LANDSCAPE IRRIGATION SPECIFICATIONS

LANDSCAPE IRRIGATION SYSTEM

PART 1 – GENERAL

1.01 SCOPE

A. The Landscape Irrigation Contractor shall furnish and install the landscape irrigation system including all products, equipment and labor required to complete the system as specified and shown on the Drawings.

B. The Landscape Irrigation Contractor shall be licensed as per the State of Texas Licensed Irrigator's Act and supply proof thereof. The backflow preventer will be tested and certified by a Texas Certified Backflow Tester.

C. The system may include, but is not limited to: Installing and testing main lines and lateral lines, electrical valves and wiring, valve boxes, controllers, sprinklers, and quick coupling accessories to complete the system.

D. The Landscape Irrigation Contractor shall obtain and pay for permits, fees, inspections and tests required for the installation.

E. The Owner shall at his expense have the water tap and meter installed.

F. The Landscape Irrigation Contractor shall supply all insurance as required by the Owner.

1.02 COORDINATION: Coordinate irrigation work with other trades on the jobsite, particularly those performing the planting.

1.03 NOTIFICATION: Notify Owner's representative 72 hours in advance of 1) pressure testing of main line and flagging of sprinkler locations; and 2) inspections for subtantial completion and final acceptance.

1.04 STANDARDS:

A. QUALITY ASSURANCE: Perform all work in compliance with applicable requirements of governing authorities. Electrical work shall conform to State of Texas Codes and latest edition of the National Electric Code.

B. APPLICABLE STANDARDS: All Polyvinyl Chloride (PVC) pipe, fittings, and solvent cements for PVC pipe and fittings shall conform to applicable ASTM standards.

2.01 EQUIPMENT MANUFACTURERS: Shall be as noted herein and on the Drawings.

2.02 POLYVINYL CHLORIDE (PVC) PIPE: Shall be permanently marked with the manufacturer's name, pipe size, type of material, SDR number and the NSF seal. All mainline and lateral pipe shall be class 200,except 1/2" which shall be class 315.

2.03 SWING PIPE: As specified on the drawings.

2.04 SWING JOINTS: As specified on the drawings.

2.05 FITTINGS: Shall be PVC suitable for solvent weld, slip joint ring, tight seal or threaded connection.

A. Mains shall have schedule 40 PVC fittings.

B. Lateral lines shall have schedule 40 PVC Type 1 fittings.

2.06 WIRE: From the Controller to the electric valves shall be Type UF with 4/16" plastic insulation, solid copper, UL approved for direct burial when used in National Electrical Code Class II Circuit (30 volts AC, or less) applications. Wire shall sized according the recommendations of the electric valve and controller manufacturer.

2.07 SOLVENT AND CLEANER:

A. Use WELD-ON C-65 pipe cleaner on all pipe joints.

B. Use WELD-ON P-68 or P-70 purple primer on all pressurized pipe joints.

C. Use WELD-ON 795 clear cement on all flexible pipe.

D. Use WELD-ON 705 cement on all other pipe joints.

2.08 EQUIPMENT: As shown on the Drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. The Landscape Irrigation Contractor shall verify existing and proposed locations of all site utilities (including gas, water, electric, telephone, sanitary and storm sewers) prior to pipe installation.

B. Coordinate irrigation work with that of all other site work trades and contractors.

C. Exact location and configuration of islands, walks and roads may vary from that shown on Drawings. Verify revised layout of piping with Owner's representative.

D. Piping and sprinkler layout is shown in SCHEMATIC FORM ONLY. All piping to be installed directly behind curb where possible and in all cases to be routed around existing or proposed trees. Refer to the landscape planting and site drawings for approximate tree locations and closely coordinate work and schedules with other contractors. Do not layout pipe, wire or any irrigation equipment on adjacent properties.

3.02 CONDITION OF SURFACES:

A. The Landscape Irrigation Contractor shall examine the project site and completely familiarize himself with the nature and extent of the work to be accomplished. No extra compensation will be allowed for any work made necessary by unusual conditions or obstacles encountered during the progress of the work, when conditions or obstacles are readily apparent upon a visit to the site.

B. Verify existing surface and subsurface conditions, and final (proposed) finished grades of the areas to be irrigated.

C. Upon completion of irrigation system installation, return the area to a condition equal to or better than its condition prior to installation.

3.03 TRENCHING, PIPE INSTALLATION AND BACKFILLING:

A. GENERAL: Piping shall be generally laid out according to Drawings. In the event of a major piping layout conflict, notify and obtain approval of the Owner's representative prior to trenching. Refer to Drawings for location of water source.

B. Overexcavation shall be backfilled with excavated soil. Do not backfill with excavated soil that contains rock. Remove all unsuitable or excess material from the site.

C. Trenches shall have sides as nearly vertical as possible and bottoms shall be shaped to provide continuous bedding of each section of pipe along its entire length in undisturbed soil or thoroughly compacted fill. When rock is encountered, lay pipe in cushion sand bed surrounding the pipe a minimum of 4" deep. Dewater trenches as required for dry work.

D. PIPE INSTALLATION: Pipe installation includes all irrigation piping required for water and electrical wiring to complete the automatic irrigation system. Provide firm, uniform bearing for entire length of each pipeline to prevent uneven settlement. Wedging or blocking of pipe will not be permitted. Remove foreign matter or dirt from inside of pipe before welding and keep piping clean by approved means during and after laying of pipe.

E. DEPTH OF PIPING; All piping under paving shall be as shown on the drawings and all piping in landscaped areas shall be as shown on the detail sheets.

F. BACKFILL IN LANDSCAPED AREAS: Backfill trenches with material removed during excavation, except where rock is encountered. Do not backfill with excavated soil that contains rock.

G. COMPACTION: Compact and water-settle all excavation to prevent after-settling. Hand rake excavation and adjoining areas to leave grade at the previous elevation and in as good or better condition than before installation.

3.04 PVC PIPE AND FITTING ASSEMBLY

A. SOLVENT: Use only cleaner, primer and solvent specified herein. Thoroughly clean pipe and fittings of dirt, dust and moisture before applying primer and solvent.

B. PVC TO METAL CONNECTIONS: Work metal connections first. Use non-hardening pipe dope (Permatex No. 2) on threaded PVC to metal joints. Use only light wrench pressure.

C. THREADED PVC CONNECTION: Where required, use threaded PVC adapter into which pipe may be welded.

3.05 SPRINKLERS

A. GENERAL: Supply in accordance with the Drawings, with nozzling in accordance with the Drawings. Revise nozzle degree as directed by Landscape Architect for wind conditions.

B. Before installation is started, place a stake or flag where each sprinkler is to be located, in accordance with the Drawings, and as recommended by the Manufacturer. Anticipate planting areas and adjust head layout accordingly. Notify Owner's representative of major changes. Staking shall be approved by Owner's representative before proceeding.

3.06 ELECTRIC VALVES & QUICK COUPLING VALVES: Supply in accordance with the Drawings and sized as shown on the Drawings. Install in a level position, according to the manufacturer's recommendations and the details on the Drawings. The manufacturer's specifications and installation instructions for the valve supplied shall become a part of these specifications. Set all valves adjacent to sidewalks or curbs and within landscape areas, or as otherwise indicated.

3.07 VALVE AND METER BOXES: Sized as specified in the Drawings. set over all electric valves, quick coupling valves, backflow preventer, and wires connections; box cover to be flush with finish grade.

3.08 WIRING:

A. Install electric control wires in the piping trenches wherever possible. Place wire in trench to one side of pipe. Install wire by "snaking" in trench with as much slack as possible to allow for expansion and contraction of the wire. Where it is necessary to run wire in a separate trench, wire shall have a minimum cover of 12 inches.

B. Provide sufficient slack at wire connections at remote control valves, in control boxes, and at all wire splices so that the valve bonnet or splice may be brought to the surface without disconnecting the wires when repair is required.

C. Each remote control valve is to be connected to one station of a controller unless otherwise noted. All remote control valves, which are to be connected to the same controller, shall be connected to a common ground wire system. Only those remote control valves which are being controlled by one specific controller shall be connected to that controller's common ground wire system.

D. All wires shall be tested prior to backfilling to insure continuity from valve location to controller location. Any wire not indicating continuity shall be repaired or replaced immediately.

3.09 ELECTRICAL WIRE CONNECTIONS: Make wire connection to remote control electric valves and splices of wire in the field, using King (or approved equal) water tight connectors as shown on the drawings. Provide tight connections, fully bedded in sealant to prevent leakage of water and build up of corrosion in splice. All wire splices in the ground but not at electric valves shall be in a valve box same as specified for the electric control valves.

3.10 BACKFLOW PREVENTER: Install per manufacturer's recommendations and in conformance with applicable codes. The backflow preventer will be tested and certified by a Texas Certified Backflow Tester.

3.11 CONTROLLER: Install the specified controller or controllers in the location(s) shown on the Drawings. Pull valve wires, connect the controller to 115v power source, program the controller and put controller into operation. If shown on the Drawings, all valve station numbers shall correspond to those shown on the Drawings.

3.12 RAIN SENSOR: Install per manufacturer's recommendations and directions, and in location approved by Owner or as shown on the Drawings. Wire into controller through a by pass switch and calibrate for operation.

3.13 FREEZE SENSOR: Install per manufacturer's recommendations and directions, and in location approved by Owner or as shown on the Drawings. Wire into controller and calibrate for operation.

3.14 MINI-WEATHER STATION: (If shown on plans) Install per manufacturer's recommendations and directions, and in location approved by Owner or as shown on the Drawings. Wire into controller and calibrate for operation.

3.15 TESTING - GENERAL: Water required for testing and adjustment of the irrigation system will be available on site and paid for by the Owner.

3.16 PIPE PRESSURE TEST:

A. The sprinkler main and all piping under paving shall be tested for a period of at least twenty four (24) hours under normal water pressure and proved tight. Upon completion of system sections, all laterals shall be tested under normal operating pressure.

B. If leaks occur, the joint or joints shall be replaced and the test repeated.

C. All tests shall be completed prior to backfilling. However, sufficient backfill material may be placed in trenches between fittings to insure stability of the line under pressure. In all cases, fittings and couplings must be open to visual inspection for the full period of the test.

3.17 FINAL ADJUSTMENT:

A. After installation has been completed, final adjustment shall be made of system.

B. The system shall be completely flushed to remove any and all debris from lines by removing nozzle from all heads on ends of lines and turning on system.

C. All sprinklers and emitters shall be checked for proper operation and proper alignment for direction of throw.

D. Each section of spray heads shall be checked for operating pressure and balanced to all other sections by use of the flow adjustment on top of each valve.

E. All nozzling shall be checked for proper coverage. Prevailing wind conditions or planting area configuration may indicate that arc or angle of spray should be other than as shown on Drawings. In that case, nozzles shall be changed to provide correct coverage at no additional expense to the Owner.

3.18 AS-BUILT DRAWINGS AND SUBMITTALS:

A. Provide "as-built" MYLAR REPRODUCIBLE record drawings sheet.

B. The drawings shall indicate all changes in line, sprinkler head and valve locations as well as material substitutions and changes in line sizes. The "as-built" drawings shall have the Landscape Irrigation Contractor's Texas Landscape Irrigation seal on each sheet.

3.19 CLEAN UP:

A. Clean the site daily of trash and debris resulting from construction operations. All walks, roads and circulation routes shall be kept clean and free from debris, material and equipment.

B. Upon completion of the work covered by this section, clean up all work areas by removing spoil piles, surplus material and equipment from the site. The ground surface shall be restored to its original condition.

3.20 INSPECTIONS:

A. Progress inspections will be made at regular intervals during the execution of the work on the project.

B. A final inspection to determine acceptance of the irrigation system shall be made at the request of the Landscape Irrigation Contractor. The irrigation system will be reviewed for acceptance provided all requirements have been complied with and the system is in full working order.

3.21 MAINTENANCE/WARRANTY PERIOD:

A. The Landscape Irrigation Contractor shall provide a one year warranty on all equipment, installation, labor and operation defects for one year after approval of the Installation by the Owner or Owner's representative. Repairs, adjustments and replacement of defective irrigation system materials, including materials that have been installed on the work during the warranty period, shall be at a the Landscape Irrigation Contractor's expense. All warranties shall commence with the date of final acceptance.

B. As deficiencies become apparent, the Landscape Irrigation Contractor shall provide maintenance of the system, including at least the following: Replace or repair defective components and leaks; raise or lower heads to compensate for settling of lawn areas and planting beds; clean and adjust sprinklers and nozzles.

C. The Landscape Irrigation Contractor shall guarantee the backfilling of irrigation system excavations for one year after acceptance of the work. If, at any time during the one-year period, trenches should settle, the Landscape Irrigation Contractor shall return and repair any settling at no expense to the Owner.

D. Backfilling around heads shall be guaranteed. If, at any time during the warranty period, heads become loose in the soil, the Landscape Irrigation Contractor shall return and re-tamp around any loose heads and use additional fill, if required, at no expense to the Owner.

3.22 TEMPORARY REPAIR: The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system equipment in operating condition. The exercise of this right of the Owner shall not relieve the Landscape Irrigation Contractor of his responsibility under the terms of the guarantee as herein specified.

3.23 OTHER PROVISIONS: Maintenance/warranty period as above described does not include alterations necessitated by re-landscaping, addition of trees, re-grading, or the addition of and changes in walks, walls, driveways, or the like. Further, maintenance does not include trimming grass around sprinklers or any service required due to lack of the Owner's maintenance of lawns and plants. It is also expressly understood that warranty and maintenance do not cover any mechanical damage (breakage) or any repairs or service needed for causes beyond the control of the Landscape Irrigation Contractor.

3.24 PUBLIC PROTECTION DURING CONSTRUCTION: At all times the Contractor shall protect the public from any accidents caused by his construction. The Contractor shall barricade and cover all holes, ditches, and any other item that poses a threat to public safety. The Owners representative shall determine the type of barricades and types of covers to be used by the Contractor.

END OF LANDSCAPE IRRIGATION SYSTEM SPECIFICATIONS

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NO.	REVISIONS	DATE

DESIGNED:	DRAWN:	CHECKED:	DATE:
MJB	MJB	MJB	03/19/03

IRRIGATION SPECIFICATIONS

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STATE OF TEXAS
Michael J. Bardis
691
LICENSED IRRIGATOR

BHB PROJECT NO:
2000.015.000

SHEET NO:
LD-5 of 5L