SP- 150463
(New)

SPECIAL PROVISIONS
FOR
IRRIGATION

Marshall County
NHSN-014-5(78)--2R-64

Effective Date
December 18, 2018

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150463.01 DESCRIPTION

A. Work Includes.
Contractor shall install complete underground irrigation system as shown on the plans and as specified, including the furnishing of all labor, equipment, and materials that are necessary for the construction of the irrigation system, including all permits.

B. Contractor's Qualifications.

1. Each bidder shall have installed at least two irrigation projects on sites similar in nature within the past 2 years.

2. The contractor shall submit with his bid, a listing of those projects which meet this requirement. Also, proper contact name, address, and telephone numbers of those who can verify this information.

3. The contractor must maintain a field service representative on their payroll. This includes having a fully equipped service vehicle capable of handling service calls within a 48 hour period.

4. The contractor shall be fully licensed in the state of Iowa to do all contracted work. License certificates to be presented as part of bid package.

5. The contractor shall designate a competent superintendent and any necessary assistants, all satisfactory to the Engineer during the entire phase of work. The superintendent shall represent the contractor in his absence and all directions given to him and decisions made by him shall be as binding as if given to or made by the contractor.

C. Submittals.
Submit the following:

1. Irrigation plan: Show all equipment including pipe sizing.

2. Product Data: Submit two sets of manufacturer's technical data on all specified materials.

3. Operating Instructions: Submit instruction sheets and parts list covering all operating equipment at the final inspection.

4. Maintenance Instructions: Submit a complete written description and schedule of annual maintenance requirements at the final inspection.

D. Protection.

1. Prior to commencing any work required under the contract, the contractor shall locate all utilities, subsurface drainage, and underground construction so that proper precautions may be taken not to disturb or damage any subsurface improvements.

2. The contractor shall be responsible for coordinating his work with all other parties involved with the job in order to eliminate unnecessary complications during the installation of his work or others.

3. The contractor shall be liable for and shall take the following actions as they may be required, in regards to damage to any property.
   - **a.** Any existing buildings, equipment, piping, pipe coverings, electrical systems, sewers, sidewalks, roads, grounds, landscaping or structure of any kind (including without limitation damage from leaks in the piping system being installed or having been installed by the contractor or by his agents, employees, or subcontractors, during the course of this work through negligence or otherwise) shall be replaced or repaired by the contractor at his own expense.
   - **b.** The contractor shall also be responsible for damage to any work covered by these specifications before final acceptance of the work. He shall securely cover all apparatus, equipment and appliances both before and after being set in place to prevent obstructions in the pipes, and breakage, misuse or disfigurement of apparatus, equipment, or appliance.
   - **c.** The contractor shall adequately protect adjacent property as provided by law and the contract documents.
   - **d.** The contractor shall be liable for any loss or damage to any work in place, any equipment, or materials on the job site caused by him, his agents, employees, or guests.

E. Field Quality Control/Workmanship.

1. The Engineer shall inspect the work at any time during the course of the work to ensure adherence to the plans and specifications.

2. Areas which are deficient due to unforeseen conditions or obstructions shall be brought to the attention of the Engineer prior to the installation in that area.

F. Final Inspection and Acceptance.

1. Upon completion of all work, an inspection for acceptance of work will be held. The contractor shall notify the Engineer at least 3 days prior to the anticipated inspection date.

2. The Contractor shall demonstrate the entire system to the Engineer, proving that all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, and that the system is workable, clean and efficient. This shall be a requirement for final acceptance of the work.

3. At the time of the inspection, if the work is wholly or substantially acceptable, a letter of acceptance will be issued by the Engineer.

4. Upon completion and re-inspection of full repairs or replacements necessary in the judgment of the Engineer at that time, and conditions in Articles SP-150463.01, D and SP-150463.01, H are met, the Engineer will give final acceptance of the work.

G. As-Built Drawings

1. The Contractor shall provide three complete sets of accurate "'As-Built" drawings. These drawings shall be prepared to scale of 1 inch equals 20 feet. In addition to drawings a complete set in AutoCAD format will also be required. An AutoCAD base plan shall be supplied by the Contracting Authority. Accuracy will be verified by the Engineer before final payment to the contractor.

2. The Contractor shall supply a controller schedule that corresponds to the As-Built drawings and provides 1.25 inches of precipitation per week.

150463.02 MATERIALS.

A. Irrigation Key.
An irrigation key describing the meaning of all symbols used on the irrigation drawing is provided on the drawings.

B. Mainline Pipe and Fittings.

1. All mainline piping within this system will be PVC SDR 21, class 200 (diameter as designated on the design), as manufactured by Cresline, Cantex, or Eagle.

2. All PVC mainlines that are 3 inches and smaller shall have solvent weld bell type connections. All PVC mainlines larger than 3 inches shall have gasketed type connections.

3. All fittings associated with 3 inch and smaller mainline shall be schedule 40 solvent weld fittings as manufactured by Spears, Lasco, or Dura. All solvent weld fittings are to be purchased "ready for use" (Example 1 1/2 inches by 1 1/2 inches by 1 inch). Use of additional bushing etc. shall not be allowed.

4. All fittings associated with mainlines larger than 3 inches shall be Harco ductile iron IPS type.

5. All mainlines crossing under roadways, sidewalks, and paths shall be installed through a continuous PVC schedule 40 sleeve (diameter as designated on the plans). The sleeve crossing under roadways, sidewalks, and paths shall be backfilled to the surface with sand. The length of this linear backfill shall extend 2 feet past each side of the hard surface edges.

C. Lateral Pipe and Fittings.

1. All lateral piping (between electric valves and sprinkler heads) shall be polyethylene NT 100, SIDR-15, as manufactured by Cresline, Cantex, or Eagle. Pipe shall be sized to keep velocity at 5 feet per second or under in all sections of piping.

2. All laterals crossing under roadways, sidewalks, and paths shall be installed through a continuous PVC schedule 40 sleeve (diameter as designated on the drawings). The sleeve crossing under roadways, sidewalks, and paths shall be backfilled to the surface with sand. The length of this linear backfill shall extend 2 feet past each side of the hard surface edges.

3. All fittings associated with lateral piping shall be polyethylene insert fittings as manufactured by Spears, Lasco, or Dura. Fittings shall be secured with Oetiker stainless steel crimp clamps.

D. Water Source.

1. All plumbing work shall be done by a licensed plumber.

2. Backflow testing shall be done by a state certified cross connection control device inspector.

3. All plumbing work shall be done in accordance to local plumbing codes.

4. Review each drawing and notes for explanation of required plumbing work.

E. Electrical Source.

1. All electrical work shall be done by a licensed electrician.

2. All electrical work shall be done in accordance to local electrical codes.

3. All electrical work shall be done as shown on the plans and in details.

F. Pop-Up Spray Sprinklers and Nozzles.

1. 12 inch pop-up, pressure regulated spray heads and MPR nozzles.

2. Nozzles must match the size of the area in which they are being used. The throttling down of nozzles to fit an area is prohibited.

G. Electric Valves for All Sprinkler Circuits.
Electric valves shall be 1 inch commercial grade series with 24 volt solenoid.

H. Valve Boxes.

1. Standard rectangular boxes shall come with a green lid.

2. Round boxes shall come with green lid.

3. All valve boxes installed in grass areas shall have green lids and all valve boxes installed in plant beds shall have brown lids.

I. Quick Coupler Valves.

1. Quick coupler valve shall be 1 inch brass with rubber lid.

2. All additional equipment is specified on the plans and in the details.

3. Contractor shall supply three quick coupler keys, and three quick coupler hose swivels.

J. Electric Wiring.

1. Install 14-1 hot and 12-1 common direct burial Irrigation control wiring between the controller and the valve box locations.

2. Splicing shall be accomplished using gel caps on solenoid wires. All splices shall be contained within the valve boxes.

K. Automatic Irrigation Controller Unit.

1. Review plans for controller types at each of the two locations. Install where shown on plans.

2. 110 volt power into the controller shall be provided by the site electrical contractor.

3. Install a rain/freeze sensor. Location to be determined with Engineer.

150463.03 CONSTRUCTION.

A. Existing Conditions.

1. The plans show conditions as they are believed to exist or are intended to be and are not a representation by or on behalf of the owner or owner's representative that such conditions actually exist.

2. If possible, every effort should be made by the contractor to visit the site prior to bidding on this project to verify site conditions.

3. Any objectionable materials such as old concrete, bricks or other debris encountered during the installation operations shall be removed from the site by the contractor. If excessive amounts of debris are encountered, contact the owner's representative immediately so all parties can be informed of potential problems.

B. General.

1. Pipeline positions indicated on the plans are generally schematic and shall be field adjusted by the contractor under the direction of the Engineer to avoid obstacles.

2. All mainline PVC will be trenched in. All soil will be properly re-compacted in lifts (minimum of three) with a mechanical tamper (jumping jack type with a shoe that fits into the trench), raked, and will be left in a "ready for seed" condition.

3. All mainline pipe shall have a minimum 24 inches of cover over top of pipe.

4. All lateral pipe shall have a minimum 12 inches of cover over top of pipe.

5. All areas disturbed by mainline construction will be properly re-compacted, debris removed, power raked, and left in a "ready for seed" condition.

C. Pipe Installation by Trenching.

1. The bottom of the trench is to be graded to a line so that the pipe, as nearly as possible, will have bearing for its full length. All rock and organic material shall be removed from the trench bottom prior to placing of pipe. If rock is encountered in the excavation, the trench must be excavated to a depth of 2 inches below the intended grade and then filled with well compacted clean earth to the intended grade. There will be at least 2 inches of clean earth between the bottom, top, or sides of the pipe and any rock.

2. The initial backfill will always be placed by hand and shoveled in place evenly along both sides of the pipe and hand tamped into place. Care will be exercised to insure that soil does not bridge and fail to go under the pipe. The soil in the trench shall be backfilled and compacted to the same condition of the surrounding soil.

3. Compaction of soil around and over the pipe is to be done in lifts (minimum of three) with a mechanical tamper (jumping jack type with a shoe that fits into the trench), raked, and will be left in a "ready for seed" condition to assure the owner that settling will not occur in the future.

4. In backfilling trenches, the addition of water should be limited to achieving optimum moisture content for tamping procedures. The contractor shall not crown the backfill on the trench area with the thought that it will eventually settle; this will not be accepted as a finished job. All excess materials shall be removed from the site in an approved manner. The trenches will be left in a condition to receive sod without any further grading.

5. During the entire prosecution of the work, the contractor will be responsible for all open excavations. The contractor shall be responsible for keeping all open excavations protected to OSHA specifications and maintaining protective devices until the excavation is properly filled.

D. Pipe Installation by Vibratory Plow.

1. All lateral piping shall be installed by the use of a vibratory plow or hand trenching where necessary.

2. All slits made by the vibratory plow shall be properly re-compacted with either hand or mechanical compactors.

3. Do not shallow up pulling depths near sprinklers and/or valve boxes. All depths shall remain consistent and level.

E. Manual Valves.

1. Manual valves are to be installed within two (minimum.) standard valve boxes with a green (only one valve, per box assembly). Stack valve boxes as necessary to accommodate the depth of the mainline at that location.

2. Compaction of soil around the valve boxes is to be done in lifts (minimum of three) to assure that soil settling will not occur in the future. Interior of the valve box is to be clear and free of debris, as shown in detail. Thrust blocks are required to stabilize these valves so it cannot move side to side and front to back.

F. Sprinkler Installation.

1. All sprinklers are to be installed in areas shown on the drawings. Sprinklers shall be consistently installed 1 inch off of curbs, sidewalks, and bed lines.

2. All previously specified sprinklers shall be installed as shown on the plans, details, and manufactures recommendations. Rigid piping and coupling extensions off of the lateral pipe will not be allowed.

3. All sprinkler connections to lateral pipe shall utilize swing pipe fittings and not more than 2 feet of swing pipe.

4. Compaction of soil around the sprinkler shall be accomplished in lifts to assure that settling will not occur in the future. Minimum compaction lifts will occur at:
   a. Lateral fitting and areas below sprinkler head.

b. Lower half of sprinkler head.
c. Upper half of sprinkler head.

5. Final compaction lift shall be accomplished with approved topsoil only.

6. Any and all nozzle sizes will be coordinated by the Engineer and the Contractor. The Contractor will be required to carry a full nozzle assortment as available by the manufacturer.

G. Valve and Valve Box Installation.

1. All valves and valve boxes are to be placed where shown. All mainline routing must take place where shown.

2. All equipment is specified on the plans and detail sheets. The interior of the valve box is to be free and clear of debris on all sides of the valves including 3 inches below the valve.

3. All wires are to be free and loose. All wire connections are to be placed above the valve as shown in the valve detail sheet for easy future inspection.

4. All PVC within the valve box shall be Schedule 80. All schedule 80 pipe shall be solvent welded back to schedule 40 fittings outside the valve box.

5. All valves are to be placed within Boxes as shown below:
a. One valve 10 inch round with green lid.
b. Two or three valves standard with green lid.
c. Four or five valves jumbo with green l id.

6. The use of bricks or similar materials will not be allowed for stacking purposes.

7. All valve boxes are to be installed flush with grade and soil around the box is to be compacted in lifts (minimum of three).

8. Where electric valves are manifolded only one mainline tap is allowed. The back of each valve tap location as well as the fittings in place prior to entering the valve, must be properly thrust blocked as shown on detail sheets.

H. Quick Coupling Valves.

1. Quick coupler valves shall be installed at locations shown on the plans next to valve boxes.

2. Install quick coupling valves as shown in details with 1 inch schedule 80 swing joint.

3. All quick couplers shall be installed in a 10 inch round valve box with green lid.

4. Compaction of soil around the quick couplers and fittings is to be done in lifts (minimum of three) to assure that soil settling will not occur in the future.

5. Deliver three quick coupler keys and hose swivels directly to the Engineer.

I. Electric Wiring General.

1. A 24 inch expansion loop shall be left in all boxes and at each turn or stress point.

2. Splicing can be accomplished using gel cap splice kits. All splices will be accomplished within the existing valve box layout (electric and isolation valves). Additional wire splice boxes are not allowed.

150463.04 METHOD OF MEASUREMENT.

Measurement for the Irrigation System will be the lump sum for the complete system installed in accordance with the contract documents.

150463.05 BASIS OF PAYMENT.

Payment for Irrigation System shall be full compensation for all labor, materials, tools, equipment, and supervision required to furnish and install a complete irrigation system. The lump sum price shall include but not be limited to the materials and installation of irrigation piping, pipe fittings, valves, secondary wiring, sprinkler heads, control equipment, valve boxes and sleeves, for all the proper operation of the system. Payment shall occur only after the complete system is accepted.