

SECTION 02819		
UNDERGROUND SPRINKLER IRRIGATION SYSTEM		
PART 1 GENERAL	Representative shall be the final judge of whether or not an item submitted for consideration as being an acceptable substitute.	qualifies
1.1 SUMMARY	D. Under no circumstances shall an item be given consideration as an "approved equal" substitute later than 10 days before the bid opening. After that date, all items shall be bid per the original specifications. Likewise, unless certified as an "approved equal" per the time frame and the requirements above, the successful bidder (known as Contractor after signing the contract) shall install all items per the original plans and specifications. Equipment or material installed or furnished without prior approval of the Owner's Representative as herein specified, may be rejected and the Contractor required to remove such materials at his own expense.	
1.2 APPLICABLE STANDARDS	E. The Contractor alone shall bear complete responsibility for the installation and operation of any material or equipment installed on the job (as a substitute for specified equipment or material) should such substituted material prove to be defective, inoperable or in-in-applicable.	
1.3 GUARANTEE AND MAINTENANCE	1.6 QUALITY ASSURANCE	
A. The Contractor is required to guarantee the sprinkler irrigation system in accordance with form below. A copy of the guarantee form shall be included in the Operations and Maintenance Manual. The guarantee form shall be on the Contractor's letterhead and contain the following information:	A. All work under this contract shall comply with the provisions of these specifications, as illustrated on the accompanying drawings, or as directed by the Owner's Representative, and shall satisfy all applicable local codes, ordinances, or regulations of the governing bodies and all authorities having jurisdiction over this project.	
GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM	B. Installation of equipment and material shall be done in accordance with the requirements of the National Electric Code, adopted Plumbing Codes and standard plumbing procedures. The drawings and these specifications are intended to comply with all the necessary rules and regulations; however, some discrepancies may occur. Where such discrepancies occur, the Contractor shall immediately notify the Owner's Representative in writing of the discrepancies and apply for an interpretation. Should the discovery and notification occur after the execution of a contract, any additional work required for compliance with the regulations shall be paid for as covered by these contract documents.	
We hereby guarantee that the sprinkler irrigation system we provided is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear, and unusual abuse or neglect excepted. We agree to repair or replace any defects in material or workmanship including repair of backfill settlement which may develop during the period of one year from date of Substantial Completion and to repair or replace any damage related to such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by Owner, after receipt of written notice from the Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.	C. The Contractor shall give all necessary notices, obtain all permits and pay all costs in connection with his work, file with all governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver to the Owner's Representative before request of acceptance and final payment for the work.	
PROJECT: LOCATION: SIGNED:	D. The Contractor shall include in the work labor, materials, services, apparatus or drawings in order to comply with applicable laws, ordinances, rules and regulations whether or not shown on the drawings and/or specified.	
SIGNED: Contractor ADDRESS: PHONE: DATE OF ACCEPTANCE:	E. Prequalification:	
B. Maintenance shall include, but not necessarily be limited to the following:	The installation of the irrigation system shall be made by an individual or firm duly licensed under the State of Utah Register of Contractors. The Contractor must demonstrate successful completion of at least five comparable projects within the last five years.	
1. Adjustment of emitters to compensate for settlement and/or plant growth.	1.7 SUPERINTENDENT	
2. Backfilling of all trenches.	A. The Contractor shall provide a superintendent satisfactory to the Owner's Representative.	
3. Unstopping emitters plugged by foreign material.	B. The superintendent shall not be changed, except with the consent of the Owner's Representative.	
4. Adjustment of controller as necessary to insure proper sequence and watering time.	C. The superintendent shall be authorized to represent the Contractor.	
5. All maintenance necessary to keep the system in good operating order.	1.8 NOTIFICATION OF OWNER'S REPRESENTATIVE	
C. Guarantee and maintenance after final acceptance do not include alterations as necessitated by re-landscaping, re-grading, addition of trees or the addition and/or changes in sidewalks, walls, driveways, etc.	A. The Owner's Representative shall have free access to the work whenever it is in preparation or progress and proper facilities, for such access and inspection. The Contractor shall notify the Owner's Representative when he will and will not be on the job. Should the Contractor work periodically on the job, the Owner's Representative shall have the right to require the Contractor to give a 24 hour notice of each and every day or partial day that he intends to work on the project. The Contractor shall perform no work, unless the Owner's Representative has been properly notified. Failure to notify the Owner's Representative may require the Contractor to redo, uncover pipe, expose for inspection, etc., all that the Owner's Representative was unable to inspect.	
1.4 SUBMITTALS	1.9 EXISTING UTILITIES - LOCATION AND ELEVATIONS	
A. The Contractor shall submit to the Owner's Representative two copies of shop drawings or manufacturer's "cut sheet" for each type of sprinkler head, pipe, controller, valves, check valve assemblies, valve boxes, wire, conduit, fittings and all other types of fixtures and equipment which he proposes to install on the job. The submittal shall include the manufacturer's name, model number, equipment capacity and manufacturer's installation recommendation, if applicable, for each proposed item.	A. The Contractor shall examine the site and verify to his own satisfaction the locations and elevations of utilities and availability of utilities and services required. Contractor shall employ the services of a professional utility locator service to locate existing on site utilities in the construction area prior to beginning work and as needed to maintain clear indications of utility locations. The Contractor shall inform himself as to their relation to the work and the submission of bids shall be deemed as evidence thereof. The Contractor shall repair at his own expense, and to the satisfaction of the Owner's Representative, for damage to utilities shown or not shown on the plans.	
B. No partial submittal will be accepted and submittals shall be neatly bound into a brochure and logically organized. After the submittal has been approved, substitutions will not be allowed except by written consent of the Owner's Representative.	B. Should utilities not shown on the plans be found during excavations, Contractor shall promptly notify Owner's Representative for instructions as to further action.	
C. Shop drawings shall include dimensions, elevations, construction details, arrangements and capacity of equipment, as well as manufacturer's installation recommendations.	C. Contractor shall make necessary adjustments in the layout as may be required to connect to existing subouts, should such subouts not be located exactly as shown and as may be required to work around existing work, at no increase in cost to the Owner. Such work will be recorded on record drawings and turned over to the Owner's Representative prior to final acceptance.	
1.5 SUBSTITUTION OF MATERIALS	1.10 COOPERATION OF TRADES	
A. This irrigation system has been designed around the irrigation components herein stated and as shown on the plans. Changes of brand name, trade name, trademarked, patented articles, or any other substitutions will be allowed only by written order signed by the Owner's Representative. The Owner is under no obligation to accept materials other than as specified. If a bidder wishes for a substitute item to receive consideration as an "approved equal," the bidder and each item must meet all of the following requirements without exceptions.	Work under this contract may be accomplished with other Contractors and trades on the project site at the same time. The Contractor shall allow each Contractor and trade adequate time at the proper stage of construction to fulfill his contract.	
B. An item, to be considered a substitute, must meet the same specifications of materials, fabrication or construction, dimension or size, shape, finish, performance standards, warranty or guarantee, and any other pertinent and salient features of quality, as indicated in manufacturer's specifications for original specified item.	1.11 RECORD DRAWINGS	
C. A sample of the item, along with a written request for consideration, shop drawings, and written specifications, must have been received by the Owner's Representative a minimum of 10 days before the bid opening date. The item shall then be examined, and the bidder shall be notified, in writing, seven days later, whether or not the item is an "approved equal." The Owner's	A. Record dimensioned locations and depths for each of the following:	
	1. Pressure line routing (provide dimensions for each 100 lineal feet (maximum) along each routing, and for each change in direction).	
	2. Controllers, pressure regulators and other items identified by the Owner's Representative.	
	3. Irrigation control valves	
	4. Control wire routing	
	5. Sleeves under paving	
	B. Locate dimensions from two permanent points (buildings, monuments, sidewalks, curbs or pavements).	
	C. Record changes which are made from the Contract Drawings, including changes in the pressure and non-pressure lines.	

2. Record required information on a set of blackline prints of the Drawings. Do not use these prints for an other purpose.	2.2 PVC PRESSURE MAINLINE PIPE AND FITTINGS)
3. Maintain information daily. Keep drawings at the site at all times and available for review by the Owner's Representative.	A. Pipe shall be made from NSF approved type I, Grade I PVC compound conforming to ASTM specification D 2241. Piping SDR solvent weld.
4. Reproducible bonds will be furnished by the Owner's Representative at cost for printing and handling.	B. Fittings for pressure mainline piping shall be PVC solvent-weld fittings Schedule 80, Type I NSF approved conforming to ASTM test procedure D 2466 and shall be as manufactured by Spears, Lasco or Dura.
1.12 CONTROLLER CHARTS	C. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be heavy duty gray Oatey Glue and Purple Primer or approved equal. Manufacturer's installation requirements shall be strictly adhered to.
A. Do not prepare charts until record drawings have been approved by the Owner's Representative.	
B. Provide one controller chart:	
1. Chart may be a reproduction of the Record Drawing, if the scale permits fitting the controller door. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.	
2. Chart shall be blackline print of the actual system, showing the area covered by that controller.	D. PVC pipe shall bear the following markings:
3. Identify the area of coverage of each remote control valve, using a distinctly different pastel color, drawn over the entire area of coverage.	1. Manufacturer's name
4. Following approval of charts by the Owner's Representative, they shall be hermetically sealed between two layers of 20 mil thick plastic sheet.	2. Nominal pipe size
5. Charts must be completed and approved prior to final acceptance of the irrigation system.	3. Schedule or class
1.13 OPERATING AND MAINTENANCE MANUALS	4. Pressure rating in psi
A. Provide two individually bound manuals detailing operating and maintenance requirements for irrigation systems.	5. National Sanitation Foundation (NSF) approval.
B. Manuals shall be delivered to the Owner's Representative no later than 10 days prior to completion of work.	6. Date of extrusion
C. Provide descriptions of installed materials and systems in sufficient detail to permit maintenance personnel to understand, operate and maintain the equipment.	A. Fittings shall bear the manufacturer's name or trademark, material designation, size, applicable IPS schedule and NSF seal of approval.
D. Provide the following in each manual:	2.3 PVC NON-PRESSURE LATERAL LINE PIPING (used to connect new drip laterals to existing irrigation system):
1. Index sheet, stating Irrigation Contractor's name, address, telephone number and name of person to contact.	A. Non-pressure buried lateral line piping shall be Sch. 40 PVC with solvent-weld joints.
2. Duration of guarantee period.	B. Pipe shall be made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specifications D1784. Pipe shall meet requirements set forth in Federal Specification PS-22-70, with an appropriate standard dimension ratio.
3. Equipment list providing the following for each item:	C. PVC solvent-weld fittings shall be Schedule 40, Type I NSF approved conforming to ASTM test procedure D2466 as manufactured by Spears, Lasco or Dura.
a. Manufacturer's name	D. Unless otherwise noted, requirements for non-pressure lateral-line pipe and fittings shall be the same as for solvent-weld pressure mainline pipe and fittings.
b. Make and model number	
c. Name and address of local manufacturer's representative	2.4 SWING JOINTS
d. Spare parts list in detail	A. All swing joint assemblies, nipples and risers shall be manufacturer pre-assembled per the following, as detailed.
e. Detailed operating and maintenance instructions of major equipment.	1" Lasco G 172-212 or approved equal.
1.14 CHECKLIST	3/4" Lasco T722-212, or approved equal.
A. Provide a signed and dated checklist and deliver to the Owner's Representative prior to final acceptance of the work.	1 1/2" Lasco T522-212, or approved equal.
B. Use the following format:	2.5 CONTROL WIRING
1. Plumbing permits: if none required, so note.	A. Connections between the automatic controllers and the electric control valves shall be made with direct burial copper wire AWG-UF 600 volt. Circuit wires shall be red with white common wires. Install in accordance with valve manufacturer's specifications.
2. Material approvals: approved by and date	Remote Control Valve circuit wire shall be #14 and common wire shall be #12.
3. Pressure line tests: by whom and date	B. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines whenever possible.
4. Record drawings: received by and date	C. Where more than one wire is placed in a trench, the wiring shall be taped together at intervals of 10 feet.
5. Controller charts: received by and date	D. An expansion curl shall be provided within 3 feet of each wire connection. Expansion curl shall be of sufficient length at each splice connection at each electric control, so that in case of repair the valve bonnet may be brought to the surface without disconnection of the control wires. Control wires shall be laid loosely in trench without stress or stretching of control wire conductors.
6. Operation and maintenance manuals: received by and date.	E. Field splices between the automatic controller and electrical control valves will not be allowed without prior approval of the Owner's Representative.
7. Manufacturer's warranties if required: received by and date.	F. Control wiring installed under paving shall be installed in UL listed Schedule 40 electrical conduit. Conduit shall terminate at least 2 feet inside of a planting area. Conduit joints and fittings shall be solvent weld. Size shall be 2" minimum and larger as required and/or shown on the plans.
8. Written guarantee: received by and date.	G. Two #12 "spare" wires shall be run from the controller to the furthest valve location in each direction. Wires shall be white with color stripes or otherwise marked in an approved manner. This is addition to any designated future wires identified on the plans. Spare wires shall be indicated on the Record Drawings.
1.15 WATER SERVICE	H. Wire connectors shall have a two-piece PVC housing which, when filled with resin epoxy and pressed together, forms a permanent, one-piece, moisture-proof wire splice. Connectors shall be UL listed, rated 600 volt, for PVC insulated wire. No wire splices shall be buried. Wire connectors shall be 3M models DBR, DBT or approved equal.
The Contractor will install a new water service and a new point of connection for this project as shown on the drawings and described in these specifications.	I. A #14 green tracer wire shall be installed along the path of main lines. Tracer wire to be looped in valve boxes.
1.16 SLEEVES AND ELECTRICAL CONDUITS	
Sleeves and electrical conduits will need to be installed as noted on the drawings or required by the project. Not all required sleeves are shown on the drawings. Contractor shall be responsible for timely placement of sleeves and conduits at no additional cost to the Owner.	2.6 ELECTRIC REMOTE CONTROL VALVES
1.17 PROGRESS MEETINGS	A. Rain Bird KCZ-100-PRF-BF Drip Control Zone Kit (DV series valve and BFF series pressure regulating back flush filter). Hunter ICV series plastic globe valve.
Contractor shall attend all progress meetings as requested by Owner's Representative during installation.	

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PART 2 PRODUCTS

2.1 GENERAL

Unless otherwise noted on the plans, materials shall be new and unused. This irrigation system has been designed around the irrigation components herein stated and as shown on plans. Changes of brand name, trade name, trademarked, patented articles, or any other substitutions will be allowed only by written order as outlined in Section 1.6.

Reserved for permit stamp

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THE CLIENT AND/OR THE CLIENT'S CONTRACTOR, IS RESPONSIBLE FOR OBTAINING OR PROVIDING THE NECESSARY CONSTRUCTION PERMIT FOR CITY CODE COMPLIANCE.

IRRIGATION
SPECIFICATIONS
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