2534 Master Association Irrigation Guidelines

Preface:

The 2534 Master Association has a non-potable water supply that furnishes water to each lot, for the exclusive use of irrigating the landscape.

The Town of Johnstown requires the use of non-potable water for use in landscape irrigation. It is the intent of the 2534 Master Association to provide non-potable landscape irrigation water to each lot owner. To be able to manage the entire 2534 Non-Potable System efficiently, the 2534 Master Association must have the capability to coordinate non-potable deliveries to end users at the site. The lot owners have the option to have the 2534 Master Association maintain their irrigation and landscape or "opt out" of having their irrigation controlled by the 2534 Master Association, and a "water window" will be assigned to that lot. Each lot will have a specific "point of connection" detail to follow, whether they have the 2534 Master Association control their irrigation or they "opt out". In most instances, lots have been "pre-wired" to connect to the Master Association's controller, thus, the design parameters will be provided by the Master Association. Since irrigation designs and installations can vary, a set of guidelines for materials and application have been developed. This will ensure that the watering schedule and maintenance of equipment will be met throughout the life of the project. This requires some standardization of products, since there are a multitude of manufacturers. This also ensures that each owner will have a "quality" irrigation system, and is designed to the same standards as other users at 2534. Each end user at 2534 will need to go through a two step design review process with the 2534 Design Review Committee (2534 DRC). One of the required submittals at the first review of a project by the 2534 DRC is the proposed landscape plan for a site, which must conform to the 2534 Design Guidelines. The landscape plan submittal shall include the total square footage of irrigated turf and square footage of other landscape material as part of the submittal. Once the landscape plan is approved, the 2534 DRC will provide design parameters to the end user for use in designing the irrigation system for the site including the point of connection to the 2534 non-potable system. The second submittal to the 2534 DRC shall include the irrigation system design for the property including the end user's intent to either opt out of the Master Association's management of the on-site irrigation and landscape maintenance or the intent to have the Master Association manage these services.

As there is a considerable amount of common area to be managed at the site, the Master Association is able to receive very competitive rates for on-site landscape maintenance. If an end user opts out of Master Association management of on-site irrigation and landscape management, that user must conform to the landscape maintenance specifications provided by the 2534 Master Association, or the 2534 Master Association will take over management of the irrigation system and on-site landscape maintenance.

2534 MASTER ASSOCIATION
UNDERGROUND SPRINKLER SYSTEM SPECIFICATIONS

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SECTION 2810:

UNDERGROUND IRRIGATION SYSTEM

PART 1: GENERAL

1.01 CONTRACTUAL REQUIREMENTS

A. Design, approval, and installation of an automatic underground irrigation system, using the 2534 Master Association's non-potable water system.

1.02 SCOPE OF WORK

A. The work shall consist of installing a new automatic underground irrigation system, to tie into the existing 2534 Master Association's system. Included will be the design, provision, and installation of all labor, equipment, tools and materials necessary for the construction of an irrigation system per the 2534 Master Association's guidelines. This includes any miscellaneous incidental material required to result in a complete and operable system.

1.03 WORK INCLUDED

A. Work under this Section to include provision of all labor, material, permits, and services needed to complete the underground sprinkler system in accordance with the details and specifications herein.

1. Provide and install all incidental equipment from the point of connection as required on the drawings.
2. Provide and install subsurface sleeves as required.
3. Provide and install miscellaneous incidental equipment which may not be indicated on the details but which is required to result in a complete and operable system.

1.04 QUALITY ASSURANCE

A. Comply with the following codes, ordinances, regulations, and standards in effect at time of installation:

1. American Society for Testing and Materials (ASTM).
2. National Plumbing Code (NPC)
3. Federal Specifications (FS)
4. Plastic Pipe Institute (PPI)
5. National Electric Code (NEC)
6. National Sanitation Code (NSC)
7. All cut-sheets, catalogs, and published data of the manufacturers whose equipment is scheduled for use under this contract.

B. Failure to be familiar with any requirement shall not preclude installer's responsibility to abide by them.

C. In the event of a conflict between requirements the most stringent requirement will prevail in any case.

D. All work under this Section shall be performed by qualified personnel who have successfully completed comparable projects previously, and who are knowledgeable and familiar with irrigation system hydraulics.

1. On-site personnel shall be capable of determining feasibility of proposed installations (with regard to hydraulics). Failure to be familiar with hydraulic feasibility will not preclude installer's responsibility for accidental or deliberate installation of incompatible equipment, pipe sizes, etc., which do not permit operation of system as intended by design.

2. The installer shall field verify static pressure at the point of connection and determine its suitability prior to commencing any work downstream of the point of connection. The point of connection shall be a 1-1/4" threaded gate valve stubbed into the property, unless otherwise noted, or required by the 2534 Master Association.

a) Failure to test and verify adequate static pressure prior to constructing the sprinkler system shall not relieve the installer to provide the adequate operating pressure to provide coverage as intended by their design.

b) It is the installer's responsibility to report inadequate static pressure to the Project Inspector and to correct the problem prior to commencing work downstream of the point of connection.

E. All material for use under this Section to be new and previously unused.

F. The installer shall be responsible for measuring and verifying accuracy of field dimensions versus drawing dimensions. All discrepancies shall be reported to the Project Inspector and resolved prior to commencing work.

1.05 SUBMITTALS

Each end user must get the 2534 DRC approval of a landscape plan and an irrigation plan for a site prior to commencement of installation of an irrigation system or landscape. The irrigation plan is to be part of the second submittal to the 2534 DRC. It shall include an estimated annual water usage chart, showing the valve I.D., the discharge rate, the irrigated area (in square feet), the precipitation rate (inches/hour), the average annual usage showing both the depth (in inches), and the volume (in gallons). Attached to these specifications, is Attachment A, a guideline chart for plant material water usage, and Attachment B, a table for use in calculating the water usage.

A. Three (3) sets of submittals of the specifications of the products to be used for the irrigation system as described, shall be transmitted to the 2534 DRC for approval, before commencement of work. Upon review and final approval by the 2534 DRC, according to these specifications, commencement of the irrigation system may begin. A 2534 DRC approved copy of the submittals will be transmitted to the contractor.

C. Shop Drawings which clearly indicate changes proposed by the installer to pipe routing, sprinkler head placement, valve placement, zone sequencing, etc., which improve operation and serviceability of the system are to be submitted to the 2534 DRC.

D. Other submittals shall be made in accordance with the contract documents and Requirements at Substantial Completion under this Section.

1.06 ALTERNATE EQUIPMENT

A. Generally, only the equipment in these specifications will be considered or accepted for installation, and shall take precedence over plan details.

1. If the specified equipment is discontinued by the manufacturer at the time of installation, alternate equipment may be proposed and submitted, and noted by exception.

a. Proposed alternate equipment shall be submitted to the 2534 Master Association in the form of additional catalog cut sheets, and an amended irrigation design, with revisions clearly marked, indicating any changes proposed for equipment, and the resulting changes to the estimated gallons-per-minute per zone, pipeline sizes, and water usage chart.

2. Should alternate equipment be installed without prior Owner approval, Final Acceptance of work provided under this Section may be delayed and/or denied.

1.07 PRODUCTS

A. Furnish all equipment to complete the sprinkler system per the approved Drawings and Specifications.

B. Rainbird and Hunter products are to be used whenever practicable.

C. All mainline piping shall be PVC, Class 200, minimum.

D. All lateral piping shall be PVC Class 160 minimum, or Polyethylene, NSF, 80 p.s.i. minimum.

1. All piping shall be new and NSF approved.

E. All mainline pipe fittings under 2.5" diameter shall be Solvent Weld type. All mainline pipe fittings 3" and larger shall be Ductile Iron, deep bell, push -on gasket type, thrust blocked according to manufacturer's recommendations. All polyethylene lateral fittings shall be insert type, with crimp type clamp for sealing, and conform to ASTM D-2609.

1. Gasket PVC mainline pipe shall meet ASTM requirements.

2. BE PVC lateral pipelines shall meet ASTM requirements.
3. Polyethylene lateral pipelines shall meet ASTM requirements.
4. Solvent weld for PVC pipe shall meet ASTM requirements.
5. Teflon tape shall be used on all threaded joints.
6. The use of cross type fittings is not permissible.

F. All sprinkler heads will be installed with swing pipe or swing joints.

G. Copper tubing and fittings shall be type 'K'.

H. PVC sleeves to be Class 200 PVC BE of the size and length indicated on the Drawings. Low voltage wiring that is not routed with the mainline shall be run in separate sleeves from mainline or lateral pipe.

PART 2: EQUIPMENT

2.01 SPRINKLER HEADS

A. All sprinkler heads shall be Rainbird or Hunter.

1. Nozzle types and arcs to be provided by the irrigation designer, and indicated on the Drawings to satisfy the coverage requirements intended by the design.
2. Sprinkler nozzles installed on any single zone shall have matched rates of precipitation.

B. Sprinkler heads shall be of the type, and size, indicated on the Drawings.

C. Watering windows will be assigned for each lot that is NOT controlled by the 2534 Master Association. It is recommended that all sprinkler heads utilized for turf grass in the entire Development provide a precipitation rate of at least .4" per hour, to ensure that all lots will be watered in a timely manner, and water windows will be met.

2.02 ELECTRIC CONTROL VALVES

A. Electric control valves shall be Hunter ICV Filter Sentry series or Rainbird PESB series, for use on non-potable irrigation systems.

1. Each electric control valve shall be installed with a PVC isolation ball valve at the inlet.
2. If the owner wishes to utilize the 2534 Master Association controller, Rainmaster model TW-D-X decoders are required.

B. Drip valves must have pressure regulation and wye strainers. Rainbird model XCZ-100B-COM or Hunter model ICZ-101are recommended.

2.03 QUICK COUPLING VALVES

A. Shall be Rainbird model 5LRC, or Hunter model HQ5LRC.

2.04 MASTER VALVE – HUNTER

A. All mainlines that are <u>not</u> utilizing the Master Association's irrigation control system shall install a Hunter model ICV valve to be used as a master valve. It shall be installed immediately downstream from the point of connection gate valve, and before the flow meter, of the size and type shown on details. It shall be connected by the 2534 Master Association, to their irrigation controller, to control the "water window" for the site.

2.05 METER

A. All irrigation systems in the 2534 Development are required to be metered. An Amco water meter model C-700 with pit pad for remote reading and totalizing register is required.

B. Installation is per 2534 Development details (provided).

2.06 AUTOMATIC CONTROLLER

A. The 2534 Master Association utilizes a Rainmaster 2-wire central control system in most instances. Only construction before September 2007 utilized a more traditional, multi wire system. Please verify the type of controller that will be controlling your lot. All irrigation controllers provided by the Master Association after September 2007 will require that the valves utilize a Rainmaster decoder model TW-D-X.

B. An irrigation schedule and "mow day" schedule is required to be submitted upon completion, for any irrigation system utilizing the 2534 Master Association irrigation controller.

C. If the owner is providing their own controller, it shall be multi-program capable, and have a rain sensor attached.

2.07 CONTROL WIRING

A. All irrigation systems utilizing the 2534 Master Association irrigation controller shall use Rainmaster TW-CAB-14 wire for 2-wire connection, and install per manufacturer's recommendation. Contact the 2534 Master Association to verify that your lot is wired for a 2-wire system.

B. All other irrigation systems that are NOT utilizing the 2534 Master Association irrigation controller shall provide and install type UF 600 volt stranded or solid copper, single conductor wire with PVC or PE insulation and bearing U.L. approval for direct underground burial, minimum 14 gauge.

1. Control wire shall be a red color.

1. Common/ground wire color to be white.

2. Master Valve wire color to be black.

3. Two yellow wires shall be installed along entire mainline as an extra wire.

4. Wire colors to be clearly indicated on the as-built Drawings.

C. Installer is responsible for sizing all wire in accordance with recognized practice, and shall clearly indicate changes in wire sizes on as-built Drawings.

D. All wire connections utilizing the 2-wire 2534 Master Association controllers are to be made with Rainmaster TW-SPLICE, 3M DBY, or other NEC approved waterproof wire connection.

E. All wire connections NOT utilizing the 2534 Master Association controller shall be made with SURESPLICE SK 8-12G or 3M DBY splices or approved equal.

2.08 VALVE BOXES

A. All electrical control valves are to be housed in control valve boxes with lock equipped covers equal to Armor 170106 (standard). Isolation gate valves and wire connections to be housed in Armor 181104 (10" round box), and drip valves shall be housed in Armor 190106 (jumbo box).

1. Valve boxes shall be adequately sized to allow clearance around all valves for servicing and removal without excavation of box, and shall have a 2" clearance from piping.

2. Valve boxes and covers shall be green in color and stamped "Irrigation Control Valve".

B. All control valves to be installed in accordance with final grade.

1. Aggregate sumps to be constructed prior to installation of control valve and box; do not attempt to fill valve boxes with aggregate.

2. Valve box interiors to be completely free of standing water, mud, or other debris at all times.

C. Provide and install manufactured valve box extensions as needed to result in box cover being at adjacent finish grades, or flush with top of mulches.

2.09 BACKFLOW PREVENTER

A. Not applicable, as the irrigation supply is raw water.

2.10 DRIP COMPONENTS

A. Lateral drip tubing from the valves shall be of a UV resistant type.

B. Install emitters on lateral drip tubing. Use ¼" distribution tubing to distribute water to plants. Install tubing stake and bug cap at each outlet.

C. Emitters shall be of a pressure compensating type, Rainbird model XB-10 series, 1 gallon per minute. Install emitters according to the following table:

Deciduous trees – single or multiple outlet emitters, totaling 5 i.e., for trees planted in bed areas. Separate zoning for trees planted in turf areas is not required.

Coniferous trees - – single or multiple outlet emitters, totaling 4 g.p.m., for trees planted in bed areas. Separate zoning for trees planted in turf areas is not required.

Shrubs – 2 single outlet emitters required for each plant.

Perennial, ground cover, and grass plants – 1 single outlet emitter required for each plant.

2.11 OTHER EQUIPMENT

A. Other equipment to be provided and installed, including but not limited to, pressure regulating valves, air relief valves, and equipment needed to result in a complete and operable sprinkler system shall be provided and installed under this Section.

1. Installation of other equipment shall be as indicated on Drawings, and per manufacturer's recommendations.

PART 3: EXECUTION OF WORK

3.01 JOBSITE CONDITIONS

A. The installer shall be completely familiar with all jobsite conditions which may affect the work prior to commencing any work under this Section.

1. No work shall be commenced until unsatisfactory jobsite conditions have been brought to the Project Inspector's attention or otherwise totally resolved.

2. Should the installer fail to resolve jobsite conditions which may negatively affect the work under this Section, he shall assume responsibility for subsequent additional work and costs to resolve unsatisfactory jobsite conditions.

3.02 UTILITIES AND PROTECTION

A. Prior to commencing any work under this Section, it will be this installer's responsibility for scheduling and coordinating the locations of all existing utilities on the jobsite which may affect the work.

1. All known existing utilities shall be clearly indicated on field drawings, and shall be flagged or otherwise marked on the jobsite.

2. Failure to locate existing utilities and provide adequate protection to them during the work shall not preclude responsibility for subsequent damage.

3. Costs for repair to existing utilities as a result of failure to properly locate and protect utilities shall be this installer's responsibility.

4. "Utility " shall include, but may not be limited to gas, electric, sewer and water, telephone, and cablevision lines.

3.03 OTHER TRADES

A. This installer shall make all reasonable efforts to coordinate work of other trades to avoid damage to work installed under this Section.

B. Work under this Section shall be coordinated with other trades so as not to willfully interfere with scheduled installations.

1. It is this installer's responsibility to be familiar at all times with scheduling of certain trades which may have a direct affect on work under this Section (i.e. pavement, plumbing, electrical) and to coordinate work under this Section with work of other trades.

3.04 FIELD VERIFICATION

A. All sprinkler heads, control valve locations, and pipe line locations to be installed are to be flagged prior to commencing excavation.

1. Minor relocation of equipment which facilitates the installation, serviceability and operation of the irrigation system may be made and documented on as-built Drawings.

B. Sprinkler heads which are adjacent to curbing and pavement are to be installed no closer one inch away from curbing/pavement to accommodate turf trimming operations.

3.05 EXCAVATION

A. This installer shall provide all necessary excavation required for proper installation of work under this Section.

B. Mechanical trenchers used for excavation shall be capable of digging smooth, flat bottom trenches regardless of slope conditions.

C. Trenches for mainlines shall be excavated to a uniform depth not less than eighteen inches.

D. Trenches for lateral pipelines shall be excavated to a uniform depth not less than twelve inches.

E. Sumps for manual drains and control valves shall be over-excavated to facilitate valve installation.

F. Sleeves crossing beneath parking lots, driveways, roadways, and sidewalks shall be installed to the depth of not less than eighteen inches to the top of the sleeve pipe.

G. Sleeves crossing beneath sidewalks shall be installed to depth indicated on Drawings prior to installation of pavement.

1. Control wiring may not be installed in mainline sleeves.

3.06 INSTALLATION

A. All installations are to be made in full accordance with the Drawings, Specifications, Local Codes and Ordinances, etc., with the most stringent requirement prevailing at all times in the event of conflict.

1. Generally, no deviations from the layout of pipelines, sprinkler heads, control valves, point of connection, controller locations, or other scheduled installations will be considered or accepted by the Project Inspector from that indicated on the Drawings.

2. The installer is authorized to make minor field adjustments in layout to facilitate minor changes in site layout.

B. No direct contact between any equipment installed under this Section and other utilities or structures is permitted.

C. Open pipe ends are to be taped or plugged closed at all times to keep out dirt and debris during installation.

D. All piping is to be flushed with clean water to remove all dirt and debris prior to installing sprinkler heads.

E. Swing joint risers to be installed and adjusted to result in all sprinkler heads being flush and plumb with finish grades prior to backfilling around heads.

1. No sprinkler head is to be pulled into a plumb and flush position after installing backfill.

F. Electric control valves are to be connected to mainline per the Drawing detail allowing clearance for servicing valve in valve box.

1. Control valves are to be adjusted for optimum flow to provide coverage as intended by design.

G. All control wiring is to be installed in the mainline trench. If control wiring is not installed in the mainline trench, it must be installed in appropriately sized conduit.

1. No splices are to occur in any sleeve.

2 Splices must be made in boxes.

3. Multiple wires in trenches are to be banded together at twenty foot intervals.

4. Two spare wires for system expansion shall be pulled to the end-points of the mainline.

5. All wire connections utilizing the 2-wire 2534 Master Association controllers are to be made with Rainmaster TW-SPLICE, 3M DBY, or other NEC approved waterproof wire connection.

6. All wire connections NOT utilizing the 2534 Master Association controller shall be made with SURESPLICE SK 8-12G or 3M DBY splices or approved equal.

H. Other equipment installations are to comply with the following requirements:

1. Quick coupling valves are to be installed on swing joints with SCH 80 PVC nipples, and are to be installed in an Armor 181104 (10" round box), plumb and one inch below the bottom of the lid.

a) Quick coupling valves shown next to a control valve on the drawings shall be installed in a separate valve box.

J. Other equipment, miscellaneous products, fittings, etc., which are not specifically indicated on the Drawings but which are required to result in a complete and operable system are to be provided and installed under this Section within the base contract.

3.07 BACKFILL AND COMPACTION

A. Provide clean backfill soil free of clods and rocks greater than one inch in size, and debris that could puncture and damage pipelines and equipment installed under this Section.

B. Backfilling to be done when pipelines are cool to avoid excessive contraction. Water puddling of trenches is acceptable.

C. Open trenches and other excavations are to be backfilled with suitable material and compacted to not less than ninety percent density in six inch increments.

1. After compaction, backfill shall be precisely flush with surrounding finish grades.

D. The installer is responsible for the repair to damaged equipment, finish grades, undermined pavements, sod, mulches and underlayments, etc., from settling of one inch or more in any trench or excavation as a result of work under this Section for a period of not less than one year from date of final Acceptance.

PART 4: INSPECTION, TESTING AND OPERATION

4.01 INSPECTIONS AND TESTING

A. An open trench inspection, upon completion of mainline installation, shall be performed by the Master Association. It shall include a visual inspection of the components installed, to verify compliance with the approved design and the materials installed.

1. The installer shall contact the Project Inspector, and shall give two days notice that an inspection for mainline installation is requested.

B. The installer shall activate the water source and pressurize the mainline to not less than 100 psi, or maximum available pressure if less than 100 psi.

1. The mainline shall remain closed and pressurized for not less than 1 hour prior to operation of the completed system.

B. After successful completion of the pressurized period and repair to any leaks, and the system can be operated at the pressure intended by design, the installer shall adjust and fine tune all equipment for optimum performance and coverage as intended by design.

1. When wind conditions are less than five mph, the installer shall adjust all sprinkler head nozzles to provide coverage to areas as intended by design. Overspray onto sidewalks is permitted by design.

Overspray onto fences shall be avoided wherever possible. No overspray is permitted onto roadways or structures.

2. All sprinkler heads are to be fully adjusted to be plumb and flush prior to sodding, seeding, and mulching operations are commenced.

   a) This installer shall assume all liability for sodding, seeding, and mulching which is installed prior to adjustment, fine tuning, and functional operation of the sprinkler system.

   b) This installer shall assume all liability for manually operating the sprinkler system and for furnishing supplemental irrigation to sustain optimum condition of all landscaping should the system not be fully operable prior to installation of landscaping.

C. After the installer has verified that all adjustments and fine tuning have been adequately performed, the Project Inspector shall be given two days notice that inspection for Substantial Completion is requested.

   1. The entire installed system shall have been allowed to operate automatically via the controller through entire cycles prior to requesting an inspection.

D. The Project Inspector's inspection for Substantial Completion shall include visually observing the operation of all work provided and installed under this Section.

   1. Any installation which does not comply entirely with any part of this Section will be documented in a written punch list.

   2. All punch list items are to be completely corrected by the installer prior to re-inspection by Project Inspector.

      a) Re-inspection for correction of punch list items for consideration of Final Acceptance will be made within five working days from date of Project Inspector's first inspection and punch list.

4.02 OPERATION OF SYSTEM

A. The installer is responsible for initial programming of controller to operate automatically at the frequency he deems necessary to promote and sustain vigorous growth of all landscaped areas to which this irrigation design provides coverage.

B. It is the responsibility of the installer to provide to the Master Association a written schedule for watering and mow days, for incorporating into the Master Association's watering schedule.

C. Unless otherwise approved by the Project Inspector, the operating sequence of all zones shall be per the Drawings.

D. During and up until Final Acceptance, the installer is responsible for making any adjustment that may be required to equipment installed under this Section.

4.03 CLEANUP AND JOBSITE RESTORATION

A. Prior to Final Acceptance, all areas on the jobsite in which work under this Section has occurred shall be thoroughly cleaned of dirt, unused material, and the installer's installation equipment.

B. Work by other trades which is damaged or destroyed as a result of work under this Section shall be fully restored by this installer as a condition of Final Acceptance.

   1. Sod, trim edges, mulches, pavements, and other existing work which is damaged as a result of work under this Section is to be completely restored as a condition of Final Acceptance of all work completed under this Section.

PART 5: WARRANTY

5.01 ENACTMENT

A. A one year warranty for all material and workmanship provided under this Section shall commence on the date of Final Acceptance of all work.

B. During the warranty period, the installer is responsible for all the following:

   1. Winterization; shut off all water sources to system, drain all pipelines, and provide air injection as required to prevent freeze damages to all equipment.

2. Activation; turn on all water sources to system, charge all pipelines, repair damaged equipment not caused by vandalism, snow removal, or unauthorized winter-use of system (charges may be incurred), adjust and fine tune all equipment to provide optimum performance.

3. Controller programming; it is the responsibility of the installer to provide a written program for the controller, at frequencies deemed necessary to promote and sustain establishment of landscaping at time of Final Acceptance.

   a) It is this installer's responsibility to shut down the controller at winterization and re-program controller at time of activation, if the site is controlled by a private controller.

   b) It is this installer's responsibility to perform seasonal service at the time he deems appropriate to protect his warranty interests.

   c) The installer is responsible for damages caused to equipment installed under this Section as a result of his failure to provide seasonal maintenance at the appropriate times.

   d) The installer may be back charged if the services of others must be employed to perform seasonal maintenance, as determined necessary by Project Inspector.

C. During the warranty period, the installer is responsible for providing labor and material as needed to keep the system completely operable as intended by design.

1. Equipment which fails to operate as intended by design shall be repaired and/or replaced by the installer.

2. Equipment which is removed from the system for repair shall be replaced immediately with equal equipment capable of providing uninterrupted operation of the system as intended by design.

D. Should at any time during the warranty period the installer fail to repair/replace equipment after being given reasonable notice from Owner to do so, he may be back charged for any costs incurred by the Owner for needed repairs which must be made by others.

5.02 EXCLUSIONS FROM WARRANTY

A. The following do not constitute valid warranty claims:

1. Vandalism to equipment.

2. Damage to the installed system as a result of work by others in the work area after Final Acceptance.

PART 6: SPARE EQUIPMENT AND CLOSEOUT MATERIAL

6.01 REQUIREMENTS AT SUBSTANTIAL COMPLETION

A. At Project Inspector's inspection for Substantial Completion the installer shall provide Project Inspector with all of the following:

1. One set of reproducible As – Built drawings.

2. A written schedule for watering and mow days, for incorporating into the Master Association's watering schedule.

3. (1) spare sprinkler head bodies and nozzles of each type installed.

4. (1) spare valve keys for drain valves installed.

5. (1) quick coupling valve keys suitable for use with valves installed.

6. (1) swivel hose bibs suitable for use with quick coupling valves installed.

7. (2) spare controller cabinet keys.

   a) All spare equipment to be new and unused.

   b) All spare equipment to be provided in a new, sealed cardboard box clearly labeled with the job name and "Spare Irrigation Equipment. " Valve keys may be securely taped to outside of box.

B. Provision of required spare equipment and closeout material in the format specified above is to occur at inspection for Substantial Completion.

PART 7: GUARANTEE

7.01 INSTALLER'S ASSURANCE OF COMPLIANCE

A. Upon entering an Agreement to provide labor and material to complete all work described under this Section the installer hereby guarantees to the Owner and the Project Inspector that he will execute to the best of his ability all provisions required under this Section.

1. The installer shall not qualify any term, condition, or requirement stated herein at any time during or after completion of the Agreement to provide work under this Section.

2. The installer may have certain rights pertaining to this guarantee as described in the General Conditions of the Agreement between the Owner and installer.

Attachment A

A Guide to Landscape Water Requirement Categories

(These are potential landscape water requirement categories, including some common plants. Categories are based on inches of supplemental water necessary per watering season.)

Turf grass

High Water Use: 24"/season Kentucky Bluegrass, Perennial Ryegrass

Moderate Water Use: 16"/season Turf-type Tall Fescue

Low Water Use: 5"/season Buffalograss, Blue Grama

Plantings

High Water Use: 20"/season

Trees Birch, Cottonwood, Fir, nonnative Maple, Willow

Shrubs Hydrangea, Quince, Willow, Yew

Perennials Cardinal Flower, Fern, Foxglove, Hosta, Meadow Rue

Moderate Water Use: 14"/season

Trees Aspen, Austrian Pine, Blue Spruce, Crabapple, Mountain Ash, Honeylocust, Linden, English or Red or White Oak, Redbud, Tatarian Maple

Shrubs Cranberry Viburnum, Winged Euonymus, Honeysuckle, Lilacs, Potentilla

Perennials Ajuga, Bishop's Weed, Bleeding Heart, Bugleweed, Hardy Chrysanthemum, Columbine, Coral Bells, Iris, Lupine, Peony, Periwinkle, Shasta Daisy

Low Water Use: 8"/season

Trees Bigtooth or Rocky Mountain Maple, Bristlecone or Ponderosa Pine, Golden Raintree, Green Ash, Kentucky Coffeetree, Rocky Mountain Juniper, Russian Hawthorne, Western Catalpa, Western Hackberry

Shrubs American Plum, Bluemist Spirea, Spreading Cotoneasters, Golden Currant, Grape Holly, Littleleaf Mockorange, Mugho Pine, Potentilla, Shrub Rose, Siberian Peashrub

Perennials Basket-of-Gold, Coreopsis, Candytuft, Daylilies, Dianthus, Harebell, Himalayan Border Jewel, Lamb's Ear, Perennial Statice, Primrose, Sweet Woodruff

Very Low Water Use: 4"/season

Trees Amur Chokecherry, Bur Oak, Canyon Maple, Pinyon Pine

Shrubs Apache Plume, Buffaloberry, Junipers, Mexican Cliffrose, Mountain Mahogany, New Mexican Privet, Rabbitbrush, Russian Sage, Sand Cherry, Saskatoon Serviceberry, Three-leaf Sumac, Yucca

Perennials Blue Flax, Cacti, Gaillardia, Gayfeather, Hardy Ice Plant, Poppy Mallow, Prairie or Purple Coneflower, Pussytoes, Penstemon, Sedum, Snow-in-Summer, Sulfur Flower, Woolly Thyme, Yarrow

Attachment B

Annual Water Use Chart (Instructions)

1. Use the Water Use Chart below, including notes, as an example of what the 2534 Design Review Committee requires to be included on an irrigation plan.
2. The discharge figures for each lateral can be calculated by summing the appropriate discharge values in the manufacturer's catalogs for the specified sprinklers, bubblers or drip emitters.
3. Irrigated areas for each lateral can be calculated using a scale and/or plan meter. This should be a "best estimate" splitting areas between zones as necessary. For drip irrigation, the irrigated area should approximate the area actually wetted by the emitters. As a general guideline, you can use one square foot for each perennial, four square feet for each shrub and twelve square feet for each tree.
4. To calculate precipitation rate (inches per hour), multiply the discharge (gallons per minute) times the conversion factor of 96.26, and then divide by the irrigated area (square feet).
5. The average annual depth of irrigation can be determined by referring to Attachment A.
6. The annual volume of water (gallons) can be determined by multiplying the irrigated area (square feet) by the average annual depth of irrigation (inches), and then dividing by the conversion factor 1.6.

Water Usage chart (example)

Valve I.D.	Discharge rate (g.p.m.)	Irrigated square footage	Avg. Precipitation rate (in./hr.)	Average Annual Irrigation	
				*Depth (in.)	Volume (gal.)
#1	40.00	7550	0.51	24	113247
#2	26.00	5562	0.45	24	83425
#3	19.00	1076	1.7	24	16138
#4	7.50	802	0.9	8	4011
* refer to Attachment A				**Total gallons**	**216821**

NOTES FOR PRIVATE IRRIGATION SYSTEMS UTILIZING WATER ONLY:

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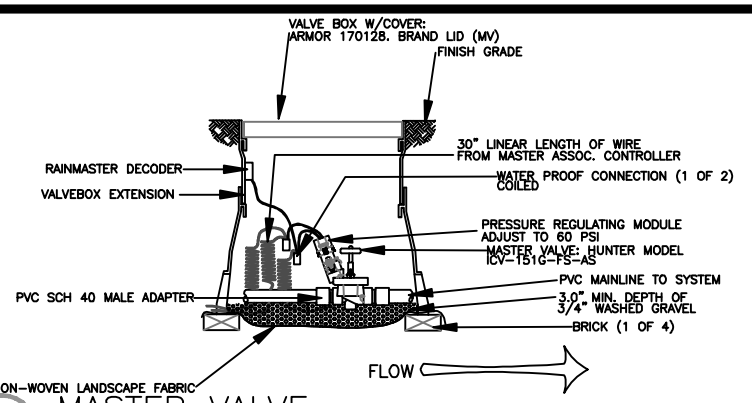
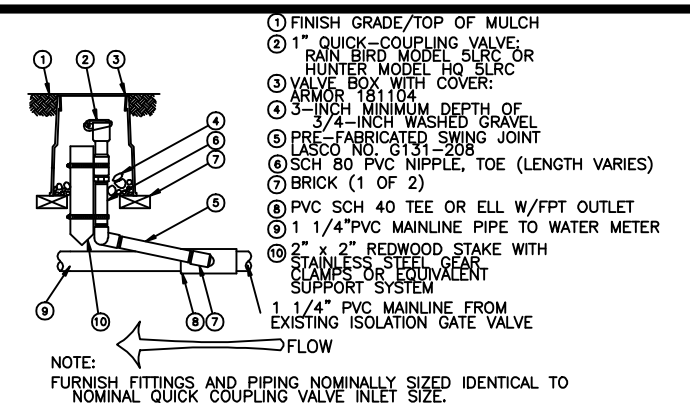
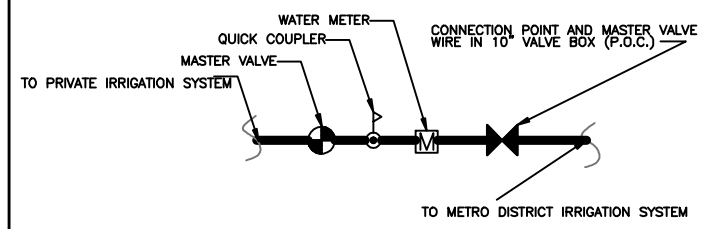
2. THE MAXIMUM FLOW RATE FOR IRRIGATION DESIGN PURPOSES IS 35 GPM, UTILIZING THE 1-1/4" P.O.C. PROVIDED. CONTACT THE METRO DISTRICT FOR THE LOCATION.
3. ALL PRIVATE IRRIGATION SYSTEMS UTILIZING ONLY THE WATER (NOT THE CONTROLLER SYSTEM) SHALL INSTALL A HUNTER ICV 151G-FS-AS MASTER VALVE, ACCORDING TO THE DETAIL, FOR USE BY THE METRO DISTRICT.
4. ADDITIONAL WIRES AT THE P.O.C. ARE FOR USE BY THE METRO DISTRICT.



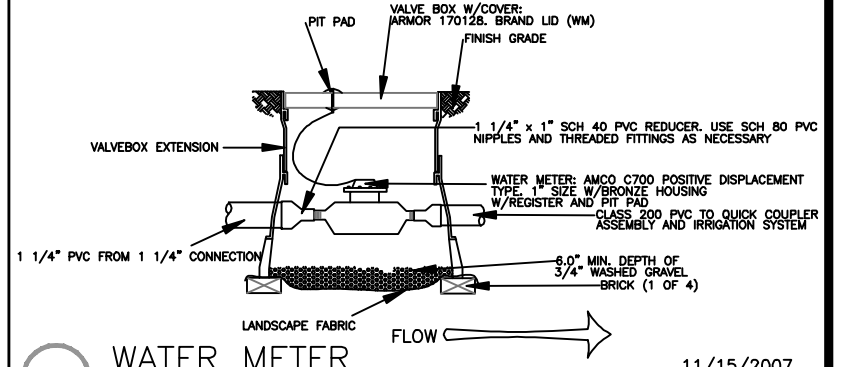
1 MASTER VALVE ASSEMBLY — 11/15/2007 N.T.S.



2 QUICK COUPLER VALVE ASSEMBLY — 11/15/2007 N.T.S.



3 PRIVATE CONNECTION ASSEMBLY — 11/15/2007 N.T.S.
PLAN VIEW



4 WATER METER ASSEMBLY — 11/15/2007 N.T.S.

NOTES FOR PRIVATE IRRIGATION SYSTEMS UTILIZING WATER AND METRO DISTRICT CONTROLLER:

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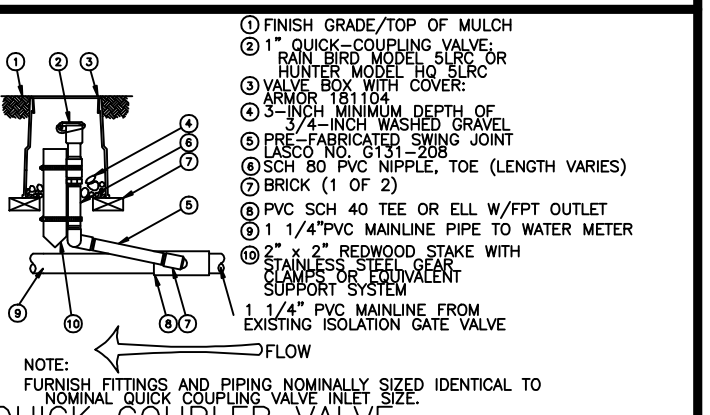
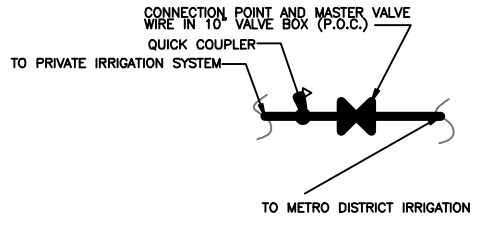
3. THE PRIVATE IRRIGATION SYSTEM OWNER SHALL CONTACT THE METRO DISTRICT TO LOCATE THEIR P.O.C. AND REQUISITION THE NUMBER OF WIRES AVAILABLE AT THEIR SITE. ACCOMODATIONS CAN BE MADE IN MANY INSTANCES FOR ADDITIONAL WIRES.
4. THE IRRIGATION INSTALLER SHALL NOTIFY THE METRO DISTRICT TO COORDINATE THE CONNECTION OF THE WIRES TO THE METRO DISTRICT CONTROLLER.

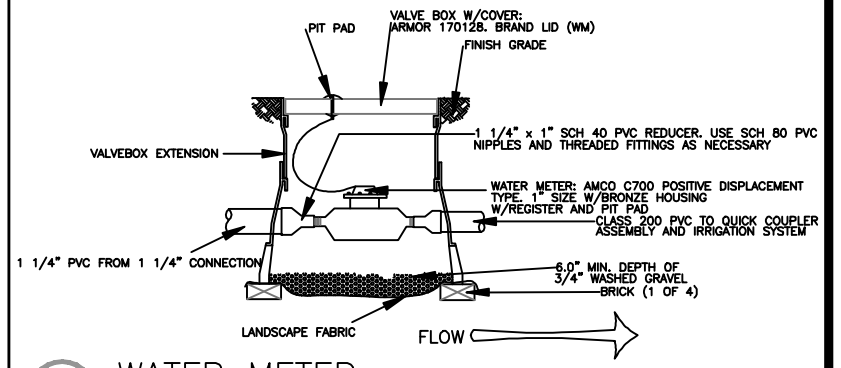
1 NO DETAIL — 11/15/2007 N.T.S.



2 QUICK COUPLER VALVE ASSEMBLY — 11/15/2007 N.T.S.



3 CONNECTION ASSEMBLY USING WATER AND CONTROLLER — 11/15/2007 N.T.S.
PLAN VIEW



4 WATER METER ASSEMBLY — 11/15/2007 N.T.S.

SHEET 1

IRRIGATION P.O.C. DETAILS

THOMPSON CROSSING METRO DISTRICT #2

BLUE MIRE Landscaping, Inc.

NOTES FOR PRIVATE IRRIGATION SYSTEMS UTILIZING WATER ONLY:

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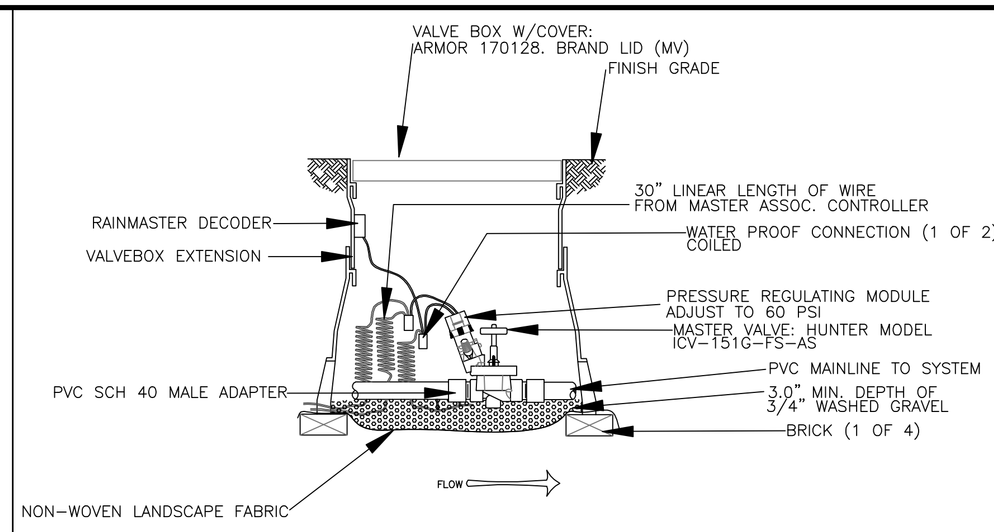
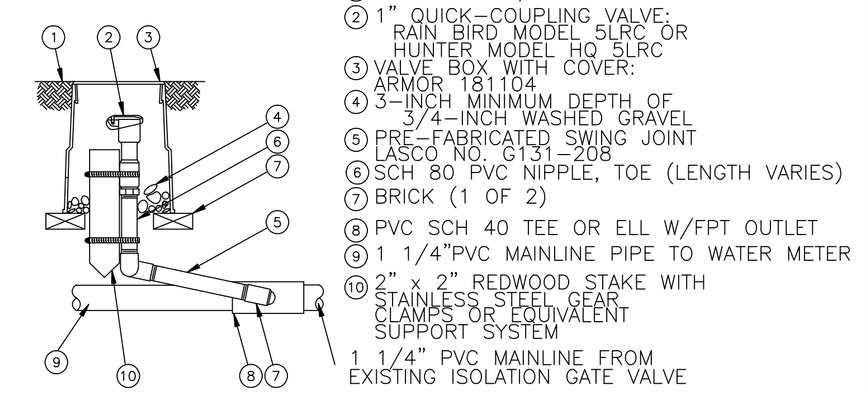
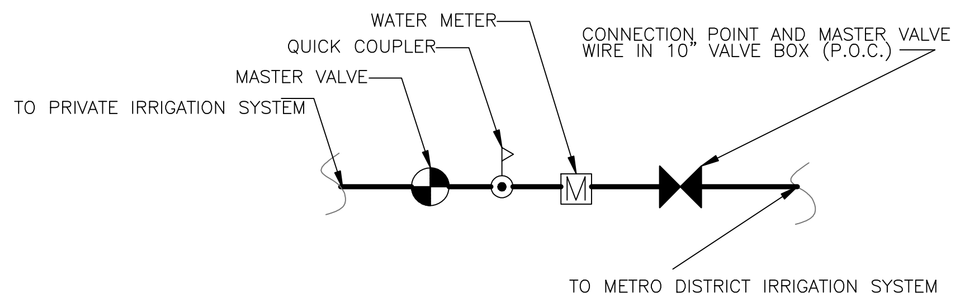
4. ADDITIONAL WIRES AT THE P.O.C. ARE FOR USE BY THE METRO DISTRICT.



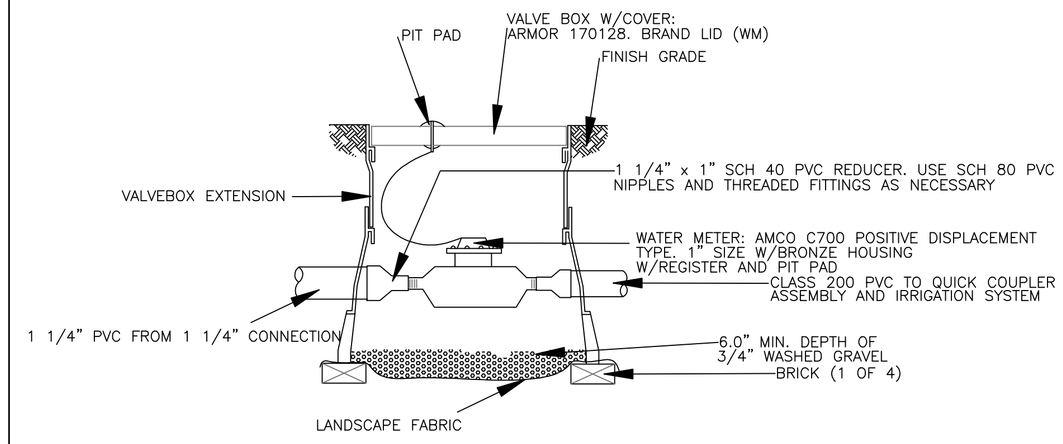
1 MASTER VALVE ASSEMBLY 11/15/2007 N.T.S.



2 QUICK COUPLER VALVE ASSEMBLY 11/15/2007 N.T.S.



3 PRIVATE CONNECTION ASSEMBLY 11/15/2007 N.T.S.
PLAN VIEW



4 WATER METER ASSEMBLY 11/15/2007 N.T.S.

NOTES FOR PRIVATE IRRIGATION SYSTEMS UTILIZING WATER AND METRO DISTRICT CONTROLLER:

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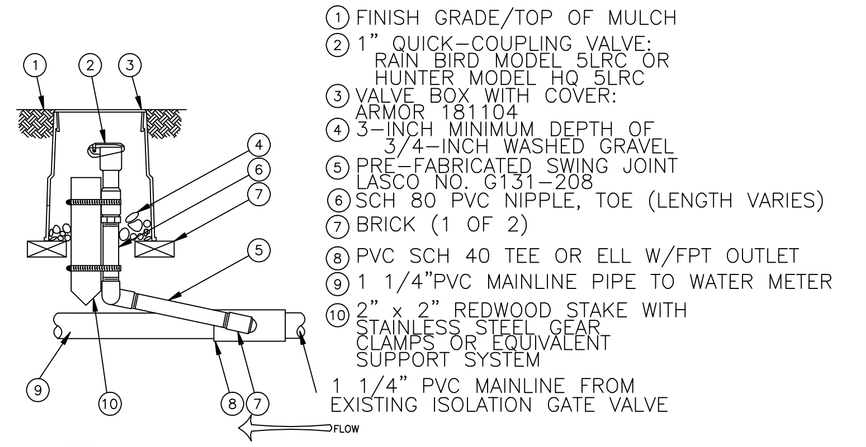
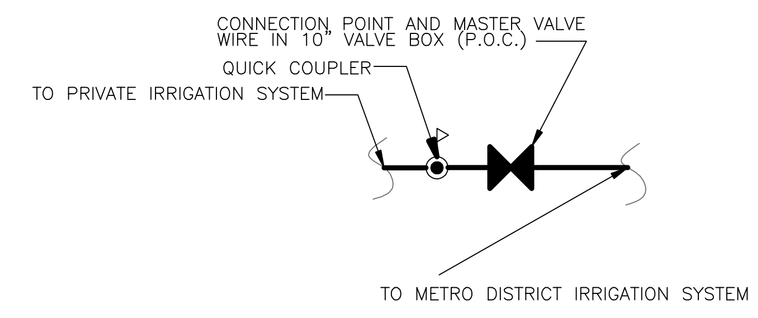
4. THE IRRIGATION INSTALLER SHALL NOTIFY THE METRO DISTRICT TO COORDINATE THE CONNECTION OF THE WIRES TO THE METRO DISTRICT CONTROLLER.

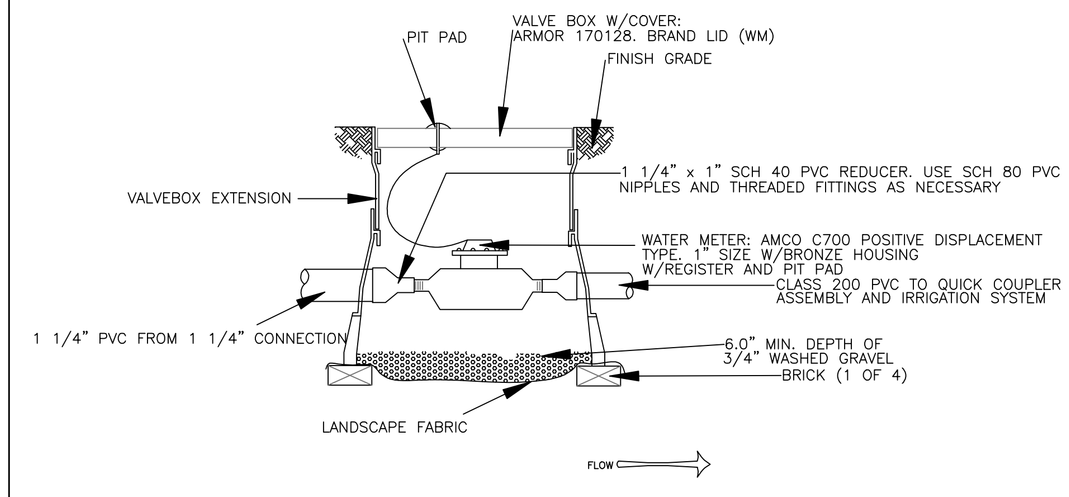
1 NO DETAIL 11/15/2007 N.T.S.



2 QUICK COUPLER VALVE ASSEMBLY 11/15/2007 N.T.S.



3 CONNECTION ASSEMBLY USING WATER AND CONTROLLER 11/15/2007 N.T.S.
PLAN VIEW



4 WATER METER ASSEMBLY 11/15/2007 N.T.S.

SHEET 1

IRRIGATION P.O.C. DETAILS

THOMPSON CROSSING
METRO DISTRICT #2

Job #	JEFFERSON #
Date	JEFFERSON DATE
Drwn.	JEFF/ DEWALT
Chkd	JEFFERSON CHECKED BY
Permits	PERMIT NUMBER

Designed By:	JDA
Drawn By:	JDA
Chkd By:	
Cons Chkd By:	
Approved By:	
Date:	11/15/2007

BLUE MIRE Landscaping, Inc.