

PART 1 GENERAL

1.01 GENERAL

- A. The underground sprinkler irrigation system shall be constructed using the sprinkler heads, valves, piping, fittings, existing controller, wiring, etc. of sizes and types as shown on the Drawings and as called for in these Specifications. The system shall be constructed to grades and conform to areas and locations as shown on the Drawings.
- B. The term "Contractor" as used in this Specification section shall refer to the Underground Sprinkler System Contractor.
- C. Prior to final acceptance of the Irrigation System, the Contractor shall cooperate with the Landscape Contractor in providing the Owner's Representative with a written "watering schedule" to ensure adequate watering of all plant materials during the Guarantee Period of this Contract.
- D. Prior to beginning construction, the Contractor and Landscape Architect shall meet on site to document the working order of the existing irrigation system. The Contractor must provide twenty-four (24) hours written notice to the Landscape Architect prior to the meeting on site.
- E. The Contractor shall coordinate existing underground sprinkler irrigation with new irrigation. Repair all damage to existing irrigation system caused by construction, and return existing irrigation system to a fully operational pre-construction condition at no additional cost to Owner. Portions of existing irrigation system shall be abandoned (capped) where required by new construction. Existing irrigation "As-Built" Drawings are available from Owner.
- F. The Contractor shall be responsible for watering existing grass lawn areas outside limit of work within park boundary during construction.

1.02 SCOPE OF WORK

- A. Furnish and install a complete underground sprinkler irrigation system to provide efficient and even irrigation (WITH MINIMUM OVERSPRAY ONTO SIGNS, PAVED OR NON-PLANTED AREAS AND NO OVERSPRAY ONTO BUILDINGS) of all planting areas shown on the Drawings and as specified in the Specifications, complete and ready for operation. The work included in this Specification (whether mentioned or not) shall consist of all labor, tools, materials, tests, permits and other related items necessary for the installation and operation of the irrigation system.
- B. Irrigation equipment shall be coordinated with utility location to avoid overspray onto or spray blockage from above grade utilities, such as electric transformers, light standards, etc.
- C. Any item of labor, material or equipment not specified or shown in detail, but incidental to or necessary for the complete installation and proper operation of the system, shall be furnished by the Contractor without additional cost to the Owner.
- D. All sleeving required for the execution of the work is to be provided under this Section.

1.03 RELATED WORK DESCRIBED ELSEWHERE

A. Related work in other sections of these Specifications includes but is not limited to:

1. Landscaping
2. Grading, Embankment, and Backfill
3. Demolition

#### 1.04 QUALIFICATIONS OF INSTALLER

A. Contractor must be a bonded sprinkler irrigation contractor. The sprinkler irrigation system must be installed by an experienced sprinkler irrigation mechanic or journeyman plumber. All electrical service connection work must be done by a licensed Electrical Contractor.

#### 1.05 VERIFICATION

- A. Before proceeding with any work, the Contractor shall inspect the site, carefully check all grades and verify all dimensions and conditions affecting the work in order to proceed safely.
- B. Contractor shall report to the Landscape Architect all deviation and/or conflicts between Drawings, Specifications and site conditions. Extra work arising from failure to do so shall be done at the Contractor's expense.
- C. Prior to the start of any work, the Contractor shall verify available static water pressure (PSI) and gallons per minute (GPM) at point of connection to water service. Any replacement, relocation or additional materials required as a failure to check (PSI) and (GPM) shall be done at the Contractor's expense.

#### 1.06 CHANGE ORDERS AND SUBSTITUTIONS

- A. The Contractor shall do no work for extra compensation without prior written approval of the Owner's Representative in the form of a Change Order.
- B. The intent of the Drawings and Specifications is to provide a totally integrated irrigation system. Substitutions will be accepted only if they are proven to be wholly compatible with this system. If standardization of products is requested by the Owner's Representative, NO SUBSTITUTIONS will be permitted.

#### 1.07 PERMITS, CODES AND REGULATIONS

- A. The Contractor shall apply for and pay for all necessary permits and fees as required by Local Authority and prevailing ordinances and/or codes.
- B. The Contractor shall keep fully informed and shall comply with all existing laws, codes, ordinances, and regulations which in any way affect the conduct of the work.

#### 1.08 INTERPRETATION OF DRAWINGS

- A. Irrigation Drawing is diagrammatic and is not intended to show exact location of piping, or valves. Locate these items as closely as possible or as per related details to curbs, headerboards, fences or edges of paving. Where possible, locate mainline and valves inside property line.
- B. Pipe lines shown parallel on Drawings may be placed in a common trench. Sprinkler heads are shown accurately and shall be installed as indicated by center of symbol.

- C. Trenching that may potentially disturb root systems of existing trees is to be brought to the attention of the Landscape Architect before proceeding.

1.09 PROTECTION OF WORK, PROPERTY AND PERSONS

- A. Take all necessary precautions to protect work in progress, all property, persons, utilities, walks, curbs, pavement and buildings from any damage that might be incurred arising from this Contract. Repair to the satisfaction of the Owner's Representative, at Contractor's expense, any damage to the above and existing landscape.

1.10 CONDUCT OF WORK

- A. The Contractor shall continuously maintain a competent superintendent or foreman during progress of the work, with the authority to act in all matters pertaining to the work. The Contractor shall give personal attention to the fulfillment of the contract and shall keep the work under control.
- B. The Contractor shall confine operations to the working areas allotted by the Owner's Representative, including material and equipment storage.
- C. The Contractor shall progressively clean the work site of debris and rubbish as the work proceeds.
- D. The Contractor shall repair to the satisfaction of the Owner's Representative any damage to existing utilities. Existing known utilities have been shown on the Architectural/Engineering and Survey Drawings and will be made available from the Owner's Representative or Utility Companies. It will be the Contractor's responsibility to verify these locations on the ground with a pipe-finder or by other means. The Contractor shall be responsible for the protection of existing known utilities. Should the ditching intercept and damage any existing utilities, all further work within said area shall stop until the Owner's Representative is advised and the Owner's Representative can review a repair method and schedule.
- E. The Contractor shall be responsible for the provisions of barricades and safety guards, and any other structures or improvements necessary for the complete protection of the public.
- F. Any of the Owner's property, including existing buildings, equipment, piping, pipe covering, sewers, sidewalks, landscaping, etc., damaged by Contractor shall be replaced or repaired by Contractor in a manner satisfactory to the Owner's Representative at the Contractor's expense before Final Payment is made.
- G. Contractor is responsible for all damages to the grounds, walks, roads, buildings, piping systems, electrical systems and their equipment and contents caused by leaks in the piping systems being installed or having been installed by him. The Contractor shall repair all damages at his expense and in a manner satisfactory to the Owner's Representative at the Contractor's expense before Final Payment is made.

1.11 SYSTEM PROTECTION

- A. As a part of the guarantee under this contract, the Contractor shall be responsible for the deactivating and draining of the system prior to the onset of the freezing season and for reactivating the system at the onset of the spring growing season; each task must be accomplished once during the one (1) year guarantee. In the event the system is completed in a season when the system will not be in use, the Contractor will winterize the system upon completion of testing (and approval by the Landscape Architect) and reactivate the system in the

spring. The Contractor shall, upon completion of the winterizing phase, submit a letter to the Owner's Representative and the Landscape Architect certifying that the system was winterized and drained and indicate the date that such action was accomplished. The Contractor shall be liable for any damage resulting from failure to comply. The Contractor shall notify both the Owner's Representative and the Landscape Architect twenty-four (24) hours prior to the work so that a Landscape Architect can be present during the winterizing and reactivating phases of work.

#### 1.12 GUARANTEE

- A. The system shall be guaranteed for all workmanship and material for a period of one (1) year from the date of acceptance of the system. Repair and/or replace defective irrigation equipment as determined by the Owner's Representative for the duration of the guarantee period. Repairs and/or replacements shall be made in the same manner as specified for the original irrigation system and shall be done at no cost to the Owner.
- B. It is expressly understood the Owner will be responsible during the Guarantee Period for normal maintenance of the project, as defined in the Contractor's Operation and Maintenance Manual and Watering Schedule Submittals.

#### 1.13 TESTS

- A. Where indicated on the Drawings and/or as specified in the Specifications, tests are to be witnessed by the Landscape Architect. The Contractor shall give advance notice of twenty-four (24) hours in writing to the Landscape Architect before proceeding with tests.
  - 1. Pressure Test: All system joints, connections, couplings, valves and all other junction points shall be left exposed until completion and acceptance of the pressure test. All leaks, however minor, shall be repaired and corrected. The Landscape Architect shall be present during the test. The total sprinkler irrigation system shall be pressure tested for acceptance.
  - 2. Performance Coverage Tests: Upon completion of the system installation and after the flushing and pressure tests are completed, the Contractor shall operate the system in the presence of the Landscape Architect. The automatic system shall be cycled to the satisfaction of the Landscape Architect. The Landscape Architect may request that up to five (5) percent of the total nozzles and five (5) percent of the heads may also be relocated at no extra cost to the Owner.
- B. The Contractor shall PRE-TEST for Pressure and Performance Coverage prior to the Landscape Architect's review of said tests to confirm that the sprinkler irrigation system will meet the requirements of the specified tests. SHOULD ADDITIONAL TEST REVIEWS BE REQUIRED DUE TO THE FAILURE OF THE CONTRACTOR TO PERFORM SAID TESTS, THE CONTRACTOR SHALL PAY TO THE LANDSCAPE ARCHITECT THE SUM OF NINETY-FOUR DOLLARS (\$94.00) PER HOUR AND ACTUAL COST OF EXPENSES FOR EACH ADDITIONAL TEST.

#### 1.14 SUBMITTALS

- A. Contractor shall submit four (4) sets of samples and/or manufacturer's "Catalog Cuts" of all material as noted in Specifications. Failure to do so may result in non-acceptance of materials already used or hauled to the site. Any removal or delays incurred will be at the expense of the Contractor. All samples submitted for approval must be unaltered and of quantity sufficient to allow for proper inspection and review.

- B. Contractor shall submit such items as: As-Built Drawings; Keys; Tools; Permits; Water Schedule; Instructions; Maintenance/Operation Manuals; etc.; as required per these Specifications.

#### 1.15 AS BUILT DRAWINGS

- A. The Contractor shall maintain a current record of all pipe, head and other equipment placement and shall record any variations of the original Drawings approved by the Landscape Architect. Upon completion of the irrigation system and prior to release of the final payment, the Contractor shall provide the Landscape Architect with a neat and legible reproducible Mylar "As Built Drawing(s)" of the complete irrigation system. Any pipe not installed in accordance with the Drawings, as originally contracted, shall be dimensioned to a permanent structure sufficient for location after burial.

#### 1.16 PIPE SLEEVES

- A. Provided and installed by the Contractor as shown on the Drawings and as specified in these Specifications. CONTRACTOR SHALL COORDINATE LOCATION AND INSTALLATION OF PIPE SLEEVING WITH GENERAL CONTRACTOR PRIOR TO PAVING OPERATIONS.

### PART 2 PRODUCTS

#### 2.01 GENERAL

- A. All materials and equipment shall be new and of the best quality. All items of equipment or material shall be as specified or approved equal.

#### 2.02 PLASTIC PIPE

- A. PVC pipe upstream of the control valves shall be Schedule 80 and conform to all requirements of ASTM D2241.
- B. PVC pipe (zone lines) downstream of the control valves shall be Schedule 40 (pressure rated for 200 psi), and conform to all requirements of ASTM D1784 and D1785.
- C. PVC Pipe sleeving shall be Schedule 40 and conform to all requirements of ASTM D1784 and D1785 unless otherwise noted on the Drawings.
- D. All pipe shall be marked with manufacturer's name, class of pipe and NSF seal. Pipe shall bear no evidence of interior or exterior extrusion marks. Pipe walls shall be uniform, smooth and glossy. Pipe may be pre-belled or with individual solvent-weld couplings.
- E. All fittings for lateral lines shall conform to the requirements of ASTM D2466 SCHEDULE 40 PVC with exception to steam rotor head riser assembly nipples which shall be ASTM D2464 SCHEDULE 80 PVC. All lateral line fittings shall be of the solvent weld type except where risers, valves, etc. require threaded transition fittings.
- F. All threaded fittings for mainlines shall conform to requirements of ASTM D2464, SCHEDULE 80 PVC. All glued fittings for mainlines shall conform to the requirements of ASTM D2466, Schedule 40 PVC.
- G. All pipe must be delivered in at least twenty (20) foot lengths.

H. All PVC pipe and fittings shall conform to the following minimums:

- |                                   |                |
|-----------------------------------|----------------|
| 1. Tensile strength 78F           | 5,000 psi      |
| 2. Izod impact strength (notched) | 15 ft. lb./in. |
| 3. Modulus of elasticity          | 300,000 psi    |
| 4. Compressive strength           | 8,500 psi      |
| 5. Flexural strength              | 10,000 psi     |

#### 2.03 SPRINKLER HEADS

A. Shall be of the type, manufacturer and size shown on the Drawings or approved equal.

#### 2.04 AUTOMATIC VALVE/REMOTE CONTROL VALVES

A. Shall be of the type, manufacturer and size shown on the Drawings or approved equal.

#### 2.05 CONTROL WIRE FOR AUTOMATIC VALVE OPERATIONS

- A. Control wire must be insulated single strand copper designed for twenty (20) to fifty (50) volts and UL approved as Type U.F. (Underground Feeder).
- B. Copper conductor must meet or exceed ASTM B-3 requirements.
- C. Red and white colors shall be available for common and lead-in wires.
- D. Yellow color shall be provided for spare wires (if spare wire(s) are existing).

#### 2.06 QUICK COUPLING VALVES

- A. Shall be of type, manufacturer and size shown on the Drawings. ONE (1) INCH VALVE AND SWING JOINT SHALL BE USED AT "AIR-BLOW" CONNECTION TO REDUCE AIR FRICTION.
- B. Provide two (2) matching valve keys, two (2) cap keys and two (2) hose swivels as shown on the Drawings or approved equal.

#### 2.07 MANUAL GATE VALVES

A. Shall be of the type, manufacturer and size shown on the Drawings or approved equal.

#### 2.08 MANUAL DRAIN VALVE

A. Shall be of the type, manufacturer and size shown on the Drawings or approved equal. AUTOMATIC DRAIN VALVES WILL NOT BE ACCEPTED.

#### 2.09 VALVE BOXES

- A. Unless otherwise specified, all automatic valves and manual gate valves shall be enclosed in Carson Industries with locking lid or approved equal.
- B. Manual drain valves shall be enclosed in a two (2) inch PVC pipe and covered with a Weathermatic 906L locking cap and PVC pipe or approved equal.

- C. Provide two (2) lid keys and two (2) valve keys per Valve Box type to Owner's Representative.
- D. Size valve boxes as required to provide approximately three (3) inches clear between valve box and valve on all sides. Provide and install valve box extensions as required.

#### 2.10 PRESSURE-REDUCING VALVE

- A. Shall be of the type, manufacturer and size shown on the Drawings.

#### 2.11 BACKFILL MATERIALS

- A. Sump Gravel (for use under valve boxes only):
  - 1. Three-quarter (3/4) minus round, water worn, washed pea gravel.
- B. Sand (backfill soils around PVC pipe within ballfield areas):
  - 1. Fine granular material naturally produced by rock disintegration and free from organic material, loam, clay and other deleterious substances.
- C. Native Material (backfill soil around PVC pipe – non-ballfield areas):
  - 1. Soil native to project site free of wood and other deleterious materials and rocks over one (1) inch diameter.

#### 2.12 OTHER SUPPLIES

- A. Electrical tape shall be black plastic, three-quarters (3/4) inch wide and a minimum of 0.007 inches thick and the all-weather type.
- B. All flexible nipples or pipe joints shall be "Toro Funny Pipe"; "Rainbird Swing Pipe"; "Triple Swing Joint Assembly" or approved equal.
- C. All electrical wire splices must be made watertight with sealing 3M Direct Burial Splice Kit or approved equal.
- D. Thrust blocking shall be on three (3) inch and larger mainline only.

### PART 3 EXECUTION

#### 3.01 TRENCHING

- A. Trenches shall allow for twelve (12) inches of cover over sprinkler lines, eighteen (18) inches of cover for irrigation main lines and twenty-four (24) inches of cover for main supply line from point of connection to backflow preventer unless otherwise noted on Drawings. Maintain a minimum clearance of three (3) inches between irrigation lines within a common trench. Trenches for sleeves shall allow for a minimum of eighteen (18) inches of cover unless otherwise noted on the Drawings. Excavate no wider at any point than is necessary to lay pipe or install equipment. Excavate with vertical sides and provide bracing and shoring as required.

- B. All trenches must be straight and not have abrupt changes in grade. Trenching that may potentially disturb root systems of existing trees shall be brought to the attention of the Landscape Architect before proceeding with work.
- C. The trench bottoms and bedding material surrounding all pipes must be free of rocks greater than one (1) inch in diameter and all sharp-edged objects. Bed and surround all pipe with approved specified "BACKFILL MATERIAL" (see Main and/or Lateral Pipe Trench Detail).
- D. Pulling of pipe is not permitted unless otherwise approved by the Owner's Representative and Landscape Architect.

### 3.02 INSTALLATION

- A. PVC Pipe and Fittings (includes pipe sleeves):
  1. Due to the nature of PVC pipe and fittings, the Contractor shall exercise care in handling, loading, unloading and storing to avoid damage. Any pipe that has been dented or damaged shall be discarded until such damage has been cut out and the pipe is rejoined with a coupling.
  2. PVC pipe ends shall be cut to ninety (90) degrees to the pipe length and cleaned of all cutting burrs prior to cementing. Use approved reaming tool. Pipe ends shall be wiped clean with a rag lightly wetted with PVC thinner. Cement shall be applied with a light coat on the inside of the fitting and a heavier coat on the outside of the pipe. Pipe shall be inserted into the fitting and given a quarter turn to seat the cement. Excess Cement Shall Not Be Used. Pipe will be tested as indicated elsewhere in these specifications. No backfilling will be permitted other than at the centers of pipe lengths until the pressure test is completed.
  3. Backfilling shall be done when pipe is not in an expanded condition due to heat or pressure. Cooling of the pipe can be accomplished by operating the system for a short time before backfill or by backfilling in the early part of the morning before the heat of the day.
  4. No PVC pipe may be threaded or connected to a threaded fitting without an adapter.
  5. Great care must be taken to insure that the inside of the pipe is absolutely clean. Any pipe ends not being worked on must be protected and not left open.
  6. All threaded joints are to have Teflon tape or pipe dope applied to male threads only.
  7. Provide and install bare copper trace wire with all piping, main and lateral lines. Attach trace wire to pipes with nylon wire ties at 10' intervals and at all changes in direction. All trace wire splices shall be made by twisting wire ends together and attaching with water tight splices as specified.
- B. Head Locations.
  1. Heads immediately adjacent to walks, curbs, shrub/groundcover planting bed edge, etc. shall have one (1) inch clearance between head and walks, curbs, shrub/groundcover planting bed edge etc. unless otherwise noted. Sprinkler heads located adjacent to parking area curb shall be located on-center with parking stall striping. CONTRACTOR SHALL REMOVE AND DISPOSE OF PAVEMENT (THAT PORTION OF PAVEMENT FOR HEAD AND PIPE ONLY) ADJACENT TO CURBS TO ALLOW ONE (1) INCH CLEARANCE PER THE ABOVE.
- C. Control Wire:

1. Control wires are to be taped together at five (5) foot intervals: then this bundle is to be taped to the bottom of the supply line at ten (10) foot intervals with at least three (3) wraps of electrical tape.
  2. All splices must be made watertight with sealing 3M Direct Burial Splice Kit and contained in valve boxes.
  3. Splices will be permitted only at the valves and never between valves or valve and controller unless in a separate valve box. There must be a separate lead or "hot" wire to each automatic valve. One (1) common wire will be acceptable.
  4. Minimum size of wire is to be determined strictly by the wire sizing chart provided by Rainbird or approved equal.
  5. The control wires shall be color coded to match existing wires.
  6. Arrange valve stations to operate in sequence shown on "As-Built" Drawings.
  7. Contractor shall field verify if spare wires exist. If spare wires are existing, spare wire(s) shall be provided to all control valves. The spare wire(s) shall be shared by all the valves and shall complete the circuit back to the controller. Wire sizes shall be the same as the Ground Wire.
- D. Risers:
1. All sprinklers and quick coupler head risers must be constructed according to the "Riser Assembly" details. The pipe risers must have the same inlet size as the sprinkler and quick coupler heads.
  2. Minimum riser size shall be the pipe size of the sprinkler head.
  3. Risers are to be capped after installation to keep inside of pipe clean.
  4. Care must be taken not to over-tighten the steel pipe into the PVC fittings.
- E. Existing Automatic Controller:
1. An updated diagram or schedule sealed in a plastic cover shall be posted in the controller to facilitate the selection of the valves to be operated.
- F. Manual Drain Valve:
1. See "Manual Drain Valve Assembly" detail for installation of three-quarter (3/4) inch drain valves. DRAIN VALVES ARE NOT REQUIRED FOR GENERAL DRAINAGE OF THE IRRIGATION SYSTEM UNLESS OTHERWISE NOTED ON THE DRAWINGS; IRRIGATION SYSTEM SHALL BE AIR BLOWN TO DRAIN. DO NOT EXCEED MANUFACTURER'S RECOMMENDED PRESSURE FOR AIR BLOWING IRRIGATION SYSTEM.
- G. Automatic Valves:
1. Install as shown on "Automatic Valve Assembly" detail.

2. Before installation of any automatic valves, the supply line must be thoroughly flushed.
  3. All automatic valves shall be enclosed in valve boxes set above finish grade as shown on details. Valve box extension may be required. Locate valve boxes in shrub and groundcover planting beds wherever possible and at points of easy access from paved and/or lawn areas.
  4. Locate outside of paved areas and grouped together where possible. Where valves occur adjacent to paved areas, install so that valve boxes will not be closer than twelve (12) inches to paving and perpendicular or parallel to it. Group boxes shall be spaced evenly to provide a neat appearance.
- H. Quick Coupling Valves:
1. Locate all quick couplers in shrub and/or groundcover planting beds when possible and at points of easy access from paved and/or lawn areas.
- I. Pipe Sleeves:
1. All sleeves shall extend a minimum of twelve (12) inches beyond the edges of pavement.
  2. Pipe for irrigation mains and laterals may be installed with sleeves but shall not include any pipes with couplers whenever possible.
  3. Plug all ends of sleeves and irrigation mains and laterals to prevent soil from entering.
- J. Pressure Testing:
1. Before backfilling, flush all new steel, cast iron and PVC main water lines; then pressure test at ninety (90) psi. This pressure shall be maintained until all joints, fittings and pipes have been inspected. Correct any leakage and repeat test until the system is watertight. Maximum psi loss in a fifteen (15) minute test shall be five (5) psi. Contractor to test system prior to Landscape Architect final test.
  2. Before backfilling, all PVC sprinkler lateral lines shall be flushed and pressure tested with the system exposed to static pressure. This pressure shall be maintained until all joints, fittings and pipes have been inspected. Correct any major leakage and repeat test until the system is reasonably watertight. Contractor to test system prior to Landscape Architect final test. **DO NOT INSTALL HEADS PRIOR TO TESTING -- PLUG RISERS AT LOCATION OF HEAD CONNECTION.**
  3. To be valid, all tests must be witnessed by the Landscape Architect. The Contractor must give twenty-four (24) hours written notice to the Landscape Architect prior to the anticipated date of inspection.
- K. Backfilling:
1. In refilling trenches, the bedding around the pipe and fittings shall be approved "Backfill Material" and shall be well tamped. If necessary, provide suitable imported backfill. Trenches shall be thoroughly compacted and water-settled. Trenches shall be backfilled uniform with the surrounding grade, raked to a slight mound, then rolled with a two hundred fifty (250) pound roller, or compacted with a vibrator.

2. All roots, rocks and surplus excavation shall be removed from the site unless otherwise directed.
3. Trenches or tunnels under roads or paved areas shall be backfilled and tamped with a mechanical tamper in successive six (6) inch lifts to at least ninety-five (95) percent density as determined by ASTM:D 1557. Paving shall be replaced to the satisfaction of the Owner's Representative's.
4. Before backfilling, all underground appurtenances including risers, valves, etc., must remain exposed so that they can be viewed during testing. Leave all joints exposed; then complete backfilling after flushing, pressure testing, inspection and preparation of "As-Built Drawings". The location, inspecting and testing provisions of these specifications will be strictly adhered to. If, for any reason, any part of the sprinkler system is backfilled before approved location, testing, or inspection is authorized by Landscape Architect, it must be completely uncovered and exposed until approved for backfilling by the Landscape Architect.

### 3.03 CLEAN-UP

- A. Clean all work areas including paving, curbs, catch basins, manholes and lawn, or debris caused by the Contractor's work on this project, or any part of the project, on completion of operations and prior to watering. All hard surfaced areas shall be washed clean. Daily clean up shall be required on all areas used for circulation, parking, or other daily use.

### 3.04 FINAL TESTING

- A. Before the sprinkler system will be accepted, the Contractor, in the presence of the Landscape Architect and/or Owner's Representative, shall perform a water "Performance Coverage Test" to determine if the water coverage and operation of the system is complete and satisfactory. If any part of the system is inadequate, it shall be repaired or replaced at the Contractor's expense and the test repeated until accepted. The Contractor must give twenty-four (24) hours written notice to the Landscape Architect prior to the field review. The Contractor shall also adjust and balance sprinkler heads for optimum and uniform coverage without excessive fogging or overthrow on to signage, pavement(s), structure(s) and building(s); adjust all sprinkler head heights and set all valve boxes to proper grade prior to final review by Landscape Architect.

### 3.05 SYSTEM FAMILIARIZATION

- A. Upon acceptance of the system by the Owner's Representative, the Contractor shall provide the Owner's Representative the necessary keys and/or other tools necessary to operate/drain/activate the system and spend sufficient time with the Owner's Representative to insure that the system operation/maintenance/winterizing can continue after the departure of the Contractor. The Contractor will be liable for all damages or losses resulting from failure to comply with the provisions of this paragraph.

### 3.06 FINAL ACCEPTANCE

- A. Upon completion and approval of all tests, final acceptance of the system will be contingent upon Contractor providing signed and approved sprinkler/plumbing/health/electrical permits as may be applicable in the area as well as reproducible mylar "As Built Drawings" and two (2) three (3) ring binders of all catalog cuts/manufacturers' instructions/maintenance and operation information.
- B. Prior to final acceptance of the irrigation system, the Contractor shall cooperate with Landscape Contractor in recommending watering schedules.

3.07 GUARANTEE

- A. The entire sprinkler system shall be guaranteed by the Contractor to give complete and satisfactory service as to materials and workmanship for a period of one (1) year from the date of final acceptance of the work by the Owner's Representative.
- B. Should any trouble develop within one (1) year which, in the opinion of the Owner's Representative, is due to inferior or faulty material and/or workmanship, the trouble shall be corrected, without delay, to the satisfaction of the Owner's Representative's and at the Contractor's expense.
- C. Any settling of backfilled trenches shall be repaired by the Contractor at the Contractor's expense, including but not limited to, restoration of pavement, seeded, sodded and/or planted areas.

3.08 DETAILED DRAWINGS SHOWN ON DRAWINGS

- A. Quick Coupling Valve
- B. Head Riser Assembly (Pop-up)
- C. Automatic Valve Assembly-PVC
- D. Main And/Or Lateral Pipe Trench Detail
- E. Manual Drain Valve Assembly
- F. Irrigation Equipment Assembly and Pressure Reducing Valve

END OF SECTION