentor, Ohio, hereby affirms under oath, pursuant to Ohio Revised Code Section 5719.042, that at the time the bid was submitted, my company **was / was not (CIRCLE ONE)** charged with delinquent personal property taxes on the General Tax List of Personal Property for Lake County, Ohio.

If such charge for delinquent personal property tax exists on the General Tax List of Personal Property for Lake County, Ohio, the amount of such due and unpaid delinquent taxes, including due and unpaid penalties and interest shall be set forth below.

This statement shall also be incorporated into the Contract made between City of Mentor, Ohio, and CONTRACTOR, and no payment shall be made with respect to any Contract unless such statement has been so incorporated as a part thereof.

Delinquent Personal Property Tax	\$ _____
Penalties	\$ _____
Interest	\$ _____

CONTRACTOR

Contractor, President

AFFIDAVIT

OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13

STATE OF OHIO

COUNTY OF _____

_____ being duly sworn deposes and states as follows:

1. I am duly authorized to make the statements contained herein on behalf of _____ (“the Contracting Party”).
2. The Contracting Party is a/an (select one):
 - Individual, partnership, or other unincorporated business association (including without limitation, a professional association organized under Ohio Revised Code Chapter 1787), estate, or trust
 - Corporation organized and existing under the laws of the State of _____
 - Labor organization
3. I hereby affirm that the Contracting Party and each of the individuals specified in R.C. 3517.13(I) (with respect to non-corporate entities and labor organizations) or R.C. 3517.13(J) (with respect to corporations) are in full compliance with the political contribution limitations set forth in R.C. 3517.13(I) and (J), as applicable.
4. I understand that a false representation on this certification will incur penalties pursuant to 3517.992(R)(3).

Affiant further sayeth naught.

By: _____

Title: _____

SWORN TO BEFORE ME and subscribed in my presence this _____ day of _____, 2023.

Notary Public

My commission expires: _____

ESCROW WAIVER

In accordance with a certain Contract between the «OwnerMuni», «OwnerState», (hereinafter referred to as "the Owner") and «ContractName», (hereinafter referred to as "the Contractor") it is mutually agreed by and between the parties hereto that because of the short-term duration of the within contract, no escrow account will be established pursuant to Sections 153.13, 153.14 and 153.63 of the Ohio Revised Code nor shall any interest be paid on any retainage.

CONTRACTOR

Contractor, President

CITY OF MENTOR

Kenneth J. Filipiak, City Manager

NOTICE TO PROCEED

Project: BLACK BROOK GOLF COURSE IRRIGATION SYSTEM
INSTALLATION SPECIFICATIONS

Owner: City of Mentor
8500 Civic Center Boulevard
Mentor, Ohio 44060

To: Contractor

Date: _____

You are hereby notified to commence work in accordance with the Contract. All work shall be completed by _____.

CITY OF MENTOR

Kenneth J. Filipiak, City Manager

**CONTRACTOR SHALL COMPLETE THE FOLLOWING AND RETURN
WITHIN 10 DAYS OF NOTICE OF AWARD:**

**A) AFFIDAVIT OF COMPLIANCE WITH POLITICAL CONTRIBUTIONS
LIMITATION (ORC 3517.13)**

**THE OWNER OR THEIR AUTHORIZED REPRESENTATIVE SHALL INSERT
THE FOLLOWING CONTRACT DOCUMENTATION IN THE EXECUTED
CONTRACT:**

A) FINDINGS FOR RECOVERY – ORC 9.24

**B) NOTIFICATION OF SURETY AND AGENT OF CONSTRUCTION
CONTRACT AWARD – ORC 9.32 (if applicable)**

**C) NOTIFICATION TO UTILITY COMPANIES OF COMMENCEMENT OF
CONTRACT EXECUTION – ORC 153.64 (if applicable)**

SUPPLEMENTARY CONDITIONS

- I. Contract format shall be as agreed between the Contractor and The City of Mentor.
- II. Contractor shall not begin construction until the insurance requirements outlined in Section Insurance & Bonding have been approved by The City of Mentor's Representative. No Subcontractor shall begin construction until the subcontractor has supplied their insurance certificates and have been approved by The City of Mentor. Insurance approval shall not reduce or relieve the Contractor of his/her liabilities.

Contractor or any subcontractor shall perform work with labor, which will work harmoniously with other elements of labor involved in the construction of the project. Contractor shall ensure that employees, subcontractors, suppliers and visitors to the Project remain only in authorized areas. Contractor shall use his best efforts to ensure that employees, suppliers, and visitors do not negatively impact on any services being provided to or work being performed in or about Black Brook Golf Course.

Contractor shall use his best efforts to assure that labor employed by the Contractor to perform work on the site shall cooperate with other separate bidders, subcontractors, and suppliers performing work on the site, no matter by whom employed in furtherance of Black Brook Golf Course/The City of Mentor's interest.

- III. Black Brook Golf Course/The City of Mentor expects Bidders to maintain safe and orderly conditions, appropriate appearance and labor harmony. Contractor shall adhere to laws and ordinances regarding hours of work, noise, odors and emissions.

Contractor shall comply with State of Ohio Covid 19- Guidelines.

Work shall be done in accordance with OSHA, EPA and other appropriate federal, state and local codes. Contractor shall comply with United States, Ohio and Mentor laws and ordinances regarding hazard communications and disposal of hazardous waste and shall protect, defend, indemnify and hold Black Brook Golf Course/The City of Mentor harmless from and against any and all loss, claims, liability or costs (including court costs and reasonable attorney's fees) incurred by reason of any actual or asserted failure of Contractor to comply with all applicable environmental laws, or the presence, handling, use or disposition in or from the premises of any hazardous materials. Contractor shall take particular care to comply with OSHA standards for hazard communication. Copies of Material Safety Data Sheets for hazardous materials brought on site shall be provided to the Owner's Representative.

Electrical work shall be in compliance with the current edition of the National Electric Code, NFPA, applicable Ohio and Mentor regulations and OSHA Standards.

Contractor shall be responsible for and protect his equipment and materials stored at the golf course against damage by fire, theft, vandalism or other causes until the Contract is complete and the installation accepted.

Contractor shall comply with federal, state and local laws regarding conditions of employment including the Immigration Reform Control Act (ICRA).

Contractor shall maintain and enforce a written substance abuse program containing rules and regulations that will provide reasonable protection to prevent damage, injury or loss to: (1) employees on the work and other persons who may be affected thereby, and (2) the work and material and equipment to be incorporated therein. Such program will provide for removal from the work site of any employee of the Contractor or any approved subcontractor who violates the rules and regulations.

Contractor shall take precautions necessary to prevent any offensive, intimidating or sexually suggestive behavior on the part of any employee of the Contractor and any approved subcontractors, taking particular care to protect Black Brook Golf Course's employees and invites from exposure to such behavior.

- IV. Changes to the work, drawings, or specifications shall be as approved by The City of Mentor in writing. Change Orders shall be initiated by the Contractor, through an AIA Form G701, except rock.

Bidders shall study and compare the drawings and Project Documents and shall be responsible for discovering and reporting to the Owner's Representative any error, omission, inconsistency or other defect that should be apparent to a reasonably prudent Contractor. Owner's Representative will interpret, correct or otherwise clarify the Project Documents as necessary, and will make any interpretation, correction or clarification in writing and issue it as an addendum to Bidders.

Omission of any material from this specification is not interpreted to the effect that omitted material will not be furnished by the Contractor. Material, unless specifically indicated as being furnished by others, shall be furnished by the Contractor under the terms of any agreement.

Work undertaken by the Contractor containing possible errors or conflicts without or before a written interpretation or instruction by The City of Mentor is done so at the Bidders own risk.

- V. Parking is not allowed near the Clubhouse, in handicapped or fire access lanes, or any private ways in or surrounding the property. Vehicles so parked may be towed at the expense of the Contractor. Coordinate parking and staging requirements with the Owner's Representative.

- VI. Contractor shall be aware that the project being bid is an existing, fully functioning public golf course. The course will remain open during construction and the aesthetic features of the course shall be maintained. Keeping this in mind, the successful Contractor will be required to install the irrigation system under the following requirements:
1. Open holes and excavations shall be marked and protected on a daily basis to prevent players, the public and staff from entering excavated areas. Protection will include barriers and plywood covers over excavations and other necessary procedures to protect the players, guests and maintenance personnel from the danger of construction activities.
 2. Entire site shall be left in a clean and safe condition at the end of each work day. "Clean and Safe" will be at the discretion of the Owner's Representative. Contractor shall appoint a supervisor who shall be responsible for safety measures, as well as for compliance with applicable governmental laws, ordinances, rules and regulations such as, for example, "OSHA" and "Right to Know" legislation and local ordinances.
 3. Necessary building access shall be arranged 24 hours in advance with the Owner's Representative.
 4. Work shall be restricted to 7:00 am to 6:00 pm. Coordinate with the Owner's Representative. No work shall be allowed on Sundays or Holidays.
 5. Order of work will be as agreed upon with the Owner's Representative, golf course maintenance staff and Contractor. The resulting agreement shall become the basis for the contract master project schedule.
 6. Contractors, employees and visitors to the site are expected to maintain an appropriate appearance while working on the site. Shirts shall be worn. The Owner's Representative shall strictly enforce this provision.
 7. No equipment or personnel will be available for use from Black Brook Golf Course including, but not limited to; mechanics, utility vehicles, loaders, backhoes, golf carts, etc.
 8. Plywood for under equipment tires shall be available to be used over turf areas when wet conditions are prevalent, sensitive areas such as greens are being installed and where the possibility of rutting can take place. Plywood shall be supplied by the Contractor and used whenever fairways or approaches are being crossed. Plywood shall also be used where directed by the Owner's Representative.
- VII. Contractor shall stake or mark out the locations of sprinklers. Contractor shall mark valves, mainline and wire paths prior to starting installation for approval by the Owner's Representative. In the event, there are discrepancies from the work shown on the drawings,

the Contractor shall verify the dimensions with the Owner's Representative before work may begin in that area. Contractor shall supply tapes, new flags and unopened paint and have available four persons for use during staking.

As staked sprinkler drawings will not be provided by the City of Mentor. If desired, they shall be the responsibility of the Contractor to draw up.

Routing of the pipe and wire and locations of sprinklers are diagrammatic and the Contractor will be expected to make field adjustments. Black Brook Golf Course/The City of Mentor reserves the right to make pipe and/or wire routing changes from those shown in the drawings in cases where ledge, boulders or other obstacles impede the path. Minor changes of this nature shall not affect the cost or time limits of the work.

It is the intent of the drawings to keep new mainline pipe and valves for fairways, tees and greens outside of the cutting area. Valve boxes should be located to the back, back left or back right of greens, where the supply line to the greens is indicated on the drawings. Valve boxes shall not be located at the golfer's entrance/exit walking path to the greens or tees. Pipe shall not be run through bunkers or tees and an effort should be made to keep sprinklers approximately five (5) feet from the putting surface. No tee sprinklers shall be located on the cut surface of the tee. No green or tee sprinklers shall be installed on the green or tee slope. No valve boxes shall be located within the fairway cut or in the greens approach area.

VIII. Work on a hole shall be 95% complete (mainline installation or lateral excavation or pulling, automation and adjustment of sprinklers) before moving on to the next scheduled hole. Installed sprinklers shall be wired and automated before moving on to the next hole. This restriction will be strictly enforced by the Owner's Representative. This restriction shall apply at all times.

IX. Ledge rock, shale, stones, organic matter or trash not suitable for use as backfill shall be dug and hauled to an accessible dump site on the course. Determination of unusable backfill material shall be made by the Contractor and the Owner's Representative.

Offsite replacement gravel shall be supplied by the Contractor in the quantities required. Bedding material, if required, shall be supplied by the Contractor per unit prices for hammering and deleterious material excavation only.

X. As soon as the Contractor begins work, the Contractor shall establish a daily work log/report. The log is to be completed each day and signed by the Contractor and the Owner's Representative or his authorized representative. The log shall minimally note the day's weather, the number of workers on site and rock quantities for the Contractor that day. The log will be the basis of payment for work complete. Any differences between the Contractor and the Owner's Representative or his representative regarding work completed should be noted on the log at the time of signing.

- XI. Contractor shall be responsible for damage to underground utilities of which they are aware or should be aware, including, but not limited to; gas, water, electricity, cable, telephone, under-drains and drains. The Contractor shall have utilities marked, both private and public. Damaged drainage lines that are not marked shall be repaired by Black Brook Golf Course. In these instances, Contractor shall be responsible for marking and reporting the location of the damaged drainage line for repair by Black Brook Golf Course.

Contractor shall be responsible for notifying each utility of the proposed work and for coordinating the marking and location of utilities in the field prior to any excavation. Black Brook Golf Course/The City of Mentor shall provide the successful Contractor and have available for review during the bid process a set of drawings with existing information and records of the location of known irrigation equipment to the extent to which it is available. However, Black Brook Golf Course/The City of Mentor will not be responsible for nor does Black Brook Golf Course/The City of Mentor guarantee the accuracy or correctness of said information and records. Utilities, both public and private, will need to be located in the field. Contractor shall be responsible for toning and locating existing wires for which there is an origination or termination point, but no routing. Contractor shall be responsible for contacting Ohio 811 and having the site marked. A copy of the Ohio 811 registration number shall be provided to the Owner's Representative before any excavation work may begin.

- XII. Contractor shall keep the existing irrigation system operational from March 15th to November 25th, of each year, weather permitting and as necessary to meet a water to greens requirement of March 13th, of each year.
- XIII. Contractor shall not assign or subcontract any part of the work without the expressed written approval of The City of Mentor prior to the start of said work to be subcontracted. Acceptance of a Subcontractor does not relieve the Contractor of his responsibilities under the agreement.
- XIV. Contractor shall provide minimum three (3) 40-foot storage trailers on site for storage of materials other than pipe. Location of trailers shall be at the irrigation staging area in the parking lot as indicated on the drawings. The only materials that are accepted to be stored outside are; pipe, valve boxes and mainline gate valves. Other materials shall be stored in trailers including prefabricated sprinkler swing joints, quick coupler and lateral isolation valve assemblies.
- XV. Materials, except pipe, shall be delivered in a covered and contained truck to protect materials from weather. Failure to deliver materials in a protected environment shall result in rejection of the materials by the Owner's Representative.

Black Brook Golf Course shall not be responsible for inventorying or off-loading any materials to be used in the irrigation system installation. Acceptance of material shall be the responsibility of the Owner's Representative.

- XVI. Contractor shall be responsible for providing a “porta potty” for use by their employees for the duration of the project. Porta potty shall be cleaned on a regularly scheduled basis not to exceed 14 days.
- XVII. Contractor shall be responsible for providing a dumpster of sufficient size to store and dispose of the refuse generated by their work. The dumpster area shall be kept clean and the dumpster shall be emptied on an as needed basis or as determined by the Owner’s Representative.
- XVIII. Contractor will be expected to conform to any Ohio DEP or City of Mentor Order of Conditions for the project.

IRRIGATION SYSTEM
TECHNICAL SPECIFICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. CONTRACT GENERAL and SUPPLEMENTARY CONDITIONS apply to the work of this Division, as well as the drawings.

1.02 DESCRIPTION OF WORK

- A. Work to be done includes furnishing labor, materials, equipment and services required to complete the irrigation work indicated on the drawings, as specified herein, or both.
- B. This work shall include furnishing and installing wet well, intake, sprinklers, pond fills, LSMs/ICM's, quick coupling valves, valve access boxes, computers, electric wire, HDPE pipe and fittings, etc., as required for a complete golf course irrigation system as shown on the drawings, called for in these specifications or as may be required for proper operation of the system.

Work shall also include installation of a City of Mentor supplied prefabricated, totally enclosed irrigation pump station and inlet screen.

- C. Materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of the system. Material overages at the completion of the installation are the property of the Contractor.
- D. Electrical work within the irrigation system is the responsibility of the Contractor.

1.03 SCOPE

- A. Irrigation system shown on the drawings and described within these specifications represents a multiple row, 2-wire, central computer-controlled golf course irrigation system supplied water from a new pump station.
- B. Applicable requirements of accepted Standards and Codes shall apply to the Work of this Section and shall be so labeled or listed:
 - 1. American Society for Testing & Materials (ASTM)
 - 2. National Standard Plumbing Code (NSPC)
 - 3. National Electric Code (NEC)
 - 4. National Sanitary Foundation (NSF)

5. American Society of Agricultural and Biological Engineers (ASABE)
6. Institute for Electrical and Electronic Engineers (IEEE)
7. Underwriters Laboratories, Inc.(UL)
8. Occupational Safety and Health Administration (OSHA)
9. American Society of Owner's Representatives (ASIC)

1.04 REGISTRATIONS AND PERMITS

- A. **Registrations:** All Contractors shall be registered to work in the City of Mentor. Registration information can be found at Mentor Gateway. Registration shall include completing required forms, providing a certificate of liability insurance, and a One Hundred Dollar (\$100.00) registration fee.

If the registered Prime Contractor or subcontractor performs any work within the municipal limits outside the performance of this contract, he shall provide a separate Ten Thousand Dollar (\$10,000.00) registration bond. If the Contractor performs work only within this contract, he may submit the Contract Performance Bond in lieu of a Ten Thousand Dollar (\$10,000.00) registration bond.

- B. **Permits:** The City of Mentor Building Department will issue a Certificate of Plan Approval (permit) for this work. The permit fees, inspection fees, and deposit will be waived. Inspections during the course of the work will be required. A list of required inspections will be provided. It is the Contractor's responsibility to call and schedule his inspections. All permit and inspection fees required by other authorities shall be paid for by the General Contractor.
- C. Post, monitor, and maintain permits as required.
- D. Any required environmental permits shall be obtained by The City of Mentor and complied with by Contractor.

1.05 CONTRACTOR QUALIFICATIONS

- A. **Installer:** A firm with at least five (5) years' experience in installation of golf course irrigation systems on existing golf courses with at least five (5) projects of similar size (minimum 18 holes), scope (complete systems) and dollar volume (\$2,000,000 plus) in the last three years on established turf (not new construction), which meets the criteria required by this specification and which is acceptable to The City of Mentor.
- B. **References:** Contractor shall supply a minimum of five (5) references for irrigation work of this type (two-wire) with their Bid Form including names and phone numbers of the Golf Course Manager and Superintendent, the type of equipment installed, the year which it was installed, cost and whether the course was new or existing.

- C. Foreman: Installation foreman/supervisor shall have demonstrated experience with installation of the selected Rain Bird or Toro equipment on an existing golf course. Contractor shall submit a Resume of such experience with their Bid Form. Contractor shall make every attempt to maintain the same foreman for the duration of the irrigation system installation. Foreman shall represent the Contractor, and directions given to him in writing shall be as binding as if given to the Contractor. There shall be no middleman. Contractor's foreman shall supervise construction and communicate with the Owner's Representative directly including approval of change orders and materials.
- D. Contractor shall appoint a job foreman for components of the work to communicate with the Owner's Representative. Separate foreman for mainline, laterals and controls will not be acceptable.
- E. Contractor shall have on site at least two trained and certified "electrical" persons trained and certified by the wire manufacturer, Paige Electric certification program or approved equal. Those individuals shall be responsible for the installation of electrical connections and grounding installations on the project.
- F. Contractor shall sufficiently staff the project. Project pace will be tracked and if insufficient personnel or on site, the Contractor shall adhere to the direction of the Owner's Representative to increase staff.

1.06 TESTS

- A. Observation: Equipment supplier and the Owner's Representative shall be on site at various times to ensure the system is being installed according to the specifications and manufacturer's requirements.
- B. Operational Test: After completion of the system, test operation of the entire system and adjust sprinklers as directed by the Owner's Representative. Demonstrate to the Owner's Representative that proposed irrigated areas are being covered, and that control system equipment is operating as required.

1.07 SUBMITTALS

- A. Contractor shall maintain schematic Record Drawings of the system as the project proceeds. Record Drawings shall specify type sprinkler and nozzle for each sprinkler along with the LSM/ICM code on which it operates. Contractor shall submit a complete to date Record Drawing to the Owner's Representative when monthly payment vouchers are submitted. Isolation valves, quick coupling valves, wire splices and air vacuum/release valves shall show measured distances from two permanent locations in a triangular pattern. Wire and pipe routing shall be shown with distance measurements every 250 feet. Mainline fitting location and size shall

also be identified. A final reproducible GPS Record Drawing of the installation shall be given to the Owner's Representative upon completion of the project for approval that includes sprinkler tags – not LSM numbers.

- B. Contractor in conjunction with the supplier shall provide, within a minimum of fourteen (14) days before materials are ordered, electronic copies of product specification sheets on proposed equipment to be installed to the Owner's Representative. These submittals shall include, but not be limited to:
1. Fairway Sprinklers
 2. Tee and Green Sprinklers
 3. Quick Coupling Valves
 4. Quick Coupler Swing Joints
 5. PVC Swing Joints
 6. Sprinkler Supports
 7. HDPE Pipe and Fittings
 8. Communication Cable
 9. Valve Boxes
 10. Materials/methods of waterproofing electrical connections below ground
 11. Materials/methods of lightning protection
 12. Isolation Valves (Ball, Mainline and Lateral)
 13. Air Vacuum/Release Valves
 14. Drain Valves
 15. Computer Hardware
 16. Computer Software
 17. LSMs/ICM's
 18. ICI+/Smart Hub
 19. Lightning Protection System
 20. Rain Gauges/Sensors
 21. iPads
 22. Pond Fills
 23. Miscellaneous Materials
- C. Submittals shall be complete and shall indicate model numbers, flow rates, electrical characteristics, valve sizes, pressures, and optional features provided. Submittals which are not properly "marked-up" shall be returned without action.
- D. Maintenance and Operating Instruction Manuals - minimum of two (2) complete manuals - shall be furnished to the Owner's Representative at the completion of the project. These manuals shall be in the form of 3-ring binders and each shall contain a complete set of "Approved" Product Submittals as well as equipment Operating and Maintenance Manuals, warranty statements and the procedure for starting up and winterizing the system.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Store and handle materials in compliance with manufacturer's instructions and recommendations. Protect materials from damage. On-site storage is available at the irrigation staging area in the Contractor provided trailers. Coordinate with the Owner's Representative.
- B. Approval of materials shall be the responsibility of the Owner's Representative.

1.09 GUARANTEE

- A. Contractor shall obtain, in Black Brook Golf Course's name, the standard written manufacturer's guarantee of materials furnished under this Division where such guarantees are offered in the manufacturer's published product data. These guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law and shall commence with the date of acceptance by Black Brook Golf Course/The City of Mentor
- B. GSP/NSN Service Contract shall commence on the date of acceptance by Black Brook Golf Course/The City of Mentor.
- C. Contractor shall warranty the entire irrigation system material and installation for a period of one (1) year (Alternate: 2 years) from date of acceptance by Black Brook Golf Course/City of Mentor.
- D. Black Brook Golf Course shall maintain the system in working order during the warranty period performing necessary minor adjustments and maintenance including grass mowing/trimming and repairs due to damage during regular ground maintenance or vandalism as outlined in the "Acceptance of Operation" section.

1.10 COORDINATION

- A. Contractor shall coordinate his work closely with the Owner's Representative and the golf course maintenance staff to avoid misunderstandings and to help lessen the impact of construction on the course. Contractor shall also closely coordinate their work with their approved subcontractors and the chosen materials supplier.
- B. Contractor shall minimally schedule a weekly meeting with the Owner's Representative to review the progress of the irrigation system installation.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Contractor shall use the materials specified unless the term "or approved equal" applies. It is the intent of the specifications and The City of Mentor to have irrigation control equipment (i.e., sprinklers, valves and control systems manufactured by one company (Rain Bird, Toro or equal) providing the material meets the specifications. This equipment shall include:
1. Sprinklers
 2. Electric Valves
 3. LSM's/ICM's
 4. Computer Software and Interfaces
 5. Rain Gauges/Sensors
- B. For warranty purposes, irrigation products shall be supplied from the local authorized distributor of those products.
- C. Provide manufacturers' products called for "or approved equal" in which case Contractor may submit a substitution to the Owner's Representative for approval. Certain manufacturer's names and model numbers are used throughout these specifications to denote a standard. Alternate manufacturer's products are acceptable when products of equal or better quality and performance are submitted and approved as outlined below. Alternative products shall be equal to, or better, to qualify as an "or approved equal" product.
- D. For each item proposed as equal, submit a request, which includes:
1. Drawings and samples as appropriate.
 2. Comparison of the qualities of the proposed item with that specified.
 3. Changes required in other elements of the work because of the substitution.
 4. Name, address and telephone number of vendor.
 5. Manufacturer's literature regarding installation, operation and maintenance.
- E. A request for approval constitutes a representation that the supplier:
1. Has investigated the proposed items, products, materials, etc. and has determined that it is equal or superior to that specified.
 2. Will provide at least the same warranties for the proposed item as for the item specified.
 3. Has determined that the proposed item is compatible with interfacing items.
 4. Will coordinate the installation of the approved item and make changes required in other elements of the work because of the substitution.

2.02 PVC SLEEVING PIPE

- A. PVC sleeving pipe shall be Class 200, SDR 21 gasketed joint PVC, ASTM No. D1784, NSF-pw as manufactured by Ipex, JM Eagle or National as indicated on

the drawings.

2.03 HIGH DENSITY POLYETHYLENE PIPE

- A. Pipe for laterals, 1-1/2 inch to 3 inch shall be HDPE IPS polyethylene pipe; Flying W, ISCO, JM Eagle, USPoly or pre-approved equal, SDR 13.5, PE 4710, 160 psi rated, ASTM 3350. Pipe shall also meet the requirements of ASTM F714, D3261 and D3350. Polyethylene pipe shall not be furnished in lengths more than 50 feet. Coiled pipe shall not be accepted without a straightener on site.
- B. Mainline HDPE pipe shall be ISCO, Flying W, JM Eagle, USPoly or pre-approved equal, SDR 13.5, PE 4710, 160 psi rated, ASTM 3350. Pipe shall also meet the requirements of ASTM F714, D3261 and D3350. Polyethylene pipe shall not be furnished in lengths more than 40 feet.
- C. HDPE pipe shall be joined by butt fusion method using personnel experienced in the procedure.

2.04 HDPE IRRIGATION FITTINGS

- A. Except for threaded fittings at fairway, green and tee taps, drain and air release valves and service tees for swing joints, other connections shall be made with fused molded HDPE or Philmac or compression fittings.
- B. HDPE molded fittings shall be DR11 meeting the requirements of ASTM D3261, and pressure rated for a minimum of 200 PSI, including 2-inch and 3-inch pipe. Full size tees shall be used, and if reduction is required, concentric reducer(s) shall be fused to the tee.
- C. No fabricated fittings are allowed.
- D. Side fusion for sprinkler and lateral line connections shall not be allowed.
- E. For the connection from the lateral to mainline at fairway, green and tee laterals, Harrington Company electro-fusion saddle x male swivel stainless-steel lateral isolation valve assemblies shall be used as shown on the details. Where quick couplers are installed on the lateral at the same location, 1-inch threaded taps shall be included in the valve assemblies as shown on the details.
- F. Connection to swing joints from 2 inch and 3-inch lateral pipe shall be made with Philmac compression fittings. Saddles shall not be allowed.
- G. Molded fittings shall have inside and outside diameters machined to match the pipe inside and outside diameters.

- H. For connection to the pump system discharge. Contractor shall connect 10-inch HDPE mainline pipe and provide proper restraint. Pump station shall not be used as a thrust block.

2.05 BRASS FITTINGS

- A. Brass nipples and fittings shall be used for quick coupler keys. Brass nipples shall be cast conforming to ASA B16.15, U.S. manufactured of red brass. Threads shall conform to ASA B2.1.

2.06 SPRINKLERS

- A. 80' FULL CIRCLE VIH SPRINKLER (TYPE "A" and "B") - The full circle sprinkler shall be a lubricated gear drive rotor capable of covering an 85-foot radius at a base pressure of 80 psi and a discharge rate of 38.4-50.0 gpm. Rotation through 360 degrees shall be four minutes or less for the full-circle sprinkler. The internal assembly shall be retained in the case by a plastic snap ring. The pop-up height shall be 2.25 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.25 or 1.5-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A952-IC-80-52 (Orange) or Toro INF55-588-66 (Red).
- B. 75' FULL CIRCLE VIH SPRINKLER - The full circle sprinkler shall be a lubricated gear drive rotor capable of covering an 79–80-foot radius at a base pressure of 80 psi and a discharge rate of 31.6-43.1 gpm. Rotation through 360 degrees shall be four minutes or less for the full-circle sprinkler. The internal assembly shall be retained in the case by a plastic snap ring. The pop-up height shall be 2.25 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.25 or 1.5-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A952-IC-80-48 (Yellow) or Toro INF55-568-66 (Gray).
- C. 70' FULL/PART CIRCLE VIH SPRINKLER (TYPE "D" and "E") - The full/part circle sprinkler shall be a lubricated gear drive rotor capable of covering a 75-76-foot radius at a base pressure of 80 psi and a discharge rate of 33.9–39.7 gpm. Rotation through 360 degrees shall be four minutes or less for the full-circle sprinkler. The internal assembly shall be retained in the case by a plastic snap ring.

The pop-up height shall be 2.25 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.25 or 1.5-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A752-IC-80-44 (Green) or Toro INF55-558-66 (Green).

- D. 65' FULL/PART CIRCLE VIH SPRINKLER (TYPE "F" and "G") - The full/part circle sprinkler shall be a lubricated gear drive rotor capable of covering a 70-71-foot radius at a base pressure of 80 psi and a discharge rate of 28.3-31.1 gallons per minute. Rotation through 360 degrees shall be four minutes or less for the full-circle setting. The internal assembly shall be retained in the case by a plastic snap ring. The pop-up height shall be 2.6 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.0 inch or 1.25-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A752-IC-80-36 (Yellow) or Toro INF35-348-66 (Orange).
- E. 50' FULL/PART CIRCLE VIH SPRINKLER (TYPE "H" and "I") - The full/part circle sprinkler shall be a lubricated gear drive rotor capable of covering a 57-59 foot radius at a base pressure of 50 psi and a discharge rate of 16.9 to 17.3 gallons per minute. Rotation through 360 degrees shall be four minutes or less for the full-circle setting. The internal assembly shall be retained in the case by a plastic snap ring. The pop-up height shall be 2.6 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.0 or 1.25-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A752-IC-50-28 (White) or Toro INF35-318-66 (Yellow).
- F. 35' FULL/PART CIRCLE VIH SPRINKLER (TYPE "M") - The full/part circle sprinkler shall be a lubricated gear drive rotor capable of covering a 41-43 foot radius at a base pressure of 50 psi and a discharge rate of 8.2 to 8.8 gallons per minute. Rotation through 360 degrees shall be four minutes or less for the full-circle setting. The internal assembly shall be retained in the case by a plastic snap ring. The pop-up height shall be 2.6 or 3.25 inches. The retract spring shall be of stainless steel and of sufficient force for positive pop-down. The nozzle shall be tested per ASABE S398.1. The rotor body shall be molded of engineering grade

plastic and shall have a double-wall construction female ACME bottom inlet. The sprinkler shall have a solenoid actuated normally closed valve in the base of the case. The rotor shall have a pressure regulator. The case shall have a 1.0 or 1.25-inch ACME threaded inlet. The sprinkler shall be as manufactured by Rain Bird A752-IC-50-22 (Red) or Toro INF35-305-66 (White).

- G. Each Rain Bird VIH sprinkler shall include an Integrated Control ICM to actuate the sprinkler. ICM shall be solid-state electronics and epoxy potted in a sturdy plastic case suitable for direct burial. ICM shall be installed directly on the solenoid mounting threads of the valve-in-head sprinkler. Each ICM shall be factory set with an address and bar code permanently and prominently marked on the ICM case. A removable bar code label shall be attached to the permanent label to facilitate easy recording of ICM addresses. The ICM unit shall have individual cable leads of 24 inches. ICM units shall be capable of two-way real-time communication with the ICI+ and central computer on a sub-second communication basis. Data transfer between the ICM and central control system shall include critical operational status, system diagnostics and voltage information at each unit. Each ICM shall incorporate internal multi-stage surge protection on each cable leg to include varistors, diodes and inductor trace management. These surge devices shall be rated for 20kV and 10 kA.
- H. Each Toro VIH sprinkler shall be equipped with a DC latching solenoid and Lynx Smart Module (LSM). Activation of the solenoid shall be through a 1 station Toro LSM incorporated on or in the sprinkler case. Data transfer between the LSM and central control system shall include critical operational status, system diagnostics and voltage information at each unit. Each LSM shall incorporate internal multi-stage surge protection on each cable leg to include varistors, diodes and inductor trace management.
- I. Valve-in-head sprinklers shall be capable of receiving a yardage marker, and have ACME threaded inlets.

2.07 ELECTRIC CONTROL VALVES (PRESSURE REGULATING)

- A. Electric control valves with pressure regulation for pond fills shall be remote control, diaphragm type, plastic (Rain Bird), brass (Toro), contamination proof valves with flow control. Valves to be capable of manual operation with adjustable pressure regulator for golf control system valves. Pressure rating shall be minimum 200 psi. Rain Bird PESB-PRS-SIC or Toro 220G.
- B. Each Rain Bird 2-wire electric valve shall include an Integrated Control Module (ICM) to actuate the sprinkler. ICM shall be solid-state electronics and epoxy potted in a sturdy plastic case suitable for direct burial. ICM shall be installed directly on the solenoid mounting threads of the valve. Each ICM shall be factory set with an address and bar code permanently and prominently marked on the ICM

case. A removable bar code label shall be attached to the permanent label to facilitate easy recording of ICM addresses. The ICM unit shall have individual cable leads of 24 inches. ICM units shall be capable of two-way real-time communication with the ICI+ and central computer on a sub-second communication basis. Data transfer between the ICM and central control system shall include critical operational status, system diagnostics and voltage information at each unit. Each ICM shall incorporate internal multi-stage surge protection on each cable leg to include varistors, diodes and inductor trace management. These surge devices shall be rated for 20kV and 10 kA.

- C. Each 2-wire electric valve on the Toro system shall be equipped with a Toro DC latching solenoid with Toro LSM. Activation of the solenoid shall be through a 1 station LSM. Data transfer between the LSM and central control system shall include critical operational status, system diagnostics and voltage information at each unit. Each LSM shall incorporate internal multi-stage surge protection on each cable leg to include varistors, diodes and inductor trace management.

2.08 TORO LSMS

- A. LSMS shall be epoxy sealed for complete waterproofing. Each LSM shall have built-in surge protection as an integral part of the LSM. LSM shall have two colored wires for the connection into the two-wire path and two wires for the connection to the valve latching solenoid. Each LSM shall be clearly marked with a code indicating the code that it has been set to respond to. Each LSM shall operate one solenoid.

2.09 VALVE BOXES

- A. Valve boxes shall be manufactured from unformed resin with a tensile strength of 3,100-5,500 psi conforming to ASTM D638. Valve box bodies shall be green or black in color. Covers shall be colored as indicated.
- B. Valve boxes for mainline isolation gate valves shall be 5-1/4-inch round valve boxes with poly-iron (detectable) sleeves. Top piece shall be 15-1/2 inches long and bottom piece 24 inches. Top shall turn on bottom section to allow for adjustment to grade. Boxes to be as manufactured by Highline Products. "T" handle wrench shall fit well inside of box.
- C. Valve boxes for live quick coupling valves cable splices, and manual drains shall be 10-inch round valve boxes, T-top lids with detectable disks as manufactured by NDS Pro-spec Series. Communication cable splices shall have black lids.
- D. Valve boxes for surge arrestors with isolation valves shall be 10-inch round valve boxes, gray T-top lids with detectable disks as manufactured by NDS Pro-spec Series.

- E. Valve boxes for fairway isolation laterals and individual sprinkler isolation valves shall be 6-inch PVC sleeve with 10-inch round valve boxes with T-top lids as manufactured by NDS Pro-spec Series with detectable disk.
- F. Valve boxes for pond fills and air vacuum/release valves shall be 13-inch x 24-inch valve box. Jumbo valve boxes shall be as manufactured by NDS Pro-spec Series with T-top lids and detectable disk. Drill thirty-two (32), 3/8-inch holes in air/vacuum release valve box covers for air passage.
- G. Valve box extensions shall be provided and installed as required for proper box depth. Valve box extensions shall be made by the same manufacturer as the box.
- H. Valve covers for ground rods and plates shall be 4-inch, green grated covers with detection consisting of a #10 washer and screw installed on the bottom side of the cover. Cover shall be installed on a 6 inch or 30-inch length of 4-inch perforated drainage pipe as manufactured by ADS or NDS.
- I. Valve box cover colors shall be as follows:

Communication Cable Splices	Black
Lateral Isolation w/Surge Arrestor	Gray
Lateral Isolation	Green
Quick Couplers	Brown
Mainline Isolation	Black
Drains	Purple
A/R	Black
Pond Fills	Black
Grounding	Green
- J. Detection for valve boxes shall consist minimally of a #10 stainless steel washer and screw installed on the underside of the valve box cover. **Detection shall be provided by the manufacturer where applicable. Field applied detection shall not be accepted or allowed except for covers not provided with detection from the manufacturer.** Detection shall be installed before the valve box is installed out on the golf course.

2.10 SURGE PROTECTION EQUIPMENT

- A. At the central equipment location, furnish and install a Sola S3700 combination voltage stabilizer and uninterruptible power source unit. This unit shall have a rated output of 700 VA and 450 Watts. It shall be suitable for 50/60 HZ operation with input power of 120 VAC. The unit shall operate in the AC mode from 90 VAC input up to 147 VAC input regulating the output voltage within proper limits. The unit shall have a boost capability of +23%. The unit shall transfer to the battery mode at any input voltage less than 90 VAC or greater than 147 VAC. Typical

transfer time shall be in the 2-millisecond range. In the battery mode, the output shall be a true sine wave form. Output voltage regulation shall be + or - 5%. Frequency regulation shall + or - 0.1 HZ. Battery back-up shall have a minimum time of approximately 18 minutes at half load capacity City. Unit shall be equipped with attractive painted enamel metal housing and shall have four (4) NEMA 5-15P electrical receptacles. The computer and the Smart Hubs unit shall be plugged into this unit. The monitor, printer and any other central equipment shall not be plugged into this unit, but directly into another source of 120 VAC power in the form of a power strip provided by the Contractor with surge protection rated at a minimum of 500 joules.

- B. The electrical circuit at the main electrical panel, that will be used to supply power to the central equipment, shall have a model Z-2 zap trap power filter surge arrestor furnished and installed on it as manufactured by Tytewadd Power Filters, Springfield, Missouri or approved equal. The zap trap surge arrestor shall be installed in the main electrical panel and wired into the circuit, supplying the 120-volt power to the central control equipment. The zap trap shall be installed according to the manufacturer's installation instructions and shall be grounded to the grounding buss of the main electrical panel.

The zap trap power filter shall meet or exceed the following electrical characteristics:

1. 120-volt, 1 phase, 100-amp load capacity.
 2. Size: 15/16-inch diameter x 3 inches long.
 3. Incoming voltage clamp level of 130 volts.
 4. 1.5 nanosecond response time.
 5. 15,000 amps discharge current capacity, 8 x 20 us pulse time.
 6. Multiple strike capability.
 7. Self-extinguishing.
 8. Arrestor faults to a dead short condition opening circuit breaker or electrical power circuit.
- C. Polyphaser Model 1S-1E50LN-CI coaxial cable surge arrestor shall be installed on any antenna.
 - D. Surge Protection, Grounding and installation of equipment here before specified, shall be installed in strict compliance with the recommendations and information given in the Rain Bird or Toro Installation Manual for Surge Protection, Wiring and Proper Grounding Requirements for Computer Control Systems.

2.11 CENTRAL CONTROL SOFTWARE

- A. System shall be capable of integrating with an on-site Weather Station, for the purpose of monitoring daily weather conditions and calculating a daily

evapotranspiration (ET) value. This data can be automatically retrieved by the computer, at some predetermined time and an evapotranspiration (ET) value then calculated from this data. The entire system or any portion of the system shall then be possible to automatically be adjusted, as to station operating time, according to this ET value. In this way, only the amount of water that was actually used in the past 24 hours shall be replaced. The software shall also include a smart weather LSM that allows for user defined reactions to sensor conditions contained in the Weather Station. These reactions shall cause an alarm in the central software, which will then be able to react according to user defined wishes such as pause or cancel.

- B. System shall allow the operator the opportunity to use his expertise and input, to have each station adjust automatically, to compensate for different types of soil, different types of grasses, different exposures, etc. It shall also be possible to override the Weather Station ET values or in the absence of a Weather Station enter an ET value manually each day and have the system automatically adjust from this factor.
- C. System shall utilize low voltage communication path between the ICI+/Smart Hub outputs and LSM's/ICM's.
- D. System shall have a cycle/soak feature, which can properly and automatically maintain any poor drainage areas, slope areas and any heavy soil conditions, etc. that may exist. This feature shall allow the sprinklers to apply water at an intake rate exceeding that of the soil, but yet maintain the demand of the system so as not to deviate from the pump station full capacities and maximum efficiency. This provides for the precise application of water, conserving water, reducing power and labor costs and providing for the more efficient operation of the system. This feature shall provide for the specifying of the maximum cycle time, for any one operation of any individual stations desired and in addition shall provide for specifying a minimum time that shall elapse before the next application of water occurs on this area. This feature shall be implemented such that adjustment of operating times that may be required according to the daily ET value shall be made on the last cycle of operation so that the resultant will be precise station watering time.
- E. Control system shall have a hydraulic management feature, which shall provide for the establishing of flow limits for the entire pipe network and entering maximum flows. The system shall also provide for the entering of data according to the pumping system operating characteristics. Each established pipe, in the pipe network, shall be assured that the demand will never exceed the design capacity, either by gallons per minute or velocity. The irrigation cycle itself, will be completed in the shortest possible running time, resulting in the least amount of wear and tear on the pumps, less maintenance costs, longer pump life, reduced power costs, etc. The system shall have a multiple pump feature, which shall allow

for data to be input for multiple pumping systems. The results shall be that the entire system may be operated on the hydraulic manager, maintaining full load demand on the pumping system, for as much of the cycle as possible, while not allowing over demand on any portion of the pipe network.

- F. Overall control program, for the control of the sprinklers shall be accomplished by a number of smaller programs or schedules, which are integrated together and executed as required to produce the desired results. The smaller schedules shall be capable of being operated each independently, in any combination or simultaneously, as may be desired.
- G. A schedule shall be a defined sequence of steps or events, by the operator of the system, which will be executed when the schedule is put into operation. Each sprinkler may be programmed for its desired sequence of operation in an individual schedule. Each specific sprinkler may be programmed for as many different sequences of operations, as may be desired, by programming a number of different schedules for that specific sprinkler. It shall be possible to program any number of different sprinklers in the same schedule, as may be required. It shall be possible to place any given individual sprinkler, in as many different schedules, as may be required. It shall not be necessary to pull that sprinkler from its normal program, in order to place it in another schedule. Any schedule shall be capable of being repeated (the entire schedule) and also have the capability of cycling continuously, for germination, etc.
- H. Minimum Rain Bird Cirrus Pro or Toro Lynx CE latest version system shall provide for the programming and operation of multiple sprinklers.
- I. System shall provide for rain shut-down of the entire irrigation system, either manually or automatically from a rain gauge or sensor, should sufficient rainfall have occurred, resulting in no irrigation required. This feature can also be used for emergency shut-down of sprinklers that may be operating at the time. The system shall have the capability of specifying a shutdown sequence and a delay time between each sequence shut down. A rain shut-down override control instruction shall provide for selected schedules to actually continue to operate, as programmed, even when the system is in the rain shut-down mode of operation.
- J. A time window shall provide for confining the schedule operation to a specific time period, by allowing the operator to specify the earliest time he will allow the schedule to operate and the latest time he will allow it to operate.
- K. The system shall be capable of providing user defined reports that can be saved or printed.
- L. The system shall have the ability of entering the golf course layout into the software through a number of options as a digital file that will in turn allow the operator to

provide graphical operations. These operations shall include loading databases, creating programs, hydraulic management, course monitoring, pause, cancel, resume and start schedules.

M. Control system software shall be Microsoft Windows based.

2.12 CENTRAL CONTROL HARDWARE

- A. Central control software shall utilize a personal computer-based, user-friendly mouse/keyboard control system capable of transparent multiple function irrigation control supplied by the Contractor.
- B. The personal computer shall be Dell or NSN utilizing minimum Intel Socket LGA1151, 7th Generation, 3.60GHz minimum microprocessor. Computer shall run on Windows 10 IOT Operating Software supplied by Contractor. Computer shall come complete with 104 key keyboard, keyboard cable and computer power cable, minimum eight USB ports. A Logitech optical wireless mouse shall also be included. Computer shall be a mini-tower base unit with ATX case and integrated sound system.
- C. Computer memory configuration shall be no less than 8.0 gigabytes of RAM (random access memory) dual channel with a primary storage drive of minimum 256 GB.
- D. ViewSonic, minimum 24-inch-wide screen flat panel color monitor complete with power cable, communication cable and stereo speakers with high definition 5.1 integrated surround sound.
- E. In addition, supply a 55-inch, 1900 x 12000 DPI flat LCD screen panel complete with mounting bracket.
- F. Cannon PIXMA iP7220 series printer or equal, power cable and communication cable.
- G. Minimum Intel Network Interface, Symantec recovery software and Emsisoft Antimalware software, latest versions.
- H. Microphone, audio cable, in monitor sound speakers and sound card shall also be included.
- I. USB Wi-Fi wireless adapter and adjustable high gain antenna with 1.2-meter USB cradle extension.
- J. Rain Bird Cirrus Pro or Toro LYNX CE latest version Programming Command Central Manual.

- K. The central computer shall be covered for one (1) year with a service/warranty plan by the irrigation manufacturer or a third party. The service warranty shall be equal to and not less than Rain Bird Global Service Plan (GSP) or Toro National Support Network (NSN). Service/warranty plan shall be presented in writing, outlining response issues and communication issues for review by Black Brook Golf Course/The City of Mentor and shall include as a minimum:
1. Toll free support.
 2. 24-hour emergency paging, guaranteed response time.
 3. Extended warranty.
 4. 24-hour hardware replacement.
 5. Certified start up.
 6. Software service packs.
 7. Basic and advanced training.
 8. Software upgrades discounts.
- L. Central computer shall plug directly into an uninterruptible power source, which in turn is fed from a power strip (supplied by the Contractor) plugged directly into the nearest 120-volt wall outlet. (Refer to Section SURGE PROTECTION EQUIPMENT.)
- M. The central communication to the ICI+/Smart Hubs shall be over a hard-wired connection. The communication to ICM/LSMs from the ICI+/Smart Hubs shall be made over a hard wire communication path.
- N. Whether or not specified, the Contractor is responsible for supplying a complete central control system for Rain Bird Cirrus Pro or Toro LYNX CE latest version complete with software, ICI+/Smart Hubs, lightning and surge protection as required by the manufacturer or these specifications.
- O. Computerized central control system shall be Rain Bird Cirrus Pro or Toro LYNX CE latest version.
- P. Software inclusive to computer package shall be provided with operation manuals, mouse pads, cables, connectors, serial numbers, etc.

2.13 RAIN BIRD ICI+

- A. ICI+ (1) shall consist of solid-state electronic circuitry. It shall provide the necessary interface between the computer and the ICM's. The ICI+ unit shall provide both communication from the computer out to the ICM's and receive "feedback" communication back to the computer. The ICI+ unit shall contain an internal transformer that reduces the output voltage to 24VAC, a CPU board and a maximum of two (2) driver boards. The ICI+ units shall be capable of controlling

up to 750 sprinklers or electric valves on each cable path, with one (1) ICM per valve-in-head golf sprinkler or electric valve. ICI+ shall be UL Listed.

- B. Units shall come standard with one driver board having the ability to control up to two (2) individual cable paths.
- C. ICI+ units shall be supplied complete with heavy-duty locking plastic cabinet, an 117VAC power supply cord, a five (5) foot long USB cable that shall connect the ICI+, installation manual, mounting template and keys. ICI+ unit shall have an external indicator light that will enable the user to observe ICI+ power supply and output performance without having to open the cabinet door. The CPU Board shall include an indicator LED to monitor communication with the central control software. Each driver board shall include two (2) LEDs for each cable path to monitor communication with central communication via data LED and output cable path performance via output LED. ICI+ output voltage for each two-wire path shall be less than 30 VAC as measured at the output terminals on the driver board.
- D. ICI+'s shall be wall mounted on a board integrated with the StrikeGuard system.
- E. ICI+ shall be provided and installed as required by Rain Bird for proper operation of the ICM system.
- F. ICI+ unit shall be connected to grounding grids by #6 solid bare copper cable. The MGP1's shall be mounted directly on the grounding grids located outside as close as possible to the ICI's. The grounding grids shall be as specified. Each two-wire path shall have its own MSP surge pipes and grounding grid, installed on MGP1's at the ICI+.

2.14 TORO SMART HUBS

- A. System shall include two (2) Smart Hubs for powering of the field LSMs/solenoids. Smart Hubs have two wire paths per board and two boards per Smart Hub. No more than 500 LSMs per board and no more than 1,000 stations per Smart Hub. Smart Hubs shall be UL Listed.
- B. Smart Hub units shall be supplied complete with heavy-duty locking cabinet, a 117VAC power supply cord, a five (5) foot long USB cable that shall connect the Smart Hub, installation manual, mounting template and keys.
- C. Smart Hubs shall be wall mounted on a board integrated with the StrikeGuard system.
- D. Smart Hubs shall be provided and installed as required by Toro for proper operation of the 2-wire LSM system.

- E. At each Smart Hub, in order to interface with the lightning detection alarm, install a Sensor Kit (102-0397).
- F. Smart Hub units shall be connected to grounding grids by #6 solid bare copper cable. The grounding grids shall be as specified. Each of two-wire path shall have its own grounding grid at the Smart Hub.

2.15 IDENTIFICATION TAGS

- A. Cable at valve boxes, junctions, interfaces and communication splices regardless of type shall have an ID tag attached. ID tags shall be manufactured from Polyurethane Behr Desopan.
- B. Each tag shall identify where the cable is coming from and where it is going to.
- C. Pond fills shall have ID tags attached also. Provide one maxi size tag for each pond fill electric valve. Each valve tag shall provide valve, LSM/ICM and station ID (database tag) information.
- D. Tags shall be as manufactured by Paige Electric or T. Christy Enterprises.

2.16 COMMUNICATION CABLE

- A. Cable for the communication paths shall be double jacketed, two conductor cables intended for control of the Communications Signal and Feed-Back Signal for the Rain Bird Cirrus Pro or Toro Lynx CE latest version computerized control system.
- B. Cable shall be suitable for direct burial in the earth and also may be installed in ducts or conduits.
- C. Conductors shall be tin coated copper conductors, insulated with PVC and having a high-density polyethylene direct burial jacket. Conductors shall be UL Listed, Type UF. Two conductors shall be single strand, #12 or #14 AWG, 60 Mils insulation wall with 45 Mils jacket wall. Outside dimension shall be >280x0.470 and weigh 83 pounds per 100 feet.

The two conductors shall be color coded Black and Red and shall be soft annealed tin coated copper conforming to ASTM B-3 and B-99. Insulation shall be Polyvinyl Chloride conforming to UL Standard 493 for Type UF rated 60 degrees Centigrade. Insulated conductors are to be laid parallel.

Outer jacket shall be black high molecular weight PE or high-density PE conforming to ICEA S-61-402. Jacket striping to be impregnated polyethylene forming an integral part of the jacket.

Cable shall be marked on the jacket as follows: "PAIGE ELECTRIC P7072D SIZE 2C VOLTAGE¹ DIRECT BURIAL SUNLIGHT RESISTANT FOR MAXI, TORO, RAINMASTER AND 2-WIRE SYSTEMS" along with identification number and other designations, such as voltage rating, etc. as may be appropriate.

- D. Wire shall be as manufactured by Paige Electric, P7072D-6
- E. In-ground wire connections shall be waterproofed with 3M DBR/Y splice kits per 3M recommendations for the wire voltage and size being used (no 3M #3570 or #4 Scotchcast or Rain Bird connectors shall be allowed). Wire splices shall be made in valve boxes or at an enclosure. Wire connectors and splices shall be UL Listed for the intended purpose. Underground splice connectors shall be listed per UL 486D-direct burial. Above ground splice connectors shall be listed as "pressure type connectors" per UL 486C.
- F. WIRE SCHEDULE:

<u>USE:</u>		<u>AWG SIZE:</u>		<u>COLOR:</u>
Communication Cable				
Rain Bird	1-1-1	#14/2	P7072D	Yellow
Rain Bird	1-1-1	#12/2	P7072D	Yellow
Rain Bird	1-1-2	#14/2	P7072D	Purple
Toro	1-1	#14/2	P7072D	Blue
Toro	1-1	#12/2	P7072D	Blue
Toro	1-2	#14/2	P7072D	Yellow
Toro	1-2	#12/2	P7072D	Yellow
Toro	1-3	#14/2	P7072D	Purple
Toro	1-3	#12/2	P7072D	Purple
Toro	1-4	#14/2	P7072D	Orange
Lateral Communication Cable		#14/2	P7072D	Red

- G. Wire shall be as manufactured by Paige Electric.

2.17 LATERAL ISOLATION VALVES

- A. Isolation gate valves for drains and pond fills, shall be of bronze construction, threaded, US Manufacture, 600 WOG with cross handle and 200 psi rating. Gate valves to be as manufactured by Apollo, model 102T or Nibco, model T-113-K.
- B. Isolation gate valves, 2-inch and 3 inch in size where indicated on the drawings shall be angle globe valves with a minimum Cv of 100. Ends shall be male swivel with one bolt machined restraint. Body shall be 304 stainless-steel. Bonnet, bonnet bolts, seal assembly, and cross handle assembly shall be 316 stainless steel, ASTM A351. Stem shall be of bronze construction, ASTM B62-C83600. Seal shall be EPDM rubber, ASTM D2000. Valves shall have 200 psi rating. Gate valves to be

as manufactured by the Harrington Corporation. Valves shall be gasketed x male swivel. Where quick couplers are installed on the mainline side of the valve, connection to the quick coupler shall be on the isolation valve using the Harco swivel extension with 1-inch side outlet.

- C. Isolation ball valves for quick couplers and air vacuum/release valves shall be of bronze construction, US Manufacture, minimum 3/4 port, 600 WOG with stainless steel handle and chrome plated ball. Ball valves to be as manufactured by Apollo, Boston or Watts.

2.18 MAINLINE ISOLATION GATE VALVES

- A. Mainline isolation gate valves in line sizes and locations as indicated on the drawings shall be cast iron epoxy coated MJ valves, C505, 200 psi rated, stainless steel stem, US Manufacturer, 2-inch operating nut and replaceable disc with Harco MJ adapters or and accessory kits as manufactured by AVK, Waterous 500 Series, Clow 2630 Series or Kennedy Ken-Seal Series.

2.19 MANUAL DRAINS

- A. Provide up to three (3) manual drains in addition to those shown on the drawings. Coordinate drain locations with The Owner's Representative and the Owner's Representative.
- B. Manual drains shall be 2-inch bronze gate valves as specified and shall drain to daylight. See Detail.

2.20 COMBINATION AIR VACUUM/RELEASE VALVES

- A. Combination air vacuum/release valves to be Crispin, Model IC10 with 1 inch NPT inlet and a 1-inch air and vacuum outlet with a 3/32-inch pressure air release orifice. Valve body shall be cast iron body with stainless steel internals and float and Buna-N seating material. Valves shall exhaust large quantities of air on system start-up and allow air to re-enter the pipeline when the line is being emptied or drained. Valves shall also automatically vent air that accumulates while the system is under pressure.
- B. A 1-inch ball valve and bronze wye strainer shall be installed below the air/vacuum release valve. Wye strainer shall utilize a 1/2-inch boiler drain for cleaning. See detail.
- C. Release valve outlet shall be piped with brass elbows and nipples to direct the air out of the valve as shown in the detail.

2.21 SWING JOINTS

- A. Valve-in-head sprinklers shall be installed on three (3) elbow, 12 inch, PVC unitized body ACME x ACME swing joints with one-piece riser assembly. Swing joints to be factory assembled with 360-degree O-ring seals as manufactured by Dura, Lasco or Spears. Connections to be threaded O-ring, no glued connections shall be allowed on the swing joints.
- B. Support sizes shall be as follows:

Size	Rain Bird	Toro
1 Inch Swing Joint		INF35-348-56 INF35-318-56 INF35-305-56
1-1/4 Inch Swing Joint	A752-IC-80-44 A752-IC-80-36 A752-IC-50-28 A752-IC-50-22	
1-1/2 Inch Swing Joint	A952-IC-80-52 A952-IC-80-48	INF55-588-56 INF55-568-56 INF55-558-56

- C. Quick couplers to be installed on 1-inch PVC swing joints with brass inserts. Minimum swing joint length to be 12 inches. Quick couplers to include anti-rotation wing.

2.22 GROUNDING EQUIPMENT

- A. ICI+/Smart Hub grounding rods to be 5/8-inch x 10-foot copper clad, UL Listed.
- B. Lightning/Surge Arrestor grounding rods to be 5/8-inch x 8-foot copper clad, UL Listed.
- C. ICI+/Smart Hub grounding plates to be 4-inch x 96-inch x 0.06-inch copper with integral connection of 25 feet of #6 AWG insulated, solid copper wire, UL Listed conforming to the minimum requirements of Section 250 of the National Electric Code. Connection of the wire to plate shall be performed by the plate manufacturer.
- D. Communication cable grounding plates to be 4-inch x 36-inch x 0.06-inch copper with integral connection of 10 feet of #10 AWG insulated, solid copper wire, UL Listed conforming to the minimum requirements of Section 250 of the National Electric Code. Connection of the wire to plate shall be performed by the plate manufacturer.

- E. Grounding connections to utilize an exothermic welding process, Cadweld connectors, UL Listed, Model NT1161G PLUS and straight through couplers PG11L PLUS.
- F. ICI+/Smart Hub grounding wire shall be #6 AWG, solid, insulated copper wire.
- G. Ground enhancement material shall be PowerSet as manufactured by Loresco, 50 lb. bags.

2.23 QUICK COUPLING VALVES

- A. Quick coupling valves shall be 1-inch inlet and outlet mounted on 1-inch PVC swing joints with brass inserts and anti-rotation wing. The quick coupling valve shall be a two-piece type. The valve body shall be constructed of heavy cast brass. The cover shall be a durable, protective self-closing vinyl or rubber cover. The valve shall be opened and closed by a brass key of the same manufacturer having a MINT and FONT outlet. The valve throat shall have a key way with ACME detent positions for regulating water flow.
- B. Quick coupling valves to have rubber or vinyl, non-locking covers.
- C. Keys shall utilize ACME threads and have long handles and extenders. Provide six (6) 1 inch ACME keys, six (6) Underhill model QK-100EX extenders and six (6) 1 inch x 1 inch swivel hose bronze ells. Keys shall include a 1-inch ball valve between the key and the swivel hose ell. Use minimum 1 inch x 3-inch brass nipples between key and ball valve and ball valve and swivel ell.
- D. Quick coupling valves shall be as manufactured by Buckner Model QB44RCATAR10 (no substitutions).

2.24 iPADS

- A. System shall also include two (2) Apple 11-inch iPad Pros with Wi-Fi + Cellular. iPads shall be minimum 256GB. iPads shall come programmed with the Rain Bird or Toro remote app for remote operation of the Rain Bird Cirrus Pro or Toro LYNX CE, latest Version control software.

2.25 ELECTRICAL CONDUIT

- A. Polyvinyl Chloride (PVC) conduit and sweeps shall be heavy wall, rigid Schedule 40 non-metallic utility conduits and sweeps, 1-1/2-inch as a minimum and shall meet the requirements of UL 651, standards for Schedule 40 PVC conduits installed outdoors. Conduit and sweeps shall be rated for direct burial, 90 degrees Centigrade. Fittings shall meet the UL standard for PVC fittings for use with rigid PVC conduit as manufactured by Carlon, Cresline or JMM.

- B. Conduit terminations shall include a properly sized standard insulating bushing (grommet) as required by NEC.
- C. Turns shall utilize long radius sweep elbows.
- D. Provide conduits under roadways and cart paths where directed by the Owner's Representative and/or as indicated on the drawings.

2.26 LIGHTNING PROTECTION SYSTEM

- A. Control system shall interface with a new StrikeGuard lightning detection system. In conjunction with the StrikeGuard system, the completed system shall automatically:
 - 1. Disconnect commercial power and modem lines from the central computer and hardware components while switching to a standby power source.
 - 2. Disconnect the AC power (hot, neutral and ground) from the ICI+'s/Smart Hubs.
 - 3. Disconnect each two-wire path going out to the golf course.
 - 4. Have the ability to signal remote alarms including Wave Siren wireless audible visual enunciator and power sequencer.
- B. System shall automatically restore connections following safe conditions and measuring and storing the number of surges during a storm for record keeping.
- C. Contractor shall provide needed relays and accessory items as required for a fully functioning system.
- D. Lightning protection system shall be compatible with the Rain Bird Cirrus Pro or Toro Lynx CE latest version central control system.
- E. WxLine shall prefabricate the Smart Hub/ICI+ equipment on mounting boards for installation.

2.27 TIPPING BUCKET RAIN GAUGES

- A. Rain Bird system shall include three (3) independent tipping bucket rain gauges at the locations indicated on the drawings.
- B. Rain gauge shall be tipping bucket type rain can with bird wire. Gauge shall be manufactured of metal, 4 inch in diameter with a bird screen and count rainfall in increments of 1/100th of an inch.

- C. Rain gauges/sensors shall include equipment necessary for it to interface with the central control system including IC-In, cabling, conduit, etc.
- D. Toro system shall include one rain sensor for the Smart Hub installed at the maintenance facility location.
- E. Rain Bird rain gauge installed at the maintenance facility shall by bypass the lightning detection disconnect relay.

2.28 STAKING EQUIPMENT

- A. Contractor shall provide new colored flags and unopened colored paint for marking of sprinkler locations to distinguish types of sprinklers, valve locations, etc. Paint shall be insoluble and labeled for marking on turfgrass. Minimum four (4) colors of paint and eight (8) colors of flags shall be provided.

- B. Flag colors shall be as follows:

35-foot	Red
50-foot	Blue
60-foot	Green
65-foot	Orange
70-foot	Yellow
75-foot	Florescent Green
80-foot	Pink
Quick Couplers	Brown

2.29 YARDAGE MARKERS

- A. Sprinklers installed in the fairways between 40 yards and 250 yards from the center of the green shall have yardage markers installed. Par 3's shall have yardage markers installed starting at the back tee.
- B. Markers shall include one number with yellow writing on a black cover or black on a white background.
- C. Markers shall be approved by the Owner's Representative before ordering. Markers shall be as manufactured by Jan Davis Marking, Underhill or equal.

2.30 SPARE PARTS

- A. Contractor shall supply a fusion machine for sizes 1-inch to 4-inch. Machine shall be 120-volt, include centerline guidance system and semi-automatic locking cam. Fusion machine shall be as manufactured by McElroy, Pit Bull 14 or equal.

- B. In addition to materials needed for installation the Contractor shall provide for in their proposal the following spare parts:
 - (1) Pressure Gage kit for setting valve and sprinkler pressure regulators.
 - (2) 2-inch box handle gate valve wrenches, 5-foot long.
 - (2) Each model of sprinklers installed.
 - (2) Sets of tools for repair and maintenance of sprinklers supplied.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine the Project Documents noting any discrepancies and bringing same to the attention of the Owner's Representative for timely resolution.
- B. Make field measurements necessary for the work. Project shall be laid out essentially as indicated on the drawings, making minor adjustments for variations in the topography and for field changes. Major changes shall be reviewed with the Owner's Representative prior to proceeding. Staking shall be done by the Contractor. Contractor to supply staking materials.
- C. Protect existing work including landscaping, trees, water courses, paving, pavers, structures, roads, walls, etc. from damage. Any inadvertent damage to any of these items shall be reported to the Owner's Representative at once, to determine how the damage will be rectified. Repair or replacement costs shall be paid by the Contractor.
- D. Clean interior of pipe, fittings and valves immediately prior to their installation.
- E. Butt fusion equipment shall be serviced prior to use on this project. The machines shall be environmentally friendly and in satisfactory working order. The hydraulic system shall be leak free. The pressure gauge and thermometer shall be checked and certified for accuracy. If machines are rented, they shall be rented from a company that has a fusion machine service center certified by the machine manufacturer. The machines shall arrive at Black Brook Golf Course with certification that the pressure gauges and heater thermometers were accurate when shipped. Contractor shall indemnify and hold Black Brook Golf Course/The City of Mentor harmless for defective equipment and any and all damage resulting from said equipment.

3.02 EXCAVATION AND INSTALLATION OF PIPE, CONDUIT AND FITTINGS

- A. Contractor shall lift and reuse/replace the sod for excavations as per specifications. Contractor shall be responsible for cutting, reusing and installing the sod. The open excavation shall not exceed approximately 250 feet, sod stripped to sod replaced.

Where sod is not salvageable, as determined by Owner's Representative, the area shall be sodded or seeded by Contractor at Black Brook Golf Course/The City of Mentor's discretion. Sod shall be paid for by The City of Mentor as an extra for these areas. Coordinate sod type with the Owner's Representative.

- B. Contractor shall do the excavating, backfilling and compaction required for the proper installation of the work.
- C. Mechanical equipment shall be used for the installation of mainline pipe and shall provide excavations with straight sides. Excavations shall be no wider at any point than is necessary to lay and bed the installed pipe and cable. Using proper width bucket or rock saw, excavate a straight and true excavation to a depth of +/- 2 inches of pipe invert elevation. Pipe shall be laid on undisturbed bottom of bottom provided suitable base is available - no rock larger than 1 inch or sharp edges; if not, excavate to 2 inches below pipe invert and provide sand base or stone dust (furnished by the Contractor) upon which to lay pipe.
- D. Using proper equipment, excavate a straight and true excavation to a depth of +/- 2 inches of pipe invert elevation. Pipe shall be laid on undisturbed bottom of excavation provided suitable base is available - no rock larger than 1 inch or sharp edges; if not, excavate to 2 inches below pipe invert and provide bedding material or stone dust (furnished by Contractor) upon which to lay pipe.
- E. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Backfill material shall contain no foreign matter and no rock larger than 1 inch in diameter. Carefully place material under, around and above pipe and conduit so that it is hand tamped to a point 8 inches above the pipe and/or conduit. Backfill can be accomplished in one lift following tamping around the pipe with the first 8 inches of soil if compaction is completed with a wheel mounted Vermeer sheep's foot roller. Machine placed backfill shall be compacted minimum of 95 percent Modified Proctor Maximum Density. Proctor testing may be ordered by the Owner's Representative as necessary and performed by an independent soil testing company at The City of Mentor's request and cost. Place backfill and fill materials evenly on sides of pipe and conduit to required elevations, and uniformly along the full length of each pipe or conduit. Under unpaved areas, scarify and re-compact top 6 inches below sub-grade and compact each layer of backfill or fill material at 85 percent.
- F. Check fusion machine heater plates on a regular basis to make sure they are at proper temperature and adjust as required to meet manufacturer's requirements.

- G. Make fusion connections for HDPE pipe and fittings per ASTM D2657, ASTM F1056, ASTM F905, PPI Technical Reports 33 and 41 and US DOT Pipeline Safety Regulations (CFR 49).
- H. Electro fusion saddles shall be installed as follows per manufacturer's instructions.
1. Mark the welding area with a wax crayon or marker.
 2. Scrape the pipe surface carefully using a manufacturer approved scraper.
 3. After scraping remove dirt and grease from the welding area of the pipe and the inside of the branch using a cleaning agent of no less than 96% Isopropyl Alcohol and a clean, white, lint free cloth.
 4. Do not tap the pipe before performing welding.
 5. Remove saddle from protective packaging. Inspect and clean fusion surface of saddle with no less than 96% Isopropyl Alcohol.
 6. Be sure both surfaces are completely dry before welding.
 7. Immediately after surfaces have dried apply the saddle to the pipe making sure the previously cleaned surfaces are not contaminated.
 8. Use a wrench to tighten the four nuts concurrently until the strap and the saddle meet for pipe sizes up to and including 12 inches in diameter. For sizes 14 inches and above a top loading tool shall be used.
 9. Inspect the interface between the saddle surface and the pipe surface. The gap between the two surfaces should not be able to pass the thickness of a sheet of paper - ½ inch - wide to no more than a depth of ¾ inches. Allow time for the pipe and saddle to conform to each other or use a top loading tool to achieve the necessary contact. Do not fuse saddle until saddle has conformed to the pipe.
 10. Connect the two electric pins to the welding connectors of the branch saddle. Scan the bar code with the optical pen or enter the welding parameters manually. After completing the welding process verify that no material has leaked out of the joint between the pipe and the saddle. Allow a minimum cooling time of 20 minutes or until the saddle is not too hot to touch.
 11. Proceed with the tapping of the pipe after cooling. Saddle straps shall be removed.
 12. Do not apply system loads or pressures until the saddle and pipe are completely cooled, minimum 45 minutes.
- I. Use a device that properly captures the coupon when cutting hole in pipe for saddles. Cutting shall be performed only after installation using a portable vacuum with small hose which fits inside hole drilled to collect and remove shavings.
- J. Provide for expansion and contraction as recommended. Cable shall be laid in same excavation and at pipe invert (see "Cable Installation").

- K. Mainline pipe shall have minimum 22 inches of COVER (excavate to invert as required by pipe size and valve locations).
- Lateral pipe shall have minimum 16 inches of COVER (excavate to invert as required by pipe size and valve locations).
- L. Cut pipe with hand saw or pipe-cutting tool, removing burrs at cut ends. Pipe cuts are to be square and true. Trim cut end as required conforming to manufacturer's specifications. Molded fittings shall be machined so that the wall thickness of the pipe and the fitting are matched.
- M. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the excavation. At times, when installation of the pipe is not in progress, the open end(s) of the pipe shall be closed by a watertight plug or other means. Pipe which cannot temporarily be joined shall be sealed to make as watertight as possible. This provision shall apply during the lunch hour as well as overnight. Pipe not to be installed that day shall not be laid out. Should water enter the excavation during or after installation of the pipe, no additional pipe may be installed or backfilled until water is removed from the excavation. Pipe shall not be installed when water is in the excavation. Pipe shall be snaked in the excavation to accommodate for expansion and contraction due to changes in temperature.
- N. In installing irrigation pipe Contractor shall route the pipe as necessary to prevent damage to tree roots.
- O. If during installation, it is necessary for one pipe to cross another pipe; at no time shall the pipes come within 6 inches of each other.
- P. Pipe shall be installed such that its curvature does not exceed manufacturer's recommendations.
- Q. Throughout the guarantee period it will be the responsibility of Contractor to refill excavations that have settled due to incomplete compaction. It shall not be Contractor's responsibility to refill and re-compact excavations that have been eroded by natural rainfall and runoff after acceptance of the system.
- R. Contractor shall be responsible for repairing existing cart paths and roadways to their original condition and level. Paved areas shall be cut and patched, not trenched, pulled or dug with a backhoe.
- S. Pipe routes have been located for optimum system performance. Contractor shall not deviate from the design as shown, unless they have notified the Owner's Representative, in writing, of any change requests to the design prior to irrigation system installation and said change requests have been subsequently approved in

writing. Contractor shall not commence work on that section of the mainline until he has received written approval from the Owner's Representative.

- T. Pulling of lateral pipe sizes shall be allowed provided soil is suitable and specified depth of bury is maintained. The bullet attachment to the plow blade shall be larger than the outside diameter of the pipes belled end. Pulling of pipe shall be accomplished in as straight a line as possible, using fittings where necessary. If pulling of fairway laterals is not possible, excavation will be required and sod shall be stripped before excavation. Sod shall be carefully replaced by the Contractor at no additional cost. No pulling shall be allowed until the specified roller is on site.
- U. Excavation and pull lines in turf areas shall be rolled or compacted to original grade with a self-propelled, vibrating, ride-on mechanical roller, 3-5,000 pounds.
- V. Before pressurization, pipe shall be flushed with a proper amount of water to flush dirt and debris from the pipe system so that it will not end up in the sprinkler nozzles. Contractor shall install flush points as needed for this task at no additional cost to Black Brook Golf Course/The City of Mentor.
- W. In installing irrigation pipe the Contractor shall route the pipe as necessary to prevent damage to tree roots. Where excavating shall occur near trees or within drip lines, the Contractor shall provide proper root pruning and sealing methods to roots 1 inch and larger at the direction of the Owner's Representative.
- X. HDPE pipe to steel pipe connections shall be made using a flange connection on the HDPE end and Harco ductile iron bell x bell flange adapter and spigot x female reducer flange. HDPE connections shall include joint restraint. HDPE pipe shall have flange connection to new 10-inch pipe using a Harco flange accessory kit with stainless steel hardware and gasket with annular modeled rings, Harco flange x MJ adapter, Harco MJ x HDPE adapter accessories with fusion bonded and coated C-110 backing ring and stainless steel bolts and Harco IPS MJ adapter with stiffener supplied by the Contractor.
- Y. Contractor shall limit the installation of lateral piping to the feature as indicated on the plans. Tees and 90-degree fittings shall be used to keep the pipe within the green or tee feature. Pipe cannot be pulled off the feature and then back on.
- Z. Branch saddles on the mainline are not allowed as well as side fusion.

3.03 BORES/SLEEVING/CONDUIT INSTALLATION

- A. Pipe bores/sleeving/conduit shall be installed under roadways, driveways, cart paths over 10 feet wide, where indicated on the drawings and where directed by the Owner's Representative. Separate electrical conduits as needed, 1-1/2-inch minimum shall be installed with sleeves.

- B. Main roadway shall be directional bored as indicated on the drawings using a directional drilling company.
- C. Where conduit or pipe is required in UNPAVED AREAS (e.g., across dirt roads), open trenching shall be used and compaction shall be to minimum 90%. Required depth of bury is to be maintained. Repair settling as necessary and immediately.
- D. Where conduit or pipe is required UNDER PAVED AREAS: Conduit shall be installed by cutting and patching and compaction shall be 95%. Required depth of bury is to be maintained. **Replacing with the old asphalt is not acceptable. The same day as installation,** repair the cut with a cold asphalt patch. Before acceptance replace cold paving patches with a hot, square, straight patch at grade where the cart path is not being replaced.
- E. Bore shall utilize flexible HDPE conduit.
- F. Bore shall include required number of conduits.
- G. Road crossing bore shall be at a depth approved by the permitting authority. Contractor shall obtain boring permit and perform any necessary pot holing before boring.
- H. No wire connection shall be made inside conduits or under paved areas.

3.05 ROCK/UNSUITABLE MATERIAL EXCAVATION

- A. Ledge rock, shale, stones, organic matter or trash not suitable for use as backfill shall be dug and hauled to accessible dump site on the property. Determination of unusable backfill material shall be made by the Contractor and the Owner's Representative.
- B. Rock excavation shall include solid rock or other masses which cannot be reasonably broken, plowed and removed with power driven equipment and/or boulder or stone which, because of size or position in the excavation requires other means for removal and when no other alternative is present, rock hammering or rock sawing shall be done and shall be considered "extra work". Payment for rock hammering, hammered rock excavation, hauling and bedding shall be made per unit price on the bid document (Item 99). Payment for rock sawing shall be made per unit price on the bid document (Item 100). Unsuitable material removal other than hammered rock or rock sawing shall be paid per deleterious material unit price on the bid document (Item 101).
- C. When rock is encountered, the Owner's Representative and the Contractor shall determine that the material to be excavated is rock. It is the intention of The City

of Mentor to avoid as much rock sawing, rock hammering and ledge removal as possible. Every attempt will be made to reroute pipe around ledge areas.

- D. Where rock, unstable or unsuitable soil is encountered the Contractor shall excavate an additional 2 inches below the proposed invert of the pipe. Contractor shall install a minimum 2-inch layer of bedding material or stone dust as a bedding for the pipe. Rock sawing shall produce its own layer of bedding during its operation. This layer shall be uniform in thickness and be complete prior to installation of any pipe.
- E. Contractor shall provide and stockpile bedding materials at locations to be selected by the Owner's Representative. Deleterious material shall be quantified by load and signed off by the Owner's Representative on a daily basis. Rock that is not signed for shall not be paid for. Rock sawing shall be quantified per linear foot of excavation, regardless of pipe size. Rock hammering shall be quantified per linear foot of excavation, regardless of pipe size.
- F. City of Mentor reserves the right to re-route pipe if possible, around rock areas. Contractor before excavating shall probe mainline routing to determine if a path exists that will reduce the amount of rock excavation.
- G. Hand picking of rock, 1 inch and size and larger, from excavations before backfilling shall not be paid under the rock clause. Rock clause shall be for removing of rock from excavations with power driven equipment and for hauling material from the excavation area that cannot be used as backfill. Picked rock shall be paid as per deleterious unit price (Item 101) on the Bid Form.
- H. Rock loads shall contain no more than 10% soil for quantifying.

3.06 CABLE INSTALLATION

- A. Communication cables and wire shall be installed with no in-ground splices. Splices shall be only at/in junction boxes, valve boxes, LSMs, ICM's or sprinklers.
- B. Communication cable shall be laid in pipe excavations or pulled alongside lateral pipe and shall be carefully backfilled to avoid any damage to the cable. Cable shall be installed with at least 1% slack and have a 36-inch expansion loop at each change of direction of 45 degrees or more. In areas of unsuitable material, the excavation shall have a 6-inch layer of select fill on the bottom before the cable is laid into the excavation and backfilled. The cable shall have a minimum of 16 inches with laterals. Cable not to be installed that day shall not be laid out. Where cable passes under roadways, walls or other paved or graveled areas, it shall be installed in a PVC conduit, minimum 1-1/2 inch. In these instances, conduit shall extend 1 foot beyond said area and depth of cover shall be 24 inches. Pipe ends shall be plugged with duct seal. Sufficient slack for expansion and contraction shall be maintained and cable shall at no point be installed tightly. Provide an additional 8

inches to 12 inches of slack at changes of direction. Cable in valve boxes shall be of sufficient length to permit connections to be brought to the surface for servicing. Slack in valve boxes shall be coiled for neatness. Wire may be laid with a vibratory plow providing proper laying equipment is employed and wire is not pulled directly off the roll. The pulling blade shall contain the appropriate attachment provided by the manufacturer for laying of wire so the wire is pulled in with slack. Specified depth of burial is to be maintained. Following pulling, pull lines shall be compacted using a ride on, self-propelled, vibratory 3000-5000-pound roller. Pull lines shall be compacted, rolled and repaired to the satisfaction of the Owner's Representative.

- C. Cable paths have been located for optimum performance. Contractor shall not deviate from the design as shown, unless he has notified the Owner's Representative, in writing of any change requests to the design prior to the irrigation system installation and said change requests have been subsequently approved in writing. Contractor shall not commence work in that area until he has received written approval from the Owner's Representative.
- D. Cable shall be installed adjacent to and with the mainline pipe per details.
- E. Cable connections shall be made using safety strippers as recommended by Rain Bird or Toro.
- F. Cable splices shall maintain the proper polarity. The same color shall be paired to the original color.
- G. Do not use tape to hold the cable splices to the sprinkler body. Locate the completed wire splices under or in with the selector assembly so they can be easily located.
- H. Where shown on the drawings install Rain Bird Integrated Control Surge Device (ICSD) or Toro Communication Line Surge Units on the cable path.
- I. In-ground wire connections shall be waterproofed with 3M DBR/Y-6 splice kits of the appropriate size for the voltage being carried and the wire sizes involved.
- J. Power termination into ICI+/Smart Hub shall include a mechanical restraint installed in the knock out as per NEC requirements.
- K. Cables in pipe excavations shall be installed under/beside the pipe, not on top of the pipe. See detail. Mainline communication cable paths shall be colored as indicated. Lateral communication cable shall be red in color.
- L. Communication cable shall not be strung out or exposed to sunlight. When communication cable is terminated for future use, it shall be neatly coiled and

placed in a UV resistant plastic bag. No cable shall be exposed to sunlight. This shall apply to cable still on the roll left on the course also.

3.07 VALVE BOX INSTALLATION

- A. Contractor is expected to remove sod for valve box areas where it exists and to be reused and shall have sod cut and valve box installed. Sod is to be replaced so that no bare soil areas are present around the valve box. Sod shall be set back to original grade.
- B. Furnish and install a valve access box for each isolation gate valve, pond fill, drain, air vacuum/release valve, quick coupling valve (except greens), grounding rod, grounding plate and wire splice as specified.
- C. Valve access boxes shall be installed on a minimum 4-inch crushed stone base. Finish elevation of boxes shall be at grade. Crushed stone to be supplied by the Contractor and installed before valve box. Crushed stone shall not be simply poured into previously installed valve boxes.
- D. Valve boxes shall be installed neatly. Boxes shall be parallel or perpendicular to hard-scape edges and to other valve boxes installed in the same location. A sufficient amount of turf shall remain in place between each valve box and between valve boxes and hardscapes.
- E. Valve boxes shall not be installed on slopes around greens and tees. Valve boxes shall not be installed in the walking paths to greens or tees. Valve box locations at greens and tees shall be approved by the Owner's Representative before installation.
- F. Valve box extensions shall be provided as required on valve boxes in order to install valve box covers at grade. This shall include air vacuum/release valves.
- G. Center equipment in valve boxes for servicing.
- H. Bricks, stones, etc. shall not be used to support valve boxes.

3.08 CENTRAL CONTROLLER INSTALLATION

- A. Central computer shall be installed in the Maintenance Facility where directed by the Owner's Representative.
- B. Central communication equipment shall be installed on a dedicated electrical circuit breaker provided by Black Brook Golf Course.

- C. Contractor shall furnish and install central control, lightning protection interface, power and other irrigation related wiring.
- D. Install central controller equipment including Smart Hubs, ICI+'s and lightning protection interfaces.
- E. Above ground wire shall be installed in conduit including grounding wires.
- F. No more than two communication cables shall be installed in one conduit. Conduit size shall be based on NEC requirements for the wire sizes passing through it.
- G. Install surge protection equipment minimum as per Rain Bird Cirrus Pro or Toro LYNX CE, latest version Installation Manuals for Surge Protection, Wiring and Proper Grounding Requirements.

3.09 ICI+/SMART HUB INSTALLATION

- A. ICI+/Smart Hubs shall be installed in the maintenance facility where directed by the Owner's Representative approximately where indicated on the drawings.
- B. Equipment shall be installed on electrical circuit breaker downstream of the circuit breaker/Zap Trap including ICI+/Smart Hub equipment and lightning protection interfaces.
- C. Install ICI+/Smart Hub equipment including, communication and lightning protection interfaces.
- D. Toro Smart Hubs shall maintain proper polarity when connected through the sensor ports.
- E. Above ground wire shall be installed in conduit including communication, antenna and grounding wires.
- F. Install surge protection equipment minimum as per Rain Bird Cirrus Pro or Toro Lynx CE latest version Installation Manuals for Surge Protection, Wiring and Proper Grounding Requirements, latest version.

3.10 ICI+/SMART HUB GROUNDING INSTALLATION

- A. ICI+/Smart Hubs shall include factory-installed and factory-recommended lightning protection and shall be connected to a grid pattern of a 5/8-inch diameter x 10-foot-long copper clad grounding rod with minimum #6 AWG, solid, insulated copper cable and a 4-inch x 96-inch x 0.0625-inch copper grounding plate as outlined below and as per ASIC Guideline 100-2002 for "Earth Grounding of Electronic Equipment in Irrigation Systems". Connection to rod shall be with

Cadweld connectors as specified. The plate manufacturer with 25 feet of insulated copper cable already attached shall perform connection to plate. Grounding rod shall be driven into the ground its full ten (10) foot length no more than 20 feet from the device and connected via a Cadweld connection to #6 solid, bare copper wire. The copper wire is to be installed in as straight a line as possible, and if it is necessary to make a turn or bend, it shall be done in a sweeping curve with a minimum radius of 8 inches and a minimum included angle of 90 degrees. There shall be no splices in the bare copper wire. The top of the ground rod shall be driven below the ground surface. A 4-inch grated cover as specified, set a minimum of 1 inch below grade, shall be placed over the ground rod and Cadweld connected for periodic maintenance. Cover shall be installed on a minimum of 6 inches of 4-inch ADS corrugated polyethylene, perforated drainage pipe. Plates shall be installed 30 inches below grade with 50 lbs. of PowerSet ground enhancement material spread evenly below the plate and 50 lbs. of PowerSet ground enhancement material spread evenly above the plate in accordance with the manufacturer's requirements. Plates shall also be covered with a 4-inch grated cover as specified, set a minimum of 1 inch below grade, to facilitate drainage onto the plate. Cover shall be installed on a minimum of 30 inches of 4-inch ADS corrugated polyethylene, perforated drainage pipe.

- B. Cable path shall include lightning protection and shall be connected a grid pattern consisting of a 5/8-inch diameter x 8-foot-long copper clad grounding rod with minimum #10 AWG, solid, insulated copper cable to 4-inch x 36-inch x 0.0625-inch copper grounding plates with 3M DBR/Y-6 connectors as outlined below and as per Paige Irrigation Wiring Guide for Decoder Systems. The plate manufacturer with 10 feet of insulated copper cable already attached shall perform connections to plates. Grounding rod shall be driven into the ground its full length and connected via a 3M DBR/Y-6 connection to #10 bare copper cable. The copper cable is to be installed in as straight a line as possible, and if it is necessary to make a turn or bend, it shall be done in a sweeping curve with a minimum radius of 8 inches and a minimum included angle of 90 degrees. There shall be no splices in the bare copper cable. The top of the ground rod shall be driven below the ground surface. A 4-inch grated cover as specified, set a minimum of 1 inch below grade, shall be placed over the ground rod and Cadweld connected for periodic maintenance. Cover shall be installed on a minimum of 6 inches of 4-inch ADS corrugated polyethylene, perforated drainage pipe. 4-inch x 36-inch plates shall be installed 30 inches below grade with 25 lbs. of PowerSet ground enhancement material spread evenly below the plate and 25 lbs. of PowerSet ground enhancement material spread evenly above the plate in accordance with the manufacturer's requirements. Plates shall also be covered with a 4-inch grated cover as specified, set a minimum of 1 inch below grade, to facilitate drainage onto the plate. Cover, set 1 inch below grade, shall be installed on a minimum of 30 inches of 4-inch ADS corrugated polyethylene, perforated drainage pipe.
- C. Grounding systems shall be minimum as specified and installed per manufacturer's

recommendations. A third party shall certify in writing after testing the results of the grounding system megging readings.

- D. Install grounding as per ASIC “Guideline 100-2004 For Earth Grounding of Electronic Equipment in Irrigation Systems” and “Paige Irrigation Wiring Guide for Decoder Systems”.

3.11 SPRINKLER INSTALLATION

- A. Contractor is expected to remove sod for sprinkler areas and shall have sod cut and sprinkler installed. Sod is to be replaced so that no bare soil areas are present around the sprinkler. Sod shall be set back to original grade.
- B. One inch and larger sprinklers shall be mounted on unutilized three-ell PVC swing joints per the specifications. Minimum swing joint length to be 12 inches.
- C. Install sprinklers as per details. Valve-in-head sprinkler grade shall be as agreed to with the golf course maintenance staff.
- D. Contractor shall properly flush pipe before installation of sprinklers. Any sprinklers found to have broken rock screens shall be replaced by the Contractor at no additional cost to The City of Mentor.

3.12 LSM/ICM INSTALLATION

- A. LSMs/ICMs shall be installed at pond fills. LSMs/ICMs shall be located in valve boxes as specified and indicated on the drawings. Contractor shall be responsible for accurately recording the LSM/ICM and sprinkler tag number/designation on the Record Drawings for each sprinkler and pond fill electric valve as it is being installed.
- B. Integrated control surge devices/communication line surge units and LSMs/ICMs may be located in the same valve box. Box shall have gray lid.
- C. LSMs/ICMs shall be wired as per the manufacturer’s instructions.

3.13 GREEN IRRIGATION INSTALLATION

- A. Greens shall have installed a supplemental irrigation system of sprinklers to water the collars and rough areas beside and behind the green as shown on the plans.
- B. Number of sprinklers to be used on each green collar will vary as depicted on the plans. Sprinkler spacing and the layout of each collar shall be approved by Owner’s Representative before installation. Surround sprinkler will not necessarily be installed beside the green sprinkler.

- C. Part circle collar sprinklers throwing out from the green shall be installed on 2-inch green loop pipe.

3.14 RAIN GAUGE/SENSOR INSTALLATION

- A. Install three (3) Rain Bird rain gauges in locations as indicated on the drawings and one a Toro rain sensor per Smart Hub at the maintenance facility location per details.
- B. Tipping bucket rain gauge at the maintenance facility shall be cabled directly to the ICI+ and bypass the StrikeGuard disconnect relay.

3.16 QUICK COUPLING VALVE INSTALLATION

- A. Install 1 quick coupling valve before the isolation valve side of each green and others where indicated on the drawings. Tees shall have quick coupling valves installed where indicated on the drawings. Quick coupling valves for greens shall be installed as per green detail, flush to grade without valve box. See detail.
- B. Quick Coupling valves shall be installed a maximum of 10 feet from the putting surface. Quick couplers for tees shall be installed in 10-inch round valve box. See detail.
- C. Live quick couplers on the green loop and in the fairway cut shall be installed beside a sprinkler with no cover.
- D. Quick coupling valves to be mounted on 1-inch PVC swing joint with brass inserts. Minimum swing joint length to be 12 inches.
- E. Green quick couplers shall be installed on the isolated lateral except for the quick coupling valve installed with the green tap which shall be before the isolation valve.
- F. Tee and green quick couplers shall be installed on the isolation valve as shown on the details using a Harco quick coupler adapter.
- G. Quick coupling valves shall be stabilized with anti-rotation wing. Area around the wing and three quarters of the valve box shall be filled with crushed stone.
- H. Height of quick couplers shall be set so that the key is easily useable with room left to get the operators fingers under the handle.

3.18 ISOLATION VALVE INSTALLATION

- A. Green isolation valve shall be installed a maximum of 10 feet from the putting surface.
- B. Isolation valves shall be installed in the closed position and shall not be opened until the mainline pipe has been pressurized and flushed.
- C. Mainline isolation shall be accomplished with MJ valves as indicated on the drawings. Install isolation valves on a level crushed stone base so that they can be easily opened or closed by hand or with the appropriate valve wrench. Install specified poly-iron valve box over each mainline isolation valve.

3.19 DRAIN VALVE INSTALLATION

- A. Drain valves shall be installed at the lowest point of the mainline in the vicinity of where shown on the drawings per detail and shall have locations approved by the Owner's Representative before installation.

3.20 AIR VACUUM/RELEASE VALVE INSTALLATION

- A. Install air vacuum/release valves as per detail at locations shown on the drawings.
- B. Provide ball valve shut-off, boiler drain and wye strainer under air vacuum/release valves as per detail. Ball valve shut-off shall be easily accessible through the valve box. Install boiler drains on discharge of wye strainers.
- C. Drill thirty-two (32), 3/8-inch holes in air vacuum/release valve box covers for air passage.
- D. Air vacuum/release valve shall be installed straight up from mainline and not on the side. This may require additional mainline depth at air vacuum/release valve locations.
- E. Air vacuum/release valve shall be installed at the highest point of the mainline in the vicinity of where shown on the drawings and shall have locations approved by the Owner's Representative before installation..

3.21 LIGHTNING PROTECTION SYSTEM INSTALLATION

- A. Install equipment at maintenance facility per manufacturer's installation instructions.
- B. Contractor shall install needed relays and accessory items as required for a fully functioning disconnect system.
- C. Wire closest tipping bucket rain gauge around disconnect relay.

3.22 DEMOLITION OF EXISTING IRRIGATION SYSTEM

- A. Contractor shall be responsible for removing existing sprinklers, quick couplers, controllers and valve boxes from the golf course following installation of the system. The removed equipment shall be stockpiled in a location on the golf course designated by the Owner's Representative.
- B. Areas where the existing irrigation equipment was located shall have a square piece of sod cut (2-foot x 2 foot) where it exists and will be reused, be filled in with approved material and compacted to grade. Contractor shall provide sod as well as replacement backfill material for these areas. The sprinkler or quick coupler shall be removed from the swing joint and the swing joint capped with a PVC, Schedule 40 threaded cap.
- C. There are approximately 150 existing golf course sprinklers, 130 quick couplers and approximately 36 valves/valve boxes on the course.

3.25 INSTALLATION OF YARDAGE MARKERS

- A. Install specified yardage markers on sprinklers per manufacturer's requirements.

3.26 LAWN RENOVATION

- A. Contractor shall be responsible for cutting, removing and replacing sod on excavations where it exists and in addition sodding areas where major damage to turf has occurred from their work. Sod shall be carefully lifted or replaced at applicable locations of mainline excavations, sprinklers, valves, quick couplers, valve boxes, grounding rods and plates and pipe connections. After components are installed, sod shall be cut to fit. Sod shall be carefully replaced or installed by the Contractor. The Owner's Representative to determine any additional areas to be sodded. New sod shall be as approved by the Owner's Representative and paid for by the Contractor.
- B. Compacted excavations and pull lines shall be flush with the adjacent existing grade and raked free of stone with a fine rake. Contractor shall be responsible for any final restoration preparation including topsoil placement before sodding. Topsoil for excavations shall be approved by the Owner's Representative.
- C. Sod shall also be required in the event the Contractor disturbs areas of existing turf stands due to obvious careless and negligent operations as determined by the Owner's Representative, examples of which may include turf damage due to vehicle/equipment use through known "wet" areas and turf damage due to haphazard vehicle/equipment travel outside of the agreed upon travel routes and damage due to equipment fluid leaks.

- D. Contractor shall be responsible for repairing ruts, depressions, etc. caused by the use of their equipment on the golf course as determined by the Owner's Representative. Any damage done to the golf course through use of the Contractor's equipment, including damage to turf from hauling rock and/or deleterious material, shall be restored to its original condition by the Contractor as determined by the Owner's Representative.
- E. Contractor shall use caution in the routing and use of heavy machinery on the golf course.
- F. Contractor shall utilize only approved means of access as directed by the Owner's Representative, minimizing the use of their equipment traveling through the golf course.
- G. Golf course utility vehicles only will be allowed on the golf course for installation. No road registered vehicles such as vans, cars and pickups shall be allowed on the golf course.

3.26 PROGRAMMING

- A. Contractor in conjunction with the supplier shall be responsible setting up and completing the central controller databases, etc. based on the as-built provided by the Contractor. This shall include sprinkler databases, controller databases, hydraulic tree and assigning of attributes to each sprinkler and valve as required for the as built map to interact with the central control software.
- B. Contractor shall fill out and program the database during installation so the system can be operational as a hole is completed and while the record drawing is being prepared.
- C. Hydraulic tree database shall be based on the design drawings.

3.27 FIELD ADJUSTMENT

- A. Adjust sprinklers, valve boxes, and quick coupling valves to grade as required so that they will not be damaged by maintenance operations.
- B. Height adjustments to equipment shall be performed as required by settlement, etc., throughout the guarantee period.
- C. Each sprinkler shall be operated for a minimum of five (5) minutes and sprinklers checked for consistency of water application.
- D. Check each sprinkler for proper nozzle size.

- E. Entire system shall be adjusted to assure compliance with the specifications and the intent of the Project Documents.

3.28 CLEAN-UP

- A. Upon completion of work, final clean-up shall be accomplished including raking, re-tamping, sodding and broom-cleaning and hosing-off of paved surfaces.

3.29 REPAIR OBLIGATION

- A. Contractor is responsible for the immediate repair of any system malfunction prior to the acceptance of the system by Black Brook Golf Course/The City of Mentor.
- B. During the execution of the Contract, Contractor shall keep a technically qualified person on the job full time, and maintain adequate labor and equipment on site, so immediate repairs can be performed in the event of a break or component failure.
- C. The costs of repairs of breaks or component failures shall be a cost of the Contractor under the terms of this Contract.

3.30 ACCEPTANCE OF OPERATION

- A. Upon completion of the work and acceptance by Black Brook Golf Course/The City of Mentor, Contractor in conjunction with the equipment supplier shall be responsible for the onsite training of the golf course superintendent and his assistants, minimum 24 hours (3 days) in the operation of the system using Black Brook Golf Course database. Offsite classes can supplement but not replace this training.
- B. Contractor in conjunction with the supplier shall furnish, in addition to the RECORD DRAWINGS AND MAINTENANCE AND OPERATING INSTRUCTION MANUALS, copies of available specification sheets, catalog sheets, and part lists to the Owner's Representative.
- C. Upon completion of the work and before acceptance by Black Brook Golf Course/The City of Mentor, the Contractor shall turn over required spare parts and release of lien forms to The City of Mentor.
- D. Contractor shall guarantee parts and labor for a minimum period of one (1) year (Alternate: 2 years) from date of acceptance.
- E. Contractor at no additional cost, during the warranty period, shall service the system at Black Brook Golf Course's request as follows:

Major failure, response within 24 hours of notification.
Minor failure, response within 72 hours of notification.

Minor failures are defined as failures, which only incapacitate a small part of the system, e.g., sprinkler, valve, lateral line.

Major failures are defined as failures, which cause the system to be in-operable, e.g., communication failure, loss of ability to water a green or tee.

In the event the Contractor does not respond promptly as defined above, The City of Mentor may take any action that it deems necessary to repair the defect and prevent further damage to their property, including hiring another Contractor or repairing the defect with their own equipment and labor. In this event, the Contractor shall be liable for materials and expenses incurred, including any property damage suffered by Black Brook Golf Course.

- F. If under the warranty period, settlement due to improper compaction and backfilling occurs and adjustment of sprinklers or other equipment becomes necessary, including seeding or sodding, the Contractor shall make these adjustments without cost to The City of Mentor unless The City of Mentor specifically agrees to the contrary in writing.
- G. If under the warranty period, sprinklers become stuck on or clogged due to improper flushing of the pipe system during installation the Contractor shall clean, repair and replace these sprinklers as needed without additional cost to The City of Mentor.

END OF DIVISION

PUMP STATION WET WELL, INTAKE AND PAD
TECHNICAL SPECIFICATIONS

PART I -- GENERAL

1.01 RELATED DOCUMENTS

- A. CONTRACT GENERAL and SUPPLEMENTARY CONDITIONS apply to the work of this Division, as well as the Drawings.

1.02 WORK INCLUDED

- A. This work shall include furnishing and installing concrete pad, wet well and intake pipe and installing inlet screen and pump station w/enclosure as required, as shown on the drawings or as may be required for proper construction of the wet well and intake in conjunction with the pump station pad. Pump station w/enclosure shall be furnished by the City of Mentor.
- B. Materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of the system. Material overages at the completion of the installation are the property of the Contractor and are to be removed from the site in a safe and legal manner.

1.03 SCOPE

- A. The work shown on the drawings and described represents a new concrete pad, wet well and intake associated with a new pump station for a new 18-hole automatic irrigation system.

1.04 CONTRACTOR QUALIFICATIONS

- A. Installer: A firm which has at least five (5) years' experiences in construction of this type which meets the criteria required by this specification and which is acceptable to the Owner's Representative.
- B. Foreman: Foreman/supervisor shall have demonstrated experience with construction of this type. Contractor shall make every attempt to maintain the same foreman for the duration of the work.

1.05 TESTS

- A. Observation: Owner's Representative shall be on site at various times to ensure the work is being constructed according to the specifications and drawing requirements.

1.06 QUALITY ASSURANCE

- A. Applicable requirements of accepted Standards and Codes shall apply to the work of this Section:
 - 1. American Concrete Institute (ACI)
 - 2. American Society of Testing & Materials (ASTM)
 - 3. Underwriters Laboratory (UL)
 - 4. Occupational Health and Safety Administration (OSHA)

1.07 DELIVERY, HANDLING AND STORAGE

- A. Store and handle materials in compliance with manufacturer's instructions and recommendations. Protect materials from damage. On-site storage is available, coordinate with the Owner's Representative.
- B. Contractor shall be solely responsible for meeting and off-loading materials. Black Brook Golf Course shall not accept or unload any materials or equipment.

1.08 WARRANTIES

- A. Contractor shall obtain, in Black Brook Golf Course's name, the standard written manufacturer's guarantee on materials furnished under this section where such guarantees are offered in the manufacturer's published product data. These guarantees shall be in addition to, and not in lieu of, other liabilities, which the Contractor may have by law. In addition to the manufacturer's guarantees the Contractor shall warrant the work, both parts and labor for a period of one (1) year from date of acceptance by the City of Mentor.

1.09 COORDINATION

- A. Contractor shall coordinate their work with the Owner's Representative and the golf course superintendent.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Contractor shall use the materials specified unless the term "or approved equal" applies.

2.02 CONCRETE/CONCRETE BASE

- A. Pump station enclosure concrete base shall be standard concrete mix in accordance with ASTM C150, ASTM C-33, and ASTM C-94 with a compressive strength (28 days) of 3,000 psi.
- B. Concrete base for pump station enclosure shall be as indicated on the drawings (216-inches long, 144-inches wide x 8-inches deep).
- C. Concrete base shall include two welded wire fabric (WWF) mats 6-inch x 6-inch, W5.5 x W5.5 grade per ASTM-A-1064. One mat shall be installed 2 inches above bottom of slab and one 2 inches below top of slab.
- D. Base shall be installed on a minimum 6-inch, transit leveled, $\frac{3}{4}$ inch crushed stone. Crushed stone shall be overlaid with an 8-mil vapor barrier.
- E. Concrete base shall be installed 6 inches above finished grade.
- F. Concrete base shall have installed electrical sweeps as follows:

4-inch	pump station power
1-inch	communication cable
1-1/2-inch	city water fill relay wires

2.03 WET WELL

- A. Pump system wet well shall be constructed of precast concrete sections having an inside diameter of 5 feet x 14 feet deep inner chamber depth. Wet well shall be as shown on the drawings.
- B. Strength of the precast concrete to be equal to or exceed 4,000 psi at 28 days and shall be of sufficient strength to withstand a minimum load produced by earth pressure plus hydrostatic pressure at the location site.
- C. Joints between any precast reinforced sections shall be formed so that adjoining sections will fit and seat properly and the gap between sections shall be no more than 3/8 inches.
- D. Wet well shall be provided with a circular opening at the location and elevation shown for connection of the inlet pipe. The pipe connection shall be sealed with a flexible manhole seal assembly. The flexible manhole seat assembly shall be installed in accordance with the recommendations of the seal assembly manufacturer and shall conform to ASTM C293-79. Acceptable flexible manhole seal assemblies are those manufactured by Interspace Corporation (Lock Joint Flexible Manhole Sleeve), National Pollution Control System, Inc. (K or -N Seal), Press-Seal Gasket Corporation or approved equal.

- E. Joints between the precast sections shall be made water tight with a preformed plastic sealing compound meeting U.S. Federal Specification SSS-210A. A non-shrink epoxy grout shall be used on the inside of the joints between precast sections.
- F. A fiberglass reinforced plastic (FRP) ladder shall be provided the full depth of the wet well. The ladder to be precast within wet well and shall have a load rating of 300 pounds. Support and standoff brackets, nuts and bolts shall be stainless steel, type 303; expansion sleeve shall be Type 302 stainless. Side reels shall form a ladder sixteen (16) inches wide.

2.04 INLET PIPE/STRAINER

- A. Inlet pipe shall be 24-inch, minimum SDR 35, PVC pipe manufactured by Cresline, JM Eagle, National Pipe or approved equal. Pipe joints shall be gasketed. Inlet pipe to be installed in 24 inch gasketed connection installed in pre-cast manhole section.
- B. Pump system inlet piping shall be installed as indicated on the drawings. Pump system inlet shall be supported by a concrete pedestal just before the inlet screen after pipe enters the pond. Inlet pipe length shall be approximately 75 feet long.
- C. Inlet strainer will be 32-inch square box type with minimum 3,072 square inches of screened area. Mesh to be ½ inch x ½ inch stainless steel screen installed on three sides. Top and bottom to be solid stainless-steel panels (minimum 20 gauge). Strainer shall bolt onto a 24-inch SDR 35 inlet pipe. Inlet strainer shall be provided by the City of Mentor, installed by the Contractor.

2.05 CRUSHED STONE BASE

- A. New concrete wet well shall be installed on a compacted dense graded, minimum 6-inch-thick, No. 57 (1-inch maximum) crushed stone base as indicated on the drawings.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine documents applying to this Division noting discrepancies and bringing the same to the attention of the Owner's Representative for timely resolution.
- B. Make field measurements necessary for the work. Project shall be laid out essentially as indicated on the plans, making minor adjustments for variations in the topography and for field changes.

- C. Protect existing trees, ponds, paving, structures, walls, etc. from damage. Any inadvertent damage to any of these items shall be reported to the golf course superintendent and the Owner's Representative at once.

3.02 SITE PREPARATION

- A. Contractor shall grade and firmly compact the new pump house/wet well area for installation of footings, crushed stone and pad using new material provided by the Contractor. Contractor shall provide compaction testing to assure 98% proctor density in accordance with ASTM D1557. Compaction testing results shall be approved by the Owner's Representative. Contractor shall be responsible for settling and pump station damage due to improper compaction.

3.03 PAD INSTALLATION

- A. Install sweep elbows and conduit for power for city water fill relay wires and communication cable through concrete pad.

3.04 WET WELL/INTAKE INSTALLATION

- A. Excavation for installation of the concrete wet well and intake pipe shall be performed by mechanical equipment of the proper size. Care shall be taken to minimize the diameter of the excavations while maintaining safe and clean working conditions, as outlined by OSHA standards.
- B. Backfill within and around the wet well excavation and below the concrete pad shall be new, clean, compacted material provided by the Contractor. Contractor shall be responsible for settling of the building due to improper compaction of the new material around the wet well and intake.
- C. Inlet screen, supplied by the City of Mentor, shall be installed by the Contractor on the end of the inlet pipe.
- D. Excess excavated material shall be disposed of by the Contractor on site in a safe and legal manner.
- E. Wet well shall be covered with a secure plywood or other cover material until pump station with enclosure is installed.

3.05 FIELD ADJUSTMENT

- A. Entire installation shall be adjusted to assure compliance with the intent of the Project Documents.

3.06 CLEAN-UP

- A. Upon completion of the work, final clean-up shall be accomplished including removal of debris and other construction activities, broom-cleaning and hosing-off of concrete surfaces.
- B. Contractor shall remove left-over materials from the site and dispose of in a safe and legal manner.

3.07 OPERATION AND ACCEPTANCE BY BLACK BROOK GOLF COURSE

- A. Owner's Representatives will punch list the work when the Contractor reports it is complete. Owner's Representatives will advise the Contractor whether or not such work has been completed in accordance with the Contract Documents.
- B. Contractor shall guarantee the work as specified.

END OF SECTION

SPECIFIC PROJECT REQUIREMENTS

1) Contact During Bidding

All Questions during bidding should be addressed to Brian E. Vinchesi, who can be reached at 978-433-8972, email: bvinchesi@irrigationconsulting.com or Nick Fortunato, City of Mentor Black Brook Golf Course Greens Superintendent, 8900 Lakeshore Blvd, Mentor, Ohio 44060 at 216-406-3060, email: fortunato@cityofmentor.com or Black Brook Golf Course Clubhouse 440-951-0010.

2) Taxes

The Contractor shall pay and/or withhold all sales, consumer, use, employment and other taxes (including the City of Mentor 2% income tax) paid or withheld by the Contractor in accordance with the Laws and Regulations of the United States, State of Ohio, and City of Mentor which are applicable during the performance of the work.

3) Working Hours

The standard work hours for this project shall be between the hours of 7:00 am and 6:00 pm unless specifically approved by the city representative. Work shall not be permitted nights, or on Sunday or legal holidays, without written permission of the City of Mentor.

4) Project Completion

All work including restoration and clean-up shall be completed no later than the contract completion date. Failure to complete all work within the allotted time will result in assessment of liquidated damages. Upon completion of all work and written notification of same by the Contractor, the Owner and Irrigation Consulting, Inc. will compile a punch list. The punch list will be sent to the Contractor. All punch list work shall be completed to the satisfaction of the Engineer and the Owner within 14 days after receipt of the punch list. Failure to complete the punch list work within the allotted time will result in assessment of liquidated damages.

5) Final Compliance and Submittals

The following forms and related sign-offs shall be documented in accordance with provisions of the contract. These forms shall be completed by the Contractor and approved by the Owner before final retainer is approved for release. Forms for Items A to E will be attached to the Contractor's executed copy of the contract.

- A. Certificate of Substantial Completion (to be submitted at time of Substantial Completion);
- B. Contractor's Certification of Completion;
- C. Contractor's Affidavit of Prevailing Wage;
- D. Consent of Surety Company for Final Payment;
- E. Affidavit of Final Acceptance Date and Correction Period;
- F. Certificate of insurance verifying completed operations insurance coverage.