PART 1 — GENERAL

DESCRIPTION

FURNISH ALL MATERIALS, LABOR, EQUIPMENT, TOOLS, AND TRANSPORTATION, UNLESS OTHERWISE SPECIFIED, NECESSARY TO PROVIDE AN AUTOMATIC IRRIGATION SYSTEM FOR LANDSCAPE PLANT MATERIALS AND TURF AND MULCH AREAS.

APPLICABLE STANDARDS

AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS S376.1, "DESIGN, INSTALLATION AND PERFORMANCE OF UNDERGROUND, THERMOPLASTIC IRRIGATION PIPELINES."

ASTM D2774, "UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING."

ASTM D1785, POLY (VINYL CHLORIDE) (PVC) PLASTIC PIPE, SCHEDULES 40, 80, AND 120.

ASTM D2241 POLY (VINYL CHLORIDE) (PVC) PLASTIC PIPE (SDR-PR).

SUBSTITUTIONS

WHEREVER BRAND NAMES ARE USED IN THESE SPECIFICATIONS, USE ONLY THE BRAND SPECIFIED. MAKE NO SUBSTITUTIONS AS A PART OF THIS BID PACKAGE.

PART 2 — MATERIALS

PIPE

FURNISH ALL UNDERGROUND PIPING AS PVC EXCEPT FOR ANY FLEXIBLE POLYETHYLENE (POLY PIPE) PIPING THAT IS TO BE USED BETWEEN THE LATERALS AND SPRINKLER HEADS. ALL PVC PIPE SHALL BE CL 200 PIPE OR BETTER.

SIZE EACH SLEEVE AT LEAST TWICE (2X) THE SIZE OF THE PIPE BEING ROUTED THROUGH IT. INSTALL EACH CONTROL WIRE SLEEVE OF SUFFICIENT SIZE FOR THE REQUIRED NUMBER OF WIRES BEING ROUTED THROUGH IT UNDER THE AREA SPECIFIED. CONSULT WITH THE OWNER OR OWNER'S REPRESENTATIVE FOR THE LOCATION, DEPTH, NUMBER AND SIZE OF ANY AVAILABLE EXISTING SLEEVES.

INSTALL ANY ABOVE GROUND PIPE AS GALVANIZED PIPE.

PIPE FITTINGS

FOR MAIN LINE PVC PIPE FITTINGS, USE PVC SCH. 40 FITTINGS AND USE THREADED FITTINGS FOR CONNECTION TO VALVES.

FOR PVC ZONE PIPE, USE SCHEDULE 40, SOLVENT WELD FITTINGS, MANUFACTURED FROM PVC 12454-B COMPOUND AND TESTED IN ACCORDANCE WITH ASTM D2466, EXCEPT FOR THREADED FITTINGS. FOR THREADED APPLICATIONS, USE SCHEDULE 80 FITTINGS MANUFACTURED FROM PVC 12454- B COMPOUND AND TESTED IN ACCORDANCE WITH ASTM D2467.

CONNECT ALL "POLY PIPE" AND RISER ASSEMBLIES TO THE IRRIGATION PIPELINE WITH A SCHEDULE 80 TEE, AS DESCRIBED ABOVE.

DO NOT USE MALE ADAPTERS FOR ANY APPLICATIONS. INSTEAD, USE A "TOE" NIPPLE GLUED INTO A SCHEDULE 40 COUPLER.

SEE DETAILS FOR SPRINKLER TO PIPE CONNECTIONS. NO "FLEX PVC" IS ALLOWED.

SOLVENT CEMENT AND PRIMER

USE A MEDIUM OR HEAVY BODY GRAY SOLVENT CEMENT MANUFACTURED IN ACCORDANCE WITH ASTM D2564 AND PRIMER MANUFACTURED IN ACCORDANCE WITH ASTM F656.

VALVE BOXES

USE 12 X 18 VALVE BOXES FOR ALL APPLICATIONS.

ELECTRIC VALVES

USE HUNTER ELECTRIC VALVES WITH PRESSURE REGULATORS FOR ALL APPLICATIONS.

CONTROLLER

USE A HUNTER I-CORE 12 STATION CONTROLLER PER LEGEND WITH A WIRELESS SOLAR SYNC SENSOR FOR THIS SYSTEM.

WIRE

USE U.L. U.F. WIRE APPROVED FOR DIRECT BURIAL UNDERGROUND FOR ALL 24 VAC APPLICATIONS.

USE RED #14 AWG WIRE FOR ALL VALVE POWER WIRES.

USE WHITE #14 AWG WIRE FOR ALL VALVE COMMON WIRES.

PART 3 — EXECUTION

A. GENERAL

INSTALL PVC PIPE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. REVIEW CONSTRUCTION PLANS WITH THE OWNER OR OWNER'S REPRESENTATIVE BEFORE ANY WORK BEGINS. THE CONTRACTOR SHALL CONTACT THE LANDSCAPE ARCHITECT/OWNER PRIOR TO INSTALLATION IF THERE IS ANY DOUBT AS TO HEAD LINE OR ZONE PLACEMENT.

INSPECT THE CONSTRUCTION SITE BEFORE ANY WORK BEGINS AND FLAG LOCATIONS OF MAINLINE PIPE, SLEEVES, HEADS AND VALVES FOR REVIEW BY THE LANDSCAPE ARCHITECT/OWNER. FLAGS SHALL BE CLEARLY MARKED OR COLORED TO DESIGNATE THE TYPE OF EQUIPMENT TO BE INSTALLED AT THAT POINT. INSTALLATION SHALL NOT COMMENCE UNTIL THE STAKING/ FLAGGING HAS BEEN APPROVED.

COORDINATE THE INSTALLATION OF THE IRRIGATION SYSTEM WITH THE LANDSCAPE CONTRACTOR TO PROVIDE FOR CORRECT APPLICATION OF WATER TO THE PLANT MATERIAL.

PIPE TRENCH CONSTRUCTION

PROVIDE FOR A MINIMUM DEPTH OF COVER OF 18" FOR ALL MAIN LINE PIPE AND 12" OF COVER FOR ALL ZONE PIPE AS MEASURED FROM FINISHED GRADE.

PROVIDE THE MINIMUM DEPTH OF COVER, AS SPECIFIED ABOVE, OVER THE TOP OF THE PIPE BEFORE THE TRENCH IS WHEEL-LOADED.

BACK FILL

PROVIDE INITIAL BACK FILL MATERIAL THAT IS FINE-GRAINED MATERIAL FREE FROM COMPACTED EARTH GREATER THAN TWO INCHES IN DIAMETER, ROCKS, OR STONES.

TAMP THE BACK FILL IN LAYERS NOT TO EXCEED SIX INCHES. LIFT AND COMPACT FIRMLY AROUND THE PIPE AND UP TO AT LEAST SIX INCHES ABOVE THE TOP OF THE PIPE. SUFFICIENTLY MOISTEN THE BACK FILL TO PERMIT THOROUGH COMPACTION UNDER AND ON EACH SIDE OF THE PIPE TO PROVIDE SUPPORT FREE FROM VOIDS. AVOID DEFORMING, DISPLACING, OR DAMAGING PIPE DURING THIS PHASE OF THE OPERATION. ASSURE THAT WHEN FINISHED, THE SOIL COMPACTION EQUALS THE ORIGINAL CONDITION.

FITTING AND PIPE CONNECTIONS

SQUARE CUT, CLEAN AND PRIME ALL JOINTS BEFORE CEMENTING.

FULLY ENGAGE ALL JOINTS WHILE CEMENTING.

PVC FITTINGS — MAKE ALL SOLVENT WELD JOINTS IN ACCORDANCE WITH ASTM D2855. PRIME ALL FITTINGS WITH PURPLE PRIMER BEFORE MAKING SOLVENT WELD CONNECTIONS. ALLOW SOLVENT WELDED JOINTS AT LEAST ONE (1) HOUR TO SET UP BEFORE MOVING OR HANDLING. DO NOT PERMIT WATER IN THE PIPE FOR AT LEAST TWENTY-FOUR HOURS AFTER MAKING A SOLVENT WELD ON THAT PIPE UNLESS RECOMMENDED OTHERWISE BY THE SOLVENT CEMENT MANUFACTURER. SEAL ALL THREADED PVC FITTINGS WITH LIQUID TEFLON EXCEPT SPRINKLER HEADS, ELECTRIC VALVE CONNECTIONS AND SWING JOINTS. INSTALL ALL OF THESE EXCEPTIONS USING ONE INCH TEFLON TAPE.

FLUSHING PIPELINES

FLUSH ALL PIPELINES BEFORE SPRINKLERS ARE INSTALLED. MAINTAIN A MINIMUM PIPE VELOCITY OF THREE FEET PER SECOND AND FLUSH FOR A MINIMUM TIME OF:

$T = 2L/3$ WHERE T = TIME IN SECONDS
& L = PIPE LENGTH IN FEET FROM INLET POINT TO MOST DISTANT POINT IN PIPELINE.

INSTALLING ELECTRIC VALVE CONTROL WIRING

INSTALL WIRING IN THE SAME TRENCH AND ALONG THE SAME ROUTE AS, AND UNDERNEATH THE MAIN LINE EXCEPT IN LOCATIONS WHERE THE WIRE WILL PASS UNDER PAVING. AT THOSE LOCATIONS INSTALL THE WIRE INSIDE OF A PVC SLEEVE. INSTALL CONTROL WIRING THROUGH WALLS, FLOORS, AND SLABS IN PVC SLEEVES. INSTALL (2) EXTRA WIRES POWER FROM EACH CONTROLLER TO THE FARTHEST VALVE IN EACH DIRECTION OPERATED BY THAT CONTROLLER.

TAPE WIRING TOGETHER AT INTERVALS OF TEN FEET, USING 1/4 INCH FIBER REINFORCED TAPE.

USE A CONTINUOUS WIRE BETWEEN THE CONTROLLER AND VALVE. MAKE AN EXPANSION LOOP OF A MINIMUM 12 INCHES DIAMETER AT EACH WIRE CONNECTION. PROVIDE EXPANSION COILS OF WIRE AT NO MORE THAN 100 FOOT INTERVALS AND AT EACH DIRECTION CHANGE IN THE WIRE ROUTING.

ATTACH PERMANENT MARKINGS AT EACH END OF EACH WIRE TO IDENTIFY IT BY VALVE NUMBER. (CHRISTIE I.D. TAGS OR EQUAL)

PROVIDE A SEPARATE POWER WIRE FOR EACH CONTROL VALVE.

AUTOMATIC CONTROLLER INSTALLATION

LOCATION — VERIFY LOCATION WITH OWNER OR OWNER'S REPRESENTATIVE BEFORE INSTALLATION.

VERIFY THAT SUFFICIENT SLEEVING EXISTS TO ALLOW ROUTING OF THE VALVE WIRING FROM THE CONTROLLER TO EACH VALVE.

VALVE INSTALLATION

INSTALL ALL AUTOMATIC ZONE VALVES AND GATE VALVES IN VALVE BOXES. NUMBER EACH ZONE VALVE BOX ON THE UNDERSIDE AND TOPSIDE OF EACH VALVE BOX COVER WITH BLACK WATERPROOF MARKER FOR REFERENCE.

INSTALL ANY MAIN LINE ISOLATION VALVES AND QUICK COUPLING VALVES IN VALVE BOXES.

INSTALLATION OF SPRAY HEADS

INSTALLATION SCHEDULE — INSTALL SPRAY HEADS AFTER THE SPRINKLER BODY ASSEMBLIES HAVE BEEN CLEANLY FLUSHED.

ORIENTATION — INSTALL POP-UP UNITS IN A PLUMB POSITION AND FIELD ADJUST SPRINKLER HEADS TO OBTAIN COMPLETE COVERAGE OF IRRIGATED AREA WITH MINIMUM OVER SPRAY ONTO PAVED SURFACES. HEADS ARE TO BE LOCATED ON A MAXIMUM SPACING OF 55% OF THE SPRINKLER COVERAGE DISTANCE AND CLOSER WHERE INDICATED. ADJUST NOZZLE DISTANCE AS NEEDED TO COVER PLANT MATERIALS AND MINIMIZE OVER SPRAY ON STRUCTURES AND PAVEMENT. ALIGN POP-UP SPRAY HEADS IN A VERTICAL ORIENTATION AS SHOWN IN THE DETAILS. ADJUST AS NECESSARY TO PROVIDE THE BEST COVERAGE IN SLOPED AREAS.

TESTING

PRESSURE TEST THE SYSTEM MAIN LINE BEFORE APPRECIABLY BACKFILLING.

PRESSURE TEST THE SYSTEM MAIN LINE, IN THE PRESENCE OF THE OWNER OR OWNER'S REPRESENTATIVE, FOR A PERIOD OF NO LESS THAN FOUR HOURS, CONTINUOUSLY, AT A PRESSURE OF NO LESS THAN 100 PSI WITH NO LEAKS AND ASSURE THAT ANY TESTS OF THE SYSTEM MAIN LINE MEET THE APPLICABLE COUNTY PLUMBING CODES. IF LEAKAGE OCCURS, REMEDY THE LEAKAGE PROBLEM AND RETEST. REPEAT THIS PROCESS AS MANY TIMES AS NECESSSARY UNTIL A SUCCESSFUL TEST IS PERFORMED.

INSPECTIONS

THE FOLLOWING INSPECTIONS ARE REQUIRED. NOTIFY OWNER OR OWNER'S REPRESENTATIVE IN ADVANCE THAT EACH ITEM IS READY FOR INSPECTION AS INDICATED BELOW:

INSPECTION OF FLAGGED UNDERGROUND MAINLINE PIPING, SLEEVES, SPRINKLER AND VALVE LOCATIONS PRIOR TO BEGINNING CONSTRUCTION — NOTIFY 48 HOURS IN ADVANCE.

SPRINKLER COVERAGE TEST — NOTIFY 48 HOURS IN ADVANCE.

FINAL INSPECTION — NOTIFY 48 HOURS IN ADVANCE.

TESTING

COVERAGE TESTS — CONDUCT SPRINKLER COVERAGE TESTS UNDER NORMAL OPERATING PRESSURE CONDITIONS BEFORE ANY GROUND COVER OR TURF IS PLANTED. CORRECT AND FIELD ADJUST SPRINKLER ORIENTATION TO PROVIDE UNIFORM PRECIPITATION OVER THE IRRIGATED AREA AND MINIMIZE OVER SPRAY ONTO PAVED SURFACES AND BUILDINGS.

WARRANTY

THE CONTRACTOR SHALL ISSUE TO THE OWNER OR OWNER'S REPRESENTATIVE A CERTIFICATE OF WARRANTY OF THE IRRIGATION SYSTEM FOR A PERIOD OF NOT LESS THAN ONE YEAR ON ALL SPRINKLERS, VALVES, THE CONTROLLER, AND HIS LABOR.

DRAWING OF RECORD

THE CONTRACTOR SHALL SUPPLY TO THE OWNER A DRAFTED, SCALED, REPRODUCIBLE PLAN SHOWING ALL CHANGES MADE TO THE EXISTING IRRIGATION SYSTEM AND ALL NEWLY INSTALLED COMPONENTS INCLUDING ALL SPRINKLERS, INCLUDING BODY TYPES AND NOZZLES, PIPE, INCLUDING SIZES AND THE ENDS OF SLEEVING LOCATIONS AS MEASURED FROM AT LEAST TWO FIXED OBJECTS, CONTROLLER, AND WIRE ROUTING. THIS PLAN MAY BE AN ADAPTATION OF THE IRRIGATION DESIGN WITH ANY CHANGES DRAFTED ON THIS PLAN. THE DRAWING SHALL ALSO PROVIDE A MINIMUM OF TWO (2) DIMENSIONS TAKEN FROM FIXED OBJECTS TO EACH AUTOMATIC VALVE AND MANUAL CONTROL VALVE.

ADDITIONAL SUBMITTALS

SUPPLY TO THE OWNER ALL INSTRUCTION SHEETS AND PARTS LISTS COVERING ALL OPERATING AND ELECTRICAL-RELATED EQUIPMENT, BOUND IN ONE FOLDER. FURNISH THE OWNER WITH ANY KEYS FOR LOCKABLE ITEMS ON THIS SYSTEM.

RAIN GAUGE

ASSURE THAT EACH CONTROLLER IS INTERFACED WITH A RAIN SWITCH WHICH WILL SHUT THE SYSTEM OFF IN CASE OF RAIN OR FREEZING WEATHER.

MISCELLANEOUS

ANY IRRIGATION ITEMS NORMALLY INSTALLED IN LANDSCAPE AREAS THAT ARE SHOWN OUTSIDE OF LANDSCAPE AREAS OR OUTSIDE OF THE PROPERTY LINES ARE SHOWN AS SUCH FOR GRAPHIC CLARITY ONLY. INSTALL THESE ITEMS INSIDE OF PROPERTY LINES AND IN LANDSCAPE AREAS. CONTACT THE OWNER OR LANDSCAPE ARCHITECT PRIOR TO INSTALLATION IF IN ANY DOUBT OF HEAD, LINE OR ZONE PLACEMENT.

ASSURE THAT THE SYSTEM PROVIDES 100% COVERAGE OF ALL LANDSCAPED AREAS. REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT BEFORE COMMENCING WITH THE INSTALLATION.

ALL APPLICABLE CODES SHALL TAKE PRECEDENCE OVER THESE PLANS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE CODES.

THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO MAKE MINOR FIELD CHANGES.

FIELD ADJUST NOZZLE SELECTION LOCATIONS AND PLUMB OF SPRINKLERS AND SPACING OF DRIP TUBING TO PROVIDE PROPER COVERAGE.

IF THERE ARE ANY CONFLICTS BETWEEN THESE SPECIFICATIONS AND THE CPH SPECIFICATIONS, THE CPH SPECIFICATIONS SHALL TAKE PRECEDENCE.

1 / IR-4 IRRIGATION SPECIFICATIONS
NOTES

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Designed by:	RES/MDS
Drawn by:	YRD
Checked by:	MDS
Approved by:	MDS
Scale:	1" = 20'
Date:	10/03/17
Job No.:	U1207

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IRRIGATION SPECOFICATIONS

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