



*CITY OF VICTORVILLE*  
*PUBLIC WORKS DEPARTMENT*

**LANDSCAPE MAINTENANCE ASSESSMENT DISTRICT (LMAD)**  
**DRAINAGE FACILITY ASSESSMENT DISTRICT (DFAD)**  
**MAINTENANCE ASSESSMENT DISTRICT (MAD)**

**LMAD/DFAD/MAD**  
**SPECIFICATIONS**  
**AND DETAIL BOOKLET**

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## Table of Contents

	<b>Page</b>
<b>Specification Booklet Overview</b>	<b>4</b>
<b>I. Procedures</b>	<b>5</b>
a. Establishment	5
b. Plan Check Submittal	7
c. Construction Inspection	7
<b>II. Plan Check</b>	<b>7</b>
a. Requirements	7
b. Process	9
<b>III. Construction – General</b>	<b>11</b>
a. Contractor/Developer Responsibilities	11
b. Substitutions	12
c. Product Delivery, Storage and Handling	13
<b>IV. Irrigation</b>	<b>13</b>
a. PVC Pressure Main Line and Fittings	13
b. PVC Non-Pressure Lateral Line Piping	14
c. Thrust Blocks	15
d. Pipe and Fitting	15
e. Backflow Prevention Units	16
f. Gate Valves/Ball Valves	17
g. Quick Coupler Valves	18
h. Check Valves	18
i. Master Valves	18
j. Flow Sensors	18
k. Remote Control Valve/Pressure Regulating RCV	19
l. Control Valve Boxes	20
m. Control Wire	21
n. Automatic Controller	21
o. Electric Meter	22
p. Piping Under Existing Walks	23
q. Sprinkler Heads	23
r. Installation	24
s. Flushing of System	26
t. Temporary Repairs	26
u. Existing Trees	26
v. Field Quality of System	27
w. Unusual Field Conditions	27
<b>V. Landscaping</b>	<b>28</b>

a. Materials	28
b. Construction	32
c. Maintenance	39
<b>VI. Standard Engineering and Public Works Requirements</b>	<b>42</b>
<b>VII. Maintenance Period Requirements</b>	<b>44</b>
<b>VIII. Approved Plant Lists</b>	<b>46</b>
<b>IX. Approved Product Lists</b>	<b>53</b>
<b>X. Specification Detail Pages</b>	<b>67</b>

## **SPECIFICATIONS AND DETAIL BOOKLET OVERVIEW**

**LANDSCAPE MAINTENANCE ASSESSMENT DISTRICT (LMAD)**

**DRAINAGE FACILITIES ASSESSMENT DISTRICT (DFAD)**

**MAINTENANCE ASSESSMENT DISTRICT (MAD)**

This booklet contains the procedures, requirements and guidelines for Landscape Maintenance Assessment District (LMAD), Drainage Facility Assessment District (DFAD), and Maintenance Assessment District (MAD) areas in the City of Victorville. Any substitutions or changes from the requirements in this booklet will require written approval from the Public Works Director or his/her designee. These specifications must be made part of the landscape and irrigation plans and followed. Any deviation from these guidelines will need to be corrected and may cause delays in the processing and/or construction of the LMAD, DFAD, or MAD.

## I. PROCEDURES

### A. ESTABLISHMENT

#### 1. LMAD's, DFAD's, and MAD's

- a. The Conditions of Approval of the Tentative Tract will dictate the need for the establishment or inclusion into a LMAD, DFAD, or MAD.
- b. The developer shall request a Petition from the City Authorized Representative along with;

#### PROCESS AND REQUIREMENTS FOR THE ANNEXATION OF TRACTS INTO AN EXISTING MAINTENANCE ASSESSMENT DISTRICT

1. The tentative tract is conditioned for the annexation.
2. City staff will determine which assessment district the tract will be annexed into.
3. Sub divider is notified through the map checking process that annexation is required by an information letter. The letter includes information on the steps and process for the annexation and a petition for the annexation to be executed and returned to the City. The sub divider is made aware of where to obtain the LMAD Specifications Booklet. The sub divider is to provide the following documents:
  - a) A signed and notarized petition requesting annexation into the district (Exhibit "A");
  - b) The legal description of the tract (Exhibit "B");
  - c) An 8-1/2" x 11" vicinity map (Exhibit "C");
  - d) An 8-1/2" x 11" (reduced) copy of the tract map (Exhibit "D");
  - e) A full size and a reduced 8-1/2" x 11" copy of the Assessment District Boundary Map and the Assessment District Diagram;
  - f) Information required by City staff (Public Works) necessary to prepare the Engineer's Report, including:
    - i) Full size set of approved landscape and irrigation plans, and perimeter wall plans;
    - ii) Table(s) including: The square footage of each sub area and the total landscape area within the tract to be maintained; A list plant names, and number each plant installed; The number of each landscape plant type (shrubs, ground cover, vines, and trees.) and the

- percentage of landscape plant type to the total number of plants; A listing and square footage of inorganic material installed and the percentage of inorganic material to the total landscape area;
- iii) Footage and area (face) of walls installed within the LMAD;
  - iv) A graphic print and AutoCAD drawing of the landscape area which includes street centerline, right-of-way, the dimensions of the lettered lot or landscape easement and dimensions of the area between the screen wall and back of sidewalk;
  - v) Number and size of meters and the footage of each pipe size installed after the water meter;
  - vi) Irrigation schedule and yearly estimated irrigation/water usage calculation based on the **Water Use Classifications of Landscape Species (WUCLS) publication. Include** landscape coefficient, landscape evapotranspiration **and total water applied figures used;**
  - vii) A maintenance plan for the area to be annexed.
4. City staff (Planning) prepares a resolution proposing the formation of the assessment district and ordering the preparation of an Engineer's Report. The resolution is placed on the City Council for hearing;
  5. City staff (Public Works) prepares the Engineer's Report;
  6. City staff (Planning) prepares a resolution approving the Engineer's Report;
  7. City staff (Planning) prepares a resolution of intent to form the district or the annexation into an existing district;
  8. City staff (Planning) places the two resolutions on the City Council agenda for hearing;
  9. City staff (Planning) prepares a resolution ordering the improvements, formation of the assessment district or annexation into an assessment district, and confirming the diagram and assessment. The resolution is placed on the City Council agenda for hearing;

Note: A Notice of Assessment is prepared by City staff (Planning), and along with the Assessment Boundary Map and Diagram Map, is recorded with the county by the City Clerk.

- c. Upon receipt of the items listed and providing the developer is the sole owner of the property, the City Authorized Representative will prepare two Resolutions to be heard at a City Council Meeting/Planning Commission Meeting scheduled

in accordance with the 45-day public notice requirement.

1. The first resolution approves the engineer's report which establishes the fee per lot and the total lot count.
2. The second Resolution orders the annexation.

## B. PLAN CHECK SUBMITTAL

- a. All plan checks must be submitted to the Development Department.
- b. Prior to construction of a LMAD, DFAD, or MAD, schedule a pre-construction meeting with the Development Department Inspection Division by calling (760) 955-5103.
- c. Prior to, during and after construction contact Imperial Technical Services for controller installation information and certification at (714) 863-0442.

## C. CONSTRUCTION INSPECTION

- a. All inspections shall be called into the Development Department Inspection Hotline at (760) 955-5103.

## II. PLAN CHECK

A. REQUIREMENTS – Contractor/Developer shall provide a current Auto CADD version of all plans required by this section.

1. Irrigation plans – 3 copies shall be submitted, drawn neatly and accurately to an engineer's scale, no smaller than 1" = 40' with the following information:
  - a. An irrigation legend with symbols, item description, manufacturer, model number, and performance criteria.
  - b. The available water pressure (minimum) and GPM (maximum) required at the point of connection shall be indicated.

- c. A calculation of the worst-case pressure loss characteristics for the system shall be shown on the plans.
  - d. The remote control valve identification shall include controller station number, valve size, and flow demand.
  - e. The water meter size.
  - f. Location of controller, backflow, and electrical pedestal.
  - g. Show by either note or symbol those areas, which are sloped.
  - h. City approved details and equipment.
2. Landscape plans – 3 copies shall be submitted, drawn neatly and accurately to an engineer’s scale no smaller than 1” x 40’ with the following information:
- a. The planting legend shall include symbols, type, size, height, spread and dimensions apart.
  - b. Trees shall not be planted in LMAD’s that are less than 10’ wide.
  - c. Show by either note or symbol those areas that are sloped.
  - d. City approved plant material.
  - e. City approved plant details.
  - f. Location of wall.
3. Wall plans – 3 copies of the wall plan shall be submitted, drawn neatly and accurately using an engineer’s scale with the following information:
- a. City approved wall detail or two separate copies of engineer’s calculations for alternate wall type.
  - b. Location.

- c. Engineer's wet stamp and signature.
4. Obtain and provide a "will-serve" letter from the City water district prior to obtaining a construction permit.
5. Install the appropriate flow sensors, master valve, CCU 28, pigtails, phone connections, remote controller, and antenna so the system will be utilized using Rain Bird Maxi-Com, with radio modem kit (RMK) system and radio remote controllers.

## B. PROCESS

1. Submit three (3) sets of plans to the Development Department. Any comments will be provided to the Contractor/Developer to incorporate into the plans.
2. Re-submit three (3) sets of plans to the Development Department once all corrections have been incorporated onto the plans. If there are no further corrections, the plans shall be approved. The Contractor/Developer will obtain a permit from the Development Department and will receive one set of plans to be used as the construction set.
3. This booklet shall become a part of the approved landscape and irrigation plans. Any discrepancies on the plan shall be held to the contents herein.
4. Approved plans and specifications shall not be changed or altered without approval of the Development Department. (Prior to start of construction, the Developer is required to send to the Public Works Department the Performance, Labor and Materials Bonds for the construction of the LMAD, DFAD, or MAD areas.)
5. Approved landscape and irrigation plans and specifications are valid for 180 days from the date of approval. If construction is not commenced and inspected within this time, a request for an extension must be submitted in writing to the Development Department prior to the expiration or plans must be resubmitted for re-review to the Development Department. Permit extension approvals can only be

granted once for a period of up to 180 days. Any policies or requirements which have been implemented during the 180 day period must be included on the plans prior to any extension period approval.

6. An excavation permit is required from the Engineering Department for any work performed within public right-of-way. The Engineering Department will inspect all tranches across public rights-of-way for depth, backfill, and compaction requirements. The Development Department will perform the remainder of the inspections. To schedule all inspections, call the Development Department Inspection Hotline at (760) 955-5103 and the Engineering Department at (760) 955-5158.
7. The Development Department will inspect the plant material prior to installation/placement, at the beginning of the 90-day maintenance period and at the end of the 90 day maintenance period.
8. Each of the following steps require a scheduled inspection by calling the Development Inspection Hotline at (760) 955-5103:
  - a. Upon completion of fine grading and A-curb installation and prior to commencement of soil preparation for acceptance of fine grading work.
  - b. Inspection of mainline trench depth, size, controller wires, valves, and pressure test. This inspection may not be combined with any other inspection.
  - c. Inspection of lateral lines, depth, size, heads, and coverage.
  - d. Inspection of plant material.
  - e. Depth of holes for planting of shrubs, vines, groundcover, and trees with amendment, tablets, and fertilizer.
  - f. Inspection of completed finish grading work following soil amendment work.
  - g. Inspection of backflow prevention device.

- h. Inspection of controller and electrical pedestal.
- i. Application of pre-emergent chemical.

### **III. CONSTRUCTION-GENERAL**

#### **A. CONTRACTOR/DEVELOPER RESPONSIBILITIES**

1. The Contractor/Developer shall follow the Manufacturer's directions and detailed drawings in conjunction with the approved plans and specifications as provided by the Development Department. The manufacturer warranties shall not relieve the Contractor/Developer of any liabilities. Such warranties shall only supplement the Contractor's/Developer's guarantees as specified in this booklet.
2. Due to the scale of the drawings, it may not be possible to indicate all offsets, fittings, sleeves, and the like, which may be required. The Contractor/Developer shall carefully investigate the structural and finished conditions affecting all of his work, plan for work accordingly, and furnish such fittings as may be required to meet such conditions. Drawings are diagrammatic and indicative of the work to be installed. The work shall be installed in such manner as to avoid conflicts between irrigation systems, plantings, and architectural features.
3. The Contractor/Developer shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that unknown obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Development Department Inspector. In the event notification is not given, the Contractor/Developer shall assume full responsibility for any corrections that become necessary.
4. The Contractor/Developer shall exercise extreme care in excavating and working near existing utilities. The Contractor/Developer shall be responsible for any damage to utilities that are caused by the contractors operations or neglect. Check existing utility drawings and call Underground Service Alert (USA) at (800) 227-2600.

5. The Contractor/Developer shall furnish equipment, all materials, or processes specified in the Drawings and Specifications.
6. All plant material installed shall be guaranteed against any and all poor, inadequate, or inferior materials and/or workmanship for a period of one year from the date of acceptance. During the one-year period following the 80% Bond Release, the Contractor/Developer shall replace any plant material in poor condition and/or dead or missing plants within 10 days of written notification. The City's Authorized Representative shall be the sole judge as to the condition of the material. Replacement shall be made in accordance with the LMAD, DFAD, or MAD specifications and plan.
7. The Contractor/Developer, at no additional cost to the City, shall provide material and labor involved in replacing plant material.
8. Plant material shall be installed as to not obstruct the vision of drivers and/or pedestrians. (See Triangular Grid Plan View Detail page 26,I-21.)
9. The Contractor/Developer is required to install walls in accordance with the City detail and will be a minimum of 6' in height. The wall will bend around corners and will then taper down to 3' in height to not obstruct the vision of drivers and/or pedestrians. (Wall shall be consistent with lot. Refer to LMAD Standard Wall Detail page 4, H-04.)

#### B. SUBSTITUTIONS

1. Substitutions will not be allowed without prior written approval from the City's Authorized Representative. Materials or equipment installed or furnished without prior written approval may need to be replaced at the Contractor/Developer's own expense.
2. Changes in location of irrigation, including water or electrical meters, or plant material, requires prior written approval by the City's Authorized Representative.

#### C. PRODUCT DELIVERY, STORAGE AND HANDLING

1. All products shall be delivered, stored, and handled with the utmost care. All materials shall be inspected by the City's Authorized Development Department Representative prior to installation. Any material deemed unsatisfactory shall be replaced at the Contractor's/Developer's expense.

#### **IV. IRRIGATION**

##### **A. PVC PRESSURE MAIN LINE AND FITTINGS**

1. Pressure main line (buried) piping for sizes 1" – 3-1/2" shall be PVC schedule 40; with solvent welded joints; 4" and larger shall be P.R. 200 IPS (SDR 21) integral gasketed bell one end (factory installed gasket) conforms to ASTM D 2241.
2. The minimum main line size shall be 1" and the minimum water meter size shall be 1.5".
3. Pipe shall be made from National Sanitation Foundation (NSF) approved type 1, grade 1, PVC compound conforming to ASTM resin specification D1784. All pipes must meet requirement as set forth in Federal Specification PS-22-70, with an appropriate standard dimension (S.D.R. Solvent Welded Pipe).
4. All PVC pipe must bear the following markings:
  - a. Manufacturer's name.
  - b. Nominal pipe size.
  - c. Schedule or Class.
  - d. Pressure rating in P.S.I.
  - e. National Sanitation Foundation (NSF) approval.
  - f. Date of extrusion.
5. Solvent cement and primer for PVC solvent weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer.

Evidence of primer application must be visible to Development Department Inspector.

6. All fittings under constant pressure shall be PVC schedule 80, NSF approved, conforming to ASTM D1464 and D2467 and bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule, and NSF seal of approval. All main line fittings shall be non-threaded (slip-type) solvent welded type. All tees shall be perpendicular to the bottom of the trench. All capping required for the performance of pressure test shall be solvent welded. All threaded fittings shall be schedule 80.
7. Pipe and fittings between water meter and backflow preventer shall be consistent with materials (copper) used between the water meter and Water District's water service. Materials to be verified with the City Water Division and/or Development Department.
8. Pipe and fittings 1-1/2" to 4" diameter and larger between the water meter and the backflow preventer shall be schedule 40 steel (minimum), type K copper or ductile iron. Welded steel or class 50/51 ductile iron pipe may be used for the line sizes 4" and larger. Fittings 4" and larger shall be class 250 (minimum) ductile iron. All metal fittings and pipe shall be coated to retard corrosion with City approved materials.

#### **B. PVC NON-PRESSURE LATERAL LINE PIPING**

1. Non-pressure (buried) lateral line piping shall be PVC schedule 40 with solvent weld joints.
2. Pipe shall be made from NSF approved type 1, grade 11 PVC compound conforming to ASTM resin specification D1784. All pipes must meet requirements set forth in Federal Specification PS-22-70 with an appropriate standard dimension ratio. All requirements for non-pressure lateral line pipe and fittings shall be the same as for PVC pressure main line and fittings, solvent weld, as set forth in the U.P.C., 1994 Edition.
3. All PVC pipe must bear the following markings:

- a. Manufacturer's name.
  - b. Nominal pipe size.
  - c. Schedule or Class.
  - d. Pressure rating in P.S.I.
  - e. National Sanitation Foundation (NSF) approval.
  - f. Date of extrusion.
4. All fittings, sprinkler risers, and bubblers exposed to sunlight shall be PVC schedule 80, NSF approved, conforming to ASTM D1464 and D2467 and bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule, and NSF seal of approval.

#### C. THRUST BLOCKS

1. Thrust blocks are required at all backflow prevention devices and on all main lines whenever there is a change in direction.
2. Concrete thrust block type, location, and installation shall be per the current California Plumbing Code. (See Thrust Block Configurations Detail page 25, I-20.)
3. Prevent concrete from contacting the pipe. Wrap the section of pipe that will contact concrete with 10 mil black tape.

#### D. PIPE AND FITTING

1. Use yellow brass screwed pipe conforming to Federal Specification WW-P-351. Fittings shall be yellow brass conforming to Federal Specification WW-P-460.
  - a. All PVC pipe threaded into brass shall be schedule 80 minimum.
  - b. Copper pipe shall be type "K" hard tempered ASTM B 88 and fittings shall be wrought solder joint type in accordance with

ANSI B 16 22.

c. All joints shall be soldered with lead-free solder conforming to ASTM B 206 and personal specification QQB 00655.

2. Galvanized pipe and fittings shall not be permitted.

#### E. BACKFLOW PREVENTION UNITS

1. All backflow preventers (BFP) 2-1/2" and larger shall be of the reduced pressure (RP) principle type. They shall be of bronze and stainless steel construction and shall incorporate two NRS resilient seat edge type gate valves. All test ports shall be equipped with a ball valve test cock. The backflow preventer shall be equipped with a separate wye strainer. Install per prevailing local codes. Support backflow device as per manufacturer's recommendation. Refer to Water District Standard W-39.
2. All backflow preventers (BFP) 2" and smaller shall be of the reduced pressure (RP) principle type. They shall be of bronze and stainless steel construction and shall incorporate two ball valve shutoffs. All test ports shall also be equipped with ball valve test cocks. The backflow preventer assembly shall be equipped with a separate wye strainer. Install per prevailing local codes. Support backflow device as per manufacturer's recommendation. Refer to Water District Standard W-39.
3. Backflow prevention units shall be of size and type indicated on the irrigation plans. Install backflow prevention units in accordance with irrigation construction details and per California plumbing code and local codes. The location and placement of backflow preventers to be determined prior to construction by a Development Department Representative and will not be placed any closer than 30 feet from a corner.
4. Required wye strainers at backflow prevention units 2" or smaller have a bronze screwed body with 100 mesh Monel screen and shall be similar to BAILEY #100B or approved equal.

5. Install all backflow preventers in a lockable protective enclosure. Enclosure shall be constructed from stainless steel. Enclosure shall be mounted on a level concrete pad 6" thick with a minimum rate of 2,000 PSI with a medium broom finish extended 6" beyond each edge of the enclosure and 6" plus the height of the enclosure at the end that opens. The edges of slab shall be thickened so that it extends a minimum of 2" below grade. Freeze protection is mandatory for all BFP; method of freeze protection is subject to City approval. Refer to Standard MPG 32.
6. Obtain an approved Certificate of Inspection by an authorized Backflow Preventer Inspector from the City of Victorville Water Department by calling (760) 955-2483.

F. GATE VALVES/BALL VALVES (to be installed per installation details at each valve)

1. Gate valves 2" and smaller shall be 150 PSI WOG brass class gate valve with screw-in bonnet, non-rising stem with solid wedge disk. All shall have threaded ends and shall be equipped with a bronze cross-handle. Use only those as manufactured by NIBCO or approved equal. (Refer to Water District Standard.)
2. Ball valves 2" and smaller shall be 200PSI SWP bronze ball valve with a stainless steel ball and handle. All shall have threaded ends and shall be similar to those manufactured by Hammond Valve Company or the approved equivalent.
3. All main line isolation valves, 2-1/2" and larger, shall be ductile iron, epoxy coated inside and out, utilize a non-rising stem, and a resilient seat wedge. Valve ends to be threaded, flanged, or mechanical jointed. These valves shall be rated to 250 PSI minimum.
4. All PVC pipe threaded into gate valves or ball valves shall be PVC schedule 80 minimum.

G. QUICK COUPLER VALVES

1. To be installed every 100 feet of landscaped length and within 50 feet of every corner.
2. Quick coupler valves shall have a 1" inlet, and brass two-piece body designed for working pressure of 150 PSI, operable with key, size and type shown on drawings.
3. Cover shall be a rubber or vinyl locking cover (if applicable to area – purple in color and state "DO NOT DRINK THIS WATER" in English and Spanish [non-potable]). Install quick coupling valves in a 10" round valve box with locking lid. Lid shall be green in color and shall be marked as to type of device (QC).

#### H. CHECK VALVES

1. Swing check valves 2" and smaller shall be of 200 lb. WOG, bronze construction, with replaceable composition, neoprene or rubber disk and shall meet or exceed Federal Specification WW-V-51D, Class A, Type IV.
2. Anti-drain valves shall be heavy-duty virgin PVC construction with female internal pipe threaded inlet and outlet. Internal part shall be stainless steel and neoprene. Anti-drain valve shall be field adjustable against draw-out from 5 to 40 feet of head. Anti-drain valve shall be similar to the VALCON "ADV" or approved equal.

#### I. MASTER VALVES

1. The master valve shall be plastic embodied in glove configuration.
2. All master valves shall have a manual flow adjustment.

#### J. FLOW SENSORS

1. The flow sensors send data to the central control or stand alone control system for precise and accurate flow sensing.
2. All flow sensors shall be plastic and pre-installed in tee type mounted insert configuration.

3. Flow sensor will be connected to pulse transmitter using an unspliced shielded wire in 1" conduit minimum.

#### K. REMOTE CONTROL VALVE (RCV)/PRESSURE REGULATING

1. All remote control valves (RCV) shall have a manual flow adjustment.
2. All electric remote control valves with or without pressure regulation shall be plastic, globe type, and shall have threaded inlet and outlet.
  - a. Each remote control valve will be accompanied with a non-rising stem (NRS) isolation gate valve or an angle valve. All angle and gate valves shall be rated at 150 PSI, WOG minimum.
3. Pressure regulating remote control valve (PRV) shall have an integral pressure regulator. There shall be no external tubing on the valve assembly.
  - a. Each RCV and PRV shall be equipped with a line size union of schedule 80 construction located on the non-pressure side of the control valve.
  - b. All RCV and PRV valves shall be installed in rectangular plastic valve boxes with bolted covers. All devices within valve box shall provide enough room to allow either repair or replacement of the device. The cover shall be green and shall be marked as to device type and station number "RCV XX". (Brass caps not required for LMAD's 15' and under.)
4. Separate pressure regulators may be used with remote control valves on stations operating bubblers. The pressure regulator shall be installed on remote control valve.
5. Install where shown on drawings and details. When grouped together, allow at least 12" between valves. Install each remote control valve in separate valve box. All devices shall be at least three inches above its gravel or crushed rock bed which shall be a least six inches deep and be of an area equivalent to the valve box.

6. All PVC pipe threaded into RCV's and PRV's shall be PVC schedule 80 minimum.
7. Assemblies:
  - a. Routing of sprinkler irrigation lines as indicated on the drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform to the details per drawings. Any discrepancies in plans and field are at discretion of the City field inspector and shall be recorded on the as-builts. In absence of detailed drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with the best practice with prior approval of the City.
  - b. Do not install multiple assemblies on PVC lines. Provide each assembly with its own outlet. One T per valve. Every riser should have its own valve.
  - c. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before installation. Installation and solvent welding methods shall be recommended by the pipe and fitting manufacturer.
  - d. Teflon tape or approved equal shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints. (From water meter to backflow, brass to plastic). When using wrenches to tighten plastic fitting **DO NOT OVER-TIGHTEN.**

#### L. CONTROL VALVE BOXES

1. All valve boxes, housing remote control valves, shut-off valves, quick coupling valves, etc., shall be installed at the toe of any slope adjacent to the curb, walk, or drive.
2. See Specification Sheet on Page 19.
3. All boxes to marked either Q.C. (Quick Coupler) or Valve # (A-1, A-2, etc. Method to be approved by City Authorized Representative. (Please see Page 3, Section 13 for additional details.)

## M. CONTROL WIRE

1. Connections between the automatic controllers and the electric control valves shall be made with direct burial copper wire Type UF, 600 volt. Pilot wires for each automatic controller shall be a minimum of 14 AWG.
2. All 24-volt valve control wire shall be 14 AWG minimum. The 24-volt common shall be a 14 AWG (minimum) white wire. All wire shall be Type UF 600 volt rated for direct burial and numbered (see approved product list) at controller for each valve. See Page 5, Section B, Materials List for LMAD/DFAD/MAD.
3. Install and label one extra 24-volt red wire equal in wire size to the "common wire" size in the mainline trench between the controller and the most distant remote control valves in all directions. The extra wire shall terminate in a small 10' coil of wire in a pull box and looped in each RCV box. Tape the wire coil to restrain it.

## N. AUTOMATIC CONTROLLER

1. Remote control valves shall be connected to controller in numeric sequence as shown on the drawings.
2. All controllers shall be mounted in a separate protective stainless steel enclosure provided by the manufacturer.
3. If a CCU 28 is required, then the enclosure shall be equipped with and approved telephone connection of a phone cable/modem and demarcation jack. The conduit and sweep ell for the telephone cable shall conform to the following specifications:
  - a. Two-inch conduit (NEMA TC-10 or equivalent) shall be placed from the irrigation controller enclosure to a point of connection designated by the telephone purveyor. Conduit shall be 24" below finish grade.
  - b. Conduit shall be stubbed 6" into enclosure, 1" from backboard and 6" from the enclosure's wall.

- c. Conduit is to be equipped with a telephone cable.
  - d. There shall be no more than two 90° turns in a 100' conduit run. 90° sweeps shall be no less than 4' radius minimum.
  - e. Exposed ends shall be capped to prevent dirt and debris from accumulating into conduit.
  - f. Conduit shall be inspected by the City's Authorized Representative prior to backfilling trench.
4. The controller shall be fitted with CCU 28 – RMK, receiver card, antenna, remote transmitter, and rain switch assembly.

O. ELECTRIC METER

1. The electric meter shall be installed in a stainless steel enclosure as per prevailing electric company or local code.
2. All 120 VAC conductors shall be installed in PVC conduit between power source (meter) and the controller enclosure.
3. All 120 VAC power wire shall be two conductors with ground, per prevailing local codes. Upon installation, the earth ground must be properly installed per manufacturer's instructions. If three separate conductors are used, the grounding wire shall be #4 AWG bare copper, if within enclosure, and #4 AWG armored if externally routed.
4. Grounding electrode shall be 5/8" copper clad rod 8 feet long driven into the ground. Ground conductor shall be mechanically fastened as per prevailing code. If more than one grounding electrode is used, they shall be separated by 10 feet.
5. All 120 VAC conductors and conduit, if installed in the mainline pipe trench, shall be covered by 24" of soil. The conductors/conduit shall be installed on the opposite side of the trench from any 24-volt wire. The communication cable shall be separated by 12" (minimum) of compacted soil. From conductors, a warning tape stating, "**Caution: Electrical Line Buried Below,**" shall be placed 3" above directly over

the conduit.

6. High voltage wiring for automatic controller.
  - a. The 120-volt power connection to the automatic controller pedestal shall be provided and installed by a qualified electrician and to be included as a part of the contract of the irrigation Contractor.
  - b. All electrical work shall conform to local codes, ordinances, and union authorities having jurisdiction.

P. PIPING UNDER EXISTING WALKS

1. Piping under existing walks shall be sleeved and constructed by a method approved by the City (i.e., jacking, boring, or hydraulic driving) prior to construction beginning. Where any cutting or breaking of sidewalks and/or concrete is necessary, the concrete shall be removed and replaced as per City standards by the Contractor as part of the contract cost. No hydraulic driving shall be permitted under concrete paving.
2. Any work in the public rights-of-way will require a separate excavation permit from the City of Victorville Engineering Department. For more information call (760) 955-5158.

Q. SPRINKLER HEADS (IF APPROVED)

1. Install the sprinkler heads as designated on the drawings (same size, type) and deliver the same rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as shown.
2. Spacing of heads shall not exceed the 75% of the maximum throw indicated in the manufacturer's specifications.
3. Spray heads shall have a screw adjustment and are not allowed on fixed risers.
4. Riser units shall be fabricated in accordance with the details shown on the drawings. Riser nipples for all sprinkler heads shall be the same

size as the riser opening in the sprinkler body.

5. Spray sprinkler systems may not be used in roadway medians. Use bubblers in these locations.
6. Bubblers will be used for all plants and trees for water conservation.

## R. INSTALLATION

### 1. Trenching

- a. Contractor is responsible for contacting Underground Service Alert (USA) 48 hours prior to any trenching. Contractor shall be responsible for the repair of any and all damage.
- b. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout indicated on drawings and as noted by the City's Authorized Representative.
- c. Provide for a minimum of 24" to cover all pressure main line pipes and a minimum of 12" for all non-pressure lateral lines.
- d. Provide for a minimum of 18" to cover for all control wire.

### 2. Line Clearance is to be a minimum of 6" from each other and from lines of other trades.

### 3. Backfilling

- a. Trenches shall not be backfilled until all required tests are performed and inspections have been completed.
- b. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy loam, clay, sand, and other approved materials, free from large clods of earth, rocks, or stones.
- c. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting

areas. Back fill shall conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities.

- d. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than ½ inch in size will be permitted in the initial backfill.
- e. Flooding of trenches will not be permitted.
- f. If settlement occurs and subsequent adjustment in pipe, valves, sprinkler heads, lawn or planting, or other construction is necessary, the Contractor shall make all required adjustments without any additional cost to the City.

#### 4. Trenching and Backfilling over Paving

- a. All pressure main line and non-pressure lateral lines under paved areas shall be placed in a PVC schedule 40 PVC sleeve measuring twice the diameter of the designated pipe.
- b. Trenches located under areas where paving, asphalt or concrete will be installed, shall be backfilled with sand (a layer six inches below the pipe and three inches above the pipe) and compacted in layers to 95% compaction, using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in a firm unyielding condition. All trenches shall be left flush with the adjoin grade. Backfill shall be conducted per City of Victorville standard. All trenches within public roadway will be backfilled per City Standard and excavation permits. (See Trenching Requirements Detail page 37, L-06.)
- c. The irrigation contractor shall set in place; cap and pressure test all piping under paving, prior to the paving work.

#### 5. Drain Ditch Crossing

- a. All drainage ditch crossings shall be galvanized steel pipe ASA schedule 40 mild steel screwed pipe. Pipe shall be strapped

parallel to a 4"x4" redwood or cedar wood member for support. Absolutely no PVC pipe will be permitted at ditch crossings.

#### S. FLUSHING OF SYSTEM

1. After all new sprinkler pipe lines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of sprinkler heads, the control valves shall be opened and a full head of water used to flush out the system.
2. Sprinkler heads shall be installed only after system flushing has been accomplished to the complete satisfaction of the City.
3. The Contractor shall flush and adjust all sprinkler heads or bubblers for optimum performance and to prevent over-spray onto walks, roadways, walls, buildings, and other structural elements, as much as possible.

#### T. TEMPORARY REPAIRS

1. The City reserves the right to make temporary repairs as necessary to keep the system equipment in operating condition. The exercise of this right by the City shall not relieve the Contractor of his or her responsibilities under the terms of the guarantee as herein specified.

#### U. EXISTING TREES

1. Where it is necessary to excavate adjacent to existing trees the Contractor shall use all possible care to avoid injury to trees and tree roots.
2. Excavation shall be by hand in areas where two-inch and larger roots occur.
3. All roots two inches or larger in diameter, except in the path of pipe or conduit, shall be tunneled under and shall be heavily wrapped with burlap to prevent scaring or excessive drying.
4. Where a trenching machine is run close to trees having roots smaller than two inches in diameter, the wall of the trench adjacent to the tree

shall be hand trimmed, making clean cuts through.

5. Roots one inch and larger in diameter shall be painted with two coats of Tree Seal or equal.
6. Trenches adjacent to trees should be closed within twenty-four hours, and where this is not possible, the sides of the trench adjacent to the tree shall be kept shaded and moist with burlap or canvas.

#### V. FIELD QUALITY OF SYSTEM

1. If it is determined that adjustments in the irrigation equipment will provide proper and more adequate coverage due to plant blockage, architectural feature interference or other unforeseen design conflict, the Contractor shall make such adjustments prior to planting. These changes should be shown on as-builts.
2. Adjustments, considered a normal function under this contract, may include, but shall not be limited to changes in nozzle, anti-drain valves, addition and/or deletion of heads, and degree of spray arc. Fogging due to high pressure shall be corrected.
3. Lowering raised sprinkler heads by the Contractor shall be accomplished within 10 working days after directed by the City.
4. All sprinkler heads, bubblers, and boxes shall be set perpendicular to finished grades unless otherwise designated on the drawings.

#### W. UNUSUAL FIELD CONDITIONS

1. Wind
  - a. The Contractor shall make such adjustments as necessary, in location of sprinkler heads, nozzle size, nozzle type, or degree of arc, as required to compensate for localized breeze, or obstructions or wind conditions that may cause over-spray or improper spray patterns.
2. Variable Pressure

- a. The Contractor shall observe and record water pressure and available flow in gallons per minute (GPM) at point of connection, every one hour for forty-eight hour period, to determine if existing water characteristics differ from the design pressure and available GPM data as supplied by the water district.
- b. If variable pressure exists, the Contractor shall notify the City, in writing, immediately prior to beginning the system installation.

### 3. Pressure Regulator

- a. For pressure over 100 PSI, the Contractor shall install a pressure regulator (check in Rain bird Catalog) between the meter and the backflow device, factory pre-set to design pressure.

### 4. Pressure Compensating Nozzles or Sprinkler Heads

- a. Installation of pressure compensating nozzles or sprinkler heads shall be used to prevent fogging and considered as a normal adjustment to the system.

### 5. Check-Valves

- a. Check-valve units shall be installed on all heads in the system that demonstrates drain-down when the system is in the off position, and shall be considered as a normal adjustment to the system.

## V. LANDSCAPING

### A. MATERIALS

1. See the City approved Plant Material List (Page ??). Substitutions of plant material not included on the approved list will be considered upon written request to the City's Authorized Representative.
2. Soil Analysis

- a. If requested by a City Authorized Representative the following requirements will apply:
  - 1. Two copies of soil test performed by an approved agronomic soils testing laboratory shall be submitted to the City. Prior to plant installation, all soil samples shall be taken in the field by a qualified soils technician in the presence of the City's Authorized Representative, unless otherwise approved prior to the commencement of any work. The test shall include but not limited to fertility, salinity, PH balance, and a suitability analysis with written recommendations given for soil amendment.
- 3. Planting Tablets are to be equal to "Gro-Power" (silica based) or approved equivalent, if utilized.
- 4. Commercial Fertilizer
  - a. Shall bear the manufacturer's statement of guarantee of analysis and shall meet the following minimum requirements: 10% nitrogen; 10% phosphoric acid; and 10% potassium.
- 5. Organic Soil Amendment
  - a. Shall consist of nitrogen fortified redwood, cedar or fir sawdust and shall contain minimum 1% available nitrogen.
  - b. Material containing manure, pipe, or other unapproved material shall not be accepted.
- 6. Rock
  - a. In areas where rock is installed, the rock shall be a minimum of ¾" diameter and 3" in depth.
- 7. Mulch
  - a. Mulch shall be nitrogen fortified redwood chips and shall contain a minimum of 10% available nitrogen. A minimum of 3" of

mulch shall be installed throughout the planter area.

#### 8. Seed

- a. All seed used for lawn areas shall be labeled and shall be furnished in sealed standard containers.
- b. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.
- c. Turf Seed Mix – “Grande,” “Rhizomatous,” Tall Fescue Seed Mix with a seeding rate of 522 pounds per acre (12 pounds per 1,000 square feet).

#### 9. Plants

- a. Plants shall be true to name and one of each bundle or lot shall be tagged with the name and size of plants in accordance with the standard of practice recommended by the American Association of Nurserymen.
- b. The root condition of plants furnished in containers shall be determined by removal of earth from the roots of not less than two plants nor more than 2% of the total number of plants of each species or variety except when container-grown plants are from several different sources; in which case, the roots of not less than two plants of each species or variety from each source shall be checked at the option of the City’s Authorized Representative.
- c. Prior to installation, the selection of plants to be checked will be made by the City Authorized Representative.
- d. In case plants are found to be defective, the entire lot or lots of plants represented by the defective plants shall be rejected and replacements shall be provided at no additional cost to the City.
- e. All trees and shrubs supplied by the Contractor/Developer shall be of the specified standard height and can diameter set by the Standard for Nursery Stock or as determined by the City. The

height of the trees shall be measured from the root crown to the last division of the terminal leader and the diameter shall be measured five feet above the crown roots.

- f. All trees shall be able to stand erect without support prior to being staked.
- g. Plant flats, ground cover plants, and other plants shall be grown and remain in the flats until transplanted at the site. The soil and spacing of the plants in the flat shall ensure the minimum disturbance of the root system at time of transplanting.
- h. All plants should go through at least one growth cycle before final bond release by the City.

#### 10. Backfill Material

- a. All soil backfill shall be bulk mixed, not individually mixed at each plant pit.
- b. Topsoil shall be free of noxious weed seed and shall be of a loam characteristic, fertile and friable.
- c. Wood shavings shall be leached nitrogen fortified and shall be free of foreign matter.
- d. Soil used for backfill of planting pits shall be enriched using the following blend per cubic yard: 70% site soil or approved import; and 30% organic amendment.

#### 11. Stakes and Ties

- a. Tree stakes shall be a diameter of 2" x 10' long and shall be free of knots, checks, splits, or disfigurements.
- b. Tree ties shall be 24" "Twist Brace Tips" or equal as approved by the City prior to installation and be secured with screws to the stakes.

- c. For tree staking, no metal wire shall circle any part of any tree.

12. Iron Chlorosis

- a. After planting and during the plant establishment period in the event that trees exhibit iron chlorosis symptoms, apply FE 138 Geigy or equivalent at manufacturer's recommended rates.

13. Topsoil

- a. Topsoil shall consist of natural, fertile, friable, sandy loam soil possessing the characteristics of representative soils in the vicinity of which produce heavy growth of crops, grasses, or other vegetation and shall be obtained from natural, well drained areas. Before removal of the topsoil, the surface at the source of supply is to be stripped to a depth of 2" in order to remove weed seeds, roots, clay lumps, and stones larger than 1" in size, noxious weed, sticks, brush, litter, and other deleterious substances. In no case shall there be more than 5% by volume of stones larger than 1", coarse sand, and small clay lumps.
- b. The topsoil shall be free from insoluble carbonates and shall have the following analysis, which shall be verified by a soil analysis made at the Contractor/Developer's expense, when required by the City.  
pH = Recommended level 7.0 – Maximum 7.0:Minimum 6.0  
ECo = Zero to Three Maximum (electrical conductivity)  
ESP = Zero to Twelve Maximum (exchangeable sodium percentage)
- c. The pH, ECo, and ESP shall be per the recommended values for the plant types purposed.

**B. CONSTRUCTION**

1. Landscape Finish Grading

- a. The Contractor/Developer shall:

1. Cross rip all planted areas.
  2. Complete preliminary grading filled as necessary to bring all areas to be landscaped within .1" of finish grade.
  3. Remove surplus dirt, rocks, and debris over 1" in diameter to a 6" minimum depth and floating to a smooth uniform grade.
  4. All areas shall slope to drain per landscape plans.
- b. Prior to planting or irrigation installation final grading shall be inspected and approved by the City. Call the Development Inspection Hotline at (760) 955-5103 to schedule an appointment.

## 2. Weed Control Measures

- a. Upon completion of all fine grading work and prior to soil preparation, perform weed control measures.
- b. Apply a pre-emergent (Roundstar G or approved equivalent) at a minimum rate of 150 lbs. per acre.
- c. Irrigate all areas designated to be planted on which pre-emergent is applied for a minimum of 10 minutes per setting, two settings per application.

## 3. Tree Planting

- a. Trees are to be planted only in areas 10' in width or wider in the center of the planting areas.
- b. Trees are to be located a minimum of 25' from any streetlights and 10' from any power pedestals.
- c. Trees planted in approved areas and within 5' of any hardscape or infrastructure (buildings, curb and gutter, sidewalk, walls, etc.) are to have root barriers installed 24 inches deep and twice

the diameter of the root-ball.

- d. Tree planting holes shall be dug to size per Specification and shall be twice the depth and twice the width of the root ball of the tree. (See Tree Planting Detail page 35, L-04.)
- e. Before trees are set in the holes, a water test should be made. Tree planting holes shall be filled to the brim with water and allowed to drain before any planting is done. If water does not drain out of the hole within 24 hours, this fact must be brought to the attention of the Landscape Architect so that corrections can be made. Correctional work shall be considered as an extra and shall be additional expense to the Contractor/Developer.
- f. Soil surrounding the planting pit shall be in a friable condition and moist to a depth of 8”.
- g. Trees shall be planted at such a depth that the crown roots bear the same relative position to finish grade as they did to the soils where they were grown. Backfill after planting shall be compacted carefully into place without injuring the roots of the tree or breaking up the ball (root ball) of earth surrounding the roots.
- h. Back fill using specified soil mix to within 8” of finish grade. At this depth, place the plant fertilizer tablets, “Gro-Power”, and quantities as directed in the drawing details.

#### 4. Ground Cover Planting

- a. Soil preparation and fine grading shall be completed prior to ground cover planting.
- b. Mulch and fertilize ground cover areas using 1 cubic yard of wood shavings and 5 pounds of 10-10-10- fertilizer per 1,000 square feet.
- c. All ground cover and bare dirt areas that are not to be hydro-seeded are to be treated with a pre-emergent chemical (subject to approval by the landscape Architect prior to application).

Chemicals are to be applied by a licensed Applicator. This treatment shall be applied at the times recommended by the manufacturer. The City's authorized Representative shall be given a minimum of 48 hours (two working days) notice prior to each application. The Contractor/Developer shall provide the City with a copy of pre-emergent application reports as filed with the county.

- d. Ground cover shall be planted in moist soil and spaced as indicated on the plans.
- e. Each plant shall be planted with its proportionate amount of topsoil to minimize root disturbance. Soil moisture shall be such that the soil does not crumble when removing plants.
- f. Following planting, ground cover and shrub areas shall be regarded to restore smooth finish grade and to ensure proper surface drainage. A 1-inch layer of soil amendment shall be spread over the planted areas. Watering shall begin immediately following the application of amendment. (See Tree Planting Detail page 35, L-04.)
- g. When necessary to prevent plant damage from pedestrian traffic during the initial growing stage, the Contractor/Developer shall erect temporary protective fencing to be removed at the end of the plant establishment period.

## 5. Watering

- a. It shall be the responsibility of the Contractor/Developer to maintain a balanced watering program to ensure proper growth until final acceptance of the work.
- b. Immediately after planting, apply water to each tree or shrub. Apply water in moderate stream in the planting hole until the material around the roots is completely saturated from the bottom of the hole to the top of the ground.
- c. Apply water in sufficient quantities and as often as seasonal conditions require keeping the planted areas moist at all times

and well below the root system of the plants.

6. Start of Plant Establishment

- a. The plant establishment period shall not start until all elements of the project that impact the landscaping are completed in accordance with the approved plans and specifications. If the project is segmented into phases, all plant material and amenities are to be established prior to each phase's placement into a 90 day maintenance period.
- b. The plant establishment period for the project shall not begin until after the first mowing of all newly planted turf areas. New turf shall not be mowed until attaining a minimum height of 1-1/2 inches. Turf shall be maintained at a mowing height of 2 inches. Turf shall be rotary mowed at least once a week.
- c. Any planting areas that do not show a prompt establishment of plant material shall be replanted at 10 day intervals until the plant material is established. If a good rate of growth has not been demonstrated within 30 days of the first planting/hydro-seeding, the Contractor/Developer shall be responsible to determine the appropriate horticultural practices necessary to obtain good growth.
- d. The Contractor/Developer shall obtain agronomic soils testing of all areas not showing good growth and shall provide copies of the test results to the City to verify the appropriateness of all maintenance work performed. If additional fertilizers are needed, up to a maximum 25% beyond the amount specified, such amendments shall be provided by the Contractor/Developer at no additional cost to the City.

7. Permanent power to remote controllers shall be established and written acceptance from the City must be obtained prior to the start of the maintenance period.

8. Record As-Built Drawings

- a. The Contractor/Developer shall provide and keep up to date a complete as-built record set of prints which shall be corrected daily and show every change from the original drawings and specifications, and the exact as-built locations, sizes, and kinds of equipment. This set of drawings shall be kept on site and shall be used only as a record set.
- b. These record drawings shall also serve as work progress sheets, and the Contractor/Developer shall make neat and legible annotations thereon daily as the work proceeds, showing the work actually installed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the City's Authorized Representative.
- c. Before the date of the final inspection, the Contractor/Developer shall transfer all information from the as-builts to a current version of Auto CADD and placed on a CD to be provided to the City.
- d. The Contractor/Developer shall dimension from two permanent points of reference, building corners, sidewalks, or road intersections', and the like of the locations of the following items:
  1. Connection of existing water lines.
  2. Connection of existing electrical power/telephone.
  3. Gate valves.
  4. Routing of sprinkler pressure lines (dimension maximum 100' along route).
  5. Sprinkler control valves.
  6. Routing of control valves.
  7. Quick coupler valves and hose bibs.
  8. Other related equipment.

- e. On or before the date of the final inspection, the Contractor/Developer shall deliver the corrected and completed as-built print and CD to the City's Authorized Representative. Delivery of the same as-built print shall not indicate that the City has approved the as-builts as true and correct until verified and approved in writing.
  - f. Two 11" x 17" copies at a readable scale (as approved by the City) showing the irrigation layout, including controller(s), valves, wiring, the lateral per valve, etc. These sheets shall be laminated on both sides with a minimum of 10 mil plastic on each side (drawings may be shown on both sides of sheet). One additional copy to be enclosed in protective enclosure for each controller. Each station shall be highlighted with a different color.
9. All valves, RCVs, Quick Couplers, and junction boxes shall be marked with 3" domed survey markers placed on the A-curb (centered). Distances, valve type and number to all devices shall be clearly marked and an arrow shall be stamped on the marker indicating the device's direction. Brass caps are not required for LMADs 15' and under.
10. Equipment to be Furnished
- a. Two sets of special tools required for removing, disassembling, and adjusting each type of sprinkler, valve supplied on this project and screws on valve boxes.
  - b. Two keys for each automatic controller.
  - c. One quick coupler key and matching hose swivel for each of the six quick coupling valves installed.
  - d. One TRC Commander remote control for each controller installed.
11. Controller Charts

- a. The City's Authorized Representative shall approve as-built drawings before controller charts are prepared.
- b. The charts (11" x 17" in size) shall show the area controlled by the automatic controller. This chart will show lettered (a, b, c...) the areas each clock covers. It will have a minimum of two reference points – "streets, buildings, etc." and a directional indicator.
- c. The chart is to be a reduced drawing of the actual as-built prints. It shall be permissible to use both sides of the chart for drawings.
- d. The chart in the protective enclosure shall show a different color highlighter for each station to indicate the area of coverage for each station. It will have a minimum of two reference points – "streets, buildings, etc." and a directional indicator.
- e. When completed and approved, the chart shall be a minimum of 10 mil thick or 20 mil totals.
- f. These charts shall be completed and approved prior to final inspection of the irrigation system.

### C. MAINTENANCE

1. The Contractor/Developer shall maintain the landscape area during the inspection period including the entire maintenance period.
2. Maintenance Tasks
  - a. During the inspection and 90 day maintenance period the Contractor/Developer shall provide all watering, weeding, fertilizing, cultivation, and spraying necessary to keep the plants and turf in a healthy growing condition.
  - b. Keep the plant areas neat, edged, and attractive.
  - c. All trees and shrubs planted under the contract shall be pruned as necessary to encourage new growth and to eliminate sucker

growth.

- d. Old wilted flowers and dead foliage shall be immediately pruned.
3. The Contractor/Developer shall apply fertilizer (Gro-Power," or equivalent) to all turf areas at a rate of 25 pounds per 1,000 square feet and all ground cover areas at a rate of 25 pounds per 1,000 square feet, at 30 day intervals, for three applications as a minimum, beyond the original soil preparation application.
4. During the inspection and 90 day maintenance period (plant establishment period), all flow lines shall be maintained to allow for free flow of surface water. Displaced material which interferes with drainage shall be removed and placed as directed. Low spots and pockets shall be graded to drain properly.
5. City approved erosion control netting shall be installed at sloped areas and other locations where erosion is evident, when directed by the City inspector.
6. Damage to planting areas shall be repaired immediately throughout the inspection and 90 day maintenance period.
7. Depressions caused by vehicles, bicycles, or foot traffic shall be filled and leveled.
8. If any plant appears to be weak for any reason, during the inspection and 90 day maintenance period, that plant shall be replaced immediately with a new, healthy plant. At the end of the maintenance period, all plant materials shall be in a healthy growing condition and spaced as indicated on the planting plans.
9. All paved areas shall be washed and maintained in a neat and clean condition at all times.
10. Debris and trash shall be removed from the site every other day at a minimum.

11. All subsurface drains shall be periodically flushed with clear water to avoid build-up of silt and debris. Keep all drain inlets clear of leaves, trash, and other debris.
12. Throughout the inspection and 90 day maintenance period, all plants shall be maintained in a disease and pest free condition. A licensed pest control operator shall be retained by the Contractor/Developer to recommend and apply all pesticides, herbicides, and fungicides. Eliminate gophers, moles, and all other animals or rodents and repair any damage.

**VI. STANDARD ENGINEERING AND  
PUBLIC WORKS DEPARTMENT  
REQUIREMENTS for LMAD/DFAD/MAD**

1. All work shall conform in accordance with the landscape maintenance assessment district standard specifications and requirements of the City of Victorville.
2. Before beginning construction, the Contractor/Developer must obtain all necessary permits from the City of Victorville.
3. The Contractor/Developer shall be responsible for contacting the Underground Service Alert (USA) at (800) 422-4133 at least two (2) working days prior to any excavation or trenching for exact underground utility locations.
4. It shall be the responsibility of the Contractor/Developer to protect all existing utilities from damage during construction, whether shown on this plan or not.
5. At least forty-eight (48) hours notice shall be given to the City of Victorville prior to all inspections. All inspections are scheduled through the Development Department Inspection Hotline by calling (760) 955-5103.
6. It shall be the responsibility of the Contractor/Developer to protect surveying monuments in place. The Contractor/Developer shall be financially responsible for resetting any damaged or destroyed monuments.
7. All street crossings shall be installed in conduit as approved by the City Engineer (Schedule 40 PVC) with minimum cover to finish pavement grade of twenty-four (24) inches.
8. All excavations shall be backfilled at the end of each working day and roads shall be open to vehicular traffic.
9. A City authorized representative shall inspect all trench backfills. A Certification of Compaction signed by a registered Civil Engineer shall be submitted for all trench backfills upon request.
10. The Contractor/Developer shall furnish the City with as-built drawings of all irrigation pipes, mains, valves, and appurtenances.
11. The following as-built drawings are to be submitted to, and approved by, the City prior to accepting the site:

- a. One CD of AS BUILTS drawn on Auto CADD 2000 or better.
  - b. Complete set of plans with as-builts.
  - c. Two laminated (10mil) 11"x17" controller charts with each valve color-coded. The sheets should be scaled at 1"=40' or greater.
12. Contractor/Developer shall provide domed survey markers for all valves, RCV, quick couplers, and junction boxes. Place markers centered on top of A-curb. Distances to the valves or devices shall be clearly marked with an arrow indicating direction of the device. Brass cap curb markers are not required on LMADS 15' or smaller.
13. All backflow devices shall be tested and approved by a Certified Backflow Device Tester prior to the site being accepted by the City and a copy of the approved inspection report must be given to the City's Authorized Representative.
14. All irrigation controllers and CCU devices shall be tested and certified by Imperial Technical Services and a copy of the inspection report must be given to the City's Authorized Representative from the Development Department.

## **VII. MAINTENANCE PERIOD REQUIREMENTS for LMAD/DFAD/MAD**

1. Ninety (90) Day Maintenance Requirements:
  - a. Upon written approval of the Development Department, the maintenance period shall commence upon completion of all phases of the planting and irrigation installation. The maintenance period shall be for a period of ninety (90) calendar days from the date of written approval by the City unless a longer period has been determined in advance.
  - b. If the assessment district landscaping and irrigation is unacceptable at the stipulated time period, the maintenance period will be extended until all corrections have been repaired to the satisfaction of the City Authorized Representative.
2. Ninety (90) Day Maintenance Procedures:
  - a. The general care and maintenance of all areas shall consist of the proper watering, fertilizing, weeding, and clean-up.
  - b. Cultivate and weed not less than once every ten (10) days. During the course of the maintenance work, the Contractor/Developer shall remove surplus materials and debris from the site and shall keep the premises in a neat and clean condition at all times.
  - c. Approximately thirty (30) days after the initial planting, apply 25 pounds of “Gro-Power”, or equal per 1,000 square feet and irrigate thoroughly. A second application shall be applied within ninety (90) days of the initial planting.
  - d. Apply Ronstar G to bed planting at a rate of 150 pounds per acre or a City approved pre-emergent at the beginning and ending of the maintenance period in the presence of the City Authorized Representative.
  - e. The Contractor/Developer shall maintain the irrigation systems in a like new, operating condition, adjusting head heights, throw and spray arcs as necessary. The Contractor/Developer is responsible for proper watering of all plant areas and shall replace any material damaged due to improper irrigation.
  - f. Any concentrated development of weed growth that may appear in planting areas during the maintenance period shall be removed. The Contractor/Developer may elect to remove such concentrations of weeds manually or by an approved herbicide program.
  - g. During the maintenance period, the Contractor/Developer shall be responsible for maintaining adequate protection for all planting areas. Any damaged areas shall be repaired at the expense of the Contractor/Developer.
  - h. Pruning, when necessary, shall be performed as per City standards or upon direction of the City Authorized Representative.
  - i. During the maintenance period, the Contractor/Developer shall replace any dead or marginal plant material as deemed necessary by the City’s Authorized Representative.

3. Ninety (90) Day Maintenance Period Acceptance
  - a. At the successful completion of the ninety (90) day maintenance period, the City Development Department Inspector will provide a signed and dated acceptance form to the assessment district administrator and the Contractor/Developer. The Contractor/Developer shall submit a letter of request for the first bond release to the City LMAD Administrator in Public Works. The first bond release is 80%.
4. Ninety (90) Day Maintenance Suspension:
  - a. Failure to maintain the assessment district to City standards may result in the suspension of the maintenance period. Prior to re-entering the maintenance period, all corrections noted shall be completed to the City's approval.
5. One-Year Warranty Period
  - a. All work and material will be guaranteed by the Contractor/Developer for a period of one year from the completed ninety (90) day maintenance period acceptance date. Upon successful completion of the one-year warranty period, the City will walk the assessment area to determine if there are any warranty repairs or replacements to be made and will contact the Contractor/Developer. If no warranty concerns exist, the City LMAD Administrator in Public Works will submit the final 20% bond release request to City Council for approval.

If warranty repairs or replacements are required, upon completion of warranty item repairs or replacements, an inspection will be scheduled with a Public Works Representative for approval of items corrected. The Public Works Representative will provide an approved 20% final release form to the City Public Works LMAD Administrator who will then submit the final 20% bond release request to City Council for approval.

# APPROVED PLANT LISTS

LANDSCAPE MAINTENANCE, DRAINAGE FACILITIES, AND  
MAINTENANCE ASSESSMENT DISTRICTS (LMAD/DFAD/MAD)

**CITY OF VICTORVILLE**  
**PUBLIC WORKS DEPARTMENT**

**APPROVED PLANT LIST FOR LANDSCAPE MAINTENANCE, DRAINAGE FACILITIES,  
AND MAINTENANCE ASSESSMENT DISTRICTS (LMAD/DFAD/MAD)**

Note: Only plants on this list may be used in the construction of LMAD/DFAD/MAD. Plant substitutions must be authorized in advance by a City Planning Division Representative.

**A. VINES FOR BLOCK WALLS**

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Hedera helix	English Ivy	6'	10'
<b>2</b>	Parthenocissus tricuspidata	Boston Ivy	6'	10'

**B. VINES**

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Ampelopsis brevipedunculata	Blueberry climber	24'	20'
<b>2</b>	Hardenbergia violacea	NCN	2'	10'
<b>3</b>	Lonicera japonica "Halliana"	Hall's Honeysuckle	3'	3'- 50'
<b>4</b>	Lonicera semperiverens	Trumpet honeysuckle	3'	12'
<b>5</b>	Vinca major	Greater periwinkle	1.5'	10'+
<b>6</b>	Vinca minor	Dwarf periwinkle	1'	5'

**C. GROUNDCOVER**

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Atemisiz caucasica	Silver Spreader	3"- 6"	2'
<b>2</b>	Atemisia dracunculias	True Tarragon	1'- 2'	1'- 2'
<b>3</b>	Atemisia frigid	Fringed Wormwood	1'- 1.5'	1'- 1.5'
<b>4</b>	Atemisia lactiflora	White Mugwort	4'- 5'	
<b>5</b>	Atemisia pycnocephala	Sandhill Sage	1'- 2'	
<b>6</b>	Baccharis pilularis	Twin Peaks/Dwarf Coyote Bush	8"- 2'	6'+
<b>7</b>	Chamaemelum nobile	Chamomile	4'	1.5'
<b>8</b>	Coreopsis auriculata	Nana	5"- 6"	2'
<b>9</b>	Coreopsis grandiflora	Coreopsis	1'- 2'	3'
<b>10</b>	Coreopsis lanceolata	Lance Coreopsis	1'- 2'	3'
<b>11</b>	Cotoneaster adpressus	Creeping Cotoneaster	1'	6'
<b>12</b>	Cotoneaster adpressus praecox	Early Cotoneaster	1.5'	6'
<b>13</b>	Cotoneaster congestus	Pyrenees Cotoneaster	3'	
<b>14</b>	Cotoneaster dammeri	Bearberry Cotoneaster	3"- 6"	10'

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
15	Cotoneaster horizontalles	Rock Cotoneaster	2'- 3'	15'
16	Euonymus fortune	Winter Creeper	12 – 24"	20'+
17	Hemerocallis fulva	Tawney Daylily	6'	12'
18	Hemerocallis hybrids		1'- 6'	2'- 12'
19	Hemerocallis lilioasphodelus	Lemon Daylily	3'	6'
20	Hippocrepis comosa	NCN	3"	3'
21	Hypericum calycinum	Aarons Beard	1'	3'
22	Juniperus chinensis "Alba"	Variiegated prostrata	1.5'	4- 5'
23	Juniperus chinensis "Parsonii"	Prostrata Juniper	1.5'	8'
24	Juniperus chinensis "San Jose"	NCN	2'	6'
25	Juniperus chinensis procumbens	Japanese garden	2'	6'
26	Juniperus chinensis procumbens	Nana	1'	4'- 5'
27	Juniperus chinensis sargentii	Sargent, Shimpaku	1'	10'
28	Juniperus horizontalis "Blue Chip"	NCN	1'	4'- 6'
29	Juniperus horizontalis "Douglasii"	Waukegan	1'	10'
30	Juniperus horizontalis "Emerald Spreader"	NCN	6"	--
31	Juniperus horizontalis "Hughes"	NCN	6"	--
32	Juniperus horizontalis "Plumosa"	NCN	1.5'	10'
33	Juniperus horizontalis "Prince of Whales"	NCN	8"	--
34	Juniperus horizontalis "Turquoise Spreader"	NCN	6"	--
35	Juniperus horizontalis "Wiltonii"	Blue Carpet	4"	8'- 10'
36	Juniperus horizontalis "Yukon Belle"	NCN	6"	--
37	Juniperus sabina "Arcadia"	NCN	1'	10'
38	Juniperus sabina "Blue Danube"	NCN	1.5'	5'
39	Juniperus sabina "Broadmoore"	NCN	14"	10'
40	Juniperus sabina "Buffalo"	NCN	8"- 12"	8'
41	Juniperus scopulorum "White's silver king"	NCN	6'	8'
42	Juniperus squamata "Blue Carpet"	NCN	2'	5'
43	Juniperus virginiana "Silver spreader"	NCN	1.5'	6'- 8'
44	Lonicera japonica "Halliana"	Hall's honeysuckle	15'	3'- 50'
45	Rosmarinus officinalis ""Huntington Blue"	Collingwood Ingram	2- 2.5'	4'+
46	Rosmarinus officinalis "Prostratus"	Dwarf Rosemary Dwarf Rosemary	1.5' 2'	-- 4'- 8'
47	Salvia argentea	Silver Sage	1'	1'
48	Salvia argentea	Mealy-cup Sage	3'	3'

#### D. SHRUBS FOR PLANTERS LESS THAN 6' WIDE

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Abelia grandiflora	Glossy Abelia	8'+	5'+
<b>2</b>	Abelia grandiflora "Edward Goucher"	NCN	5'	4'
<b>3</b>	Cotoneaster "Hybrid Penulus"	NCN	6'	5'
<b>4</b>	Euonymus japonica	Evergreen Euonymous	8'- 10'	6'
<b>5</b>	Genista hispanica	Spanish Broom	1'- 2'	2'- 4'
<b>6</b>	Hypericum calycium	Aaron's Beard	1'- 3'	3'- 4'
<b>7</b>	Juniperus chinensis "Ames"	NCN	6'	5'
<b>8</b>	Juniperus chinensis "Armstrongii"	Armstrong	4'	4'
<b>9</b>	Juniperus chinensis "Fruitland"	NCN	3'	6'
<b>10</b>	Juniperus chinensis "Gold Coast"	NCN	4'	4'
<b>11</b>	Juniperus chinensis "Golden Armstrong"	NCN	4'	4'
<b>12</b>	Juniperus chinensis "Mint Julep"	NCN	4'	6'
<b>13</b>	Juniperus chinensis "Phitzerana"	Nick's compact	2'	6'
<b>14</b>	Juniperus chinensis "Phitzerana"	Mordigan Aurea	3'	5'
<b>15</b>	Juniperus chinensis "Phitzerana"	Old Gold	4'	4'
<b>16</b>	Juniperus sabina "Varigated"	Hoarfrost	3'- 4'	6'
<b>17</b>	Juniperus squamata "Blue Star"	NCN	2'	5'
<b>18</b>	Leucophyllum frutescens	Texas Ranger	5'- 12'	3'-5'
<b>19</b>	Ligustrum japonicum "Rotundiflorum"	Japanese Privet	4'- 5'	5'
<b>20</b>	Mahonia aquifolium	Oregon Grape	5'	5'
<b>21</b>	Mahonia bealei	Leatherleaf	6'	6'
<b>22</b>	Mahonia fremontii	Desert	3'- 12'	6'
<b>23</b>	Mahonia repens	Creeping	1'	6'
<b>24</b>	Nandina domestica	Heavenly Bamboo	1.5'- 6'	6'
<b>25</b>	Photinia fraseri	NCN	10'	6'
<b>26</b>	Rhaphiolepis indica	Indian Hawthorn	2'- 5'	3'- 5'
<b>27</b>	Salvia clevelandii	NCN	4'	4'
<b>28</b>	Salvia greggii	NCN	3'- 4'	3'- 4'
<b>29</b>	Salvia leucantha	Mexican Bush Sage	3'- 4'	4'- 5'
<b>30</b>	Salvia leugophylla	Purple Sage	3'- 4'	2'- 6'
<b>31</b>	Xylosma congestum "Compacta"	NCN	4'- 5'	4'- 5'

## E. SHRUBS FOR PLANTERS 6' WIDER

Any of the above may be used in conjunction with the following list for planters 6 feet or larger in width.

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Abelia grandiflora "Francis Mason"	NCN	6'	10'
<b>2</b>	Berberis thunbergii	Japanese Barberry	6'	10'
<b>3</b>	Cotoneaster apiculatus	Cranberry cotoneaster	4'	6'- 8'
<b>4</b>	Euonymus europaea	European spindle tree	25'	15'
<b>5</b>	Fallugia paradoxa	Apache plume	3'- 8'	10'
<b>6</b>	Genista pilosa "Vancouver Gold"	NCN	1'- 1.5'	7'
<b>7</b>	Juniperus cninensis "Fruitland"	NCN	3'	6'
<b>8</b>	Juniperus chinensis "Mint Julep"	NCN	4'- 6'	6'
<b>9</b>	Juniperus chinensis "Phitzerana Glauca"	NCN	5'- 6'	10'-15'
<b>10</b>	Juniperus chinensis "Sea Green"	NCN	6'- 8'	4'- 8'
<b>11</b>	Juniperus Sabina "Moor-Dense"	NCN	1.5'	8'
<b>12</b>	Juniperus Sabina "Variegated"	Hoarfrost	3'- 4'	6'
<b>13</b>	Juniperus scopulorum "Table Top Blue"	NCN	6'	8'
<b>14</b>	Leucophyllum frutescens	Texas Ranger	5'- 12'	4'- 6'
<b>15</b>	Ligustrum japonicum	Waxleaf privet	10'- 12'	8'
<b>16</b>	Ligustrum japonicum "Silver Star"	NCN	6'- 9'	6'- 9'
<b>17</b>	Ligustrum japonicum "Texanum"	NCN	10'	8'
<b>18</b>	Mahonia bealei	Leatherleaf	6'	6'
<b>19</b>	Pittosporum tobira	Mock orange	6'- 15'	2'- 10'
<b>20</b>	Xylosma congestum	NCN	8'- 25'	10'

## F. TREES FOR AREAS 5' TO 8'

Note: Root barriers must be installed within 10' of any hardscape. Each tree is to be irrigated with two Rain Bird 1402 bubblers in perforated pipe. Two lodge poles with two twist braces mailed into stakes to support the tree. See the City approved Specifications and Details for exact types of materials and placements.

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Celtis pallid	Desert hackberry	18'	10'- 15'
<b>2</b>	Celtis reticulate	Western hackberry	25'- 30'	20'
<b>3</b>	Celtis sinensis	Chinese hackberry	30'- 40'	20'- 30'
<b>4</b>	Cercis Canadensis	Eastern redbud	25'- 35'	15'- 25'
<b>5</b>	Cercis chinensis	Chinese redbud	10'- 20'	10'
<b>6</b>	Cercis occidentalis	Western redbud	10'- 18'	10'- 15'
<b>7</b>	Cotinus coggygria	Smoke tree	25'	15'- 20'
<b>8</b>	Crateagus ambigua	Russian hawthorn	15'- 20'	10'-15'
<b>9</b>	Crateagus laevigata	English hawthorn	18'- 25'	15'-20'
<b>10</b>	Dalea spinosa	Smoke tree	12'- 30'	10'-15'
<b>11</b>	Fraximus ornus "Raywood"	Raywood ash	25'- 35'	25'
<b>12</b>	Koelreuteria bipinnata	Chinese flame	20'- 30'	20'- 30'
<b>13</b>	Koelreuteria paniculata	Goldenrain	20'- 35'	20'- 30'

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>14</b>	Pistacia chinensis	Chinese Pistache	20'- 40'	20'
<b>15</b>	Prunus cerasifera "Atopurpurea"	Purple leaf plum	25'- 30'	15'- 25'
<b>16</b>	Pyrus Bradford	Bradford Pear	25'- 50'	20'- 30'
<b>17</b>	Tilia cordata	Little Leaf Linden	30'- 40'	15'- 30'
<b>18</b>	Tilia tomentosa	Silver Linden	40'- 50'	20'- 50'
<b>19</b>	Velutina "Modesto"	Modesto Ash	40'- 50'	20'- 30'
<b>20</b>	Velutina	Arizona Ash	40'- 50'	20'- 30'

### G. TREES FOR AREAS 8' OR WIDER

Note: Root barriers must be installed within 10' of any hardscape. Each tree is to be irrigated with two Rain Bird 1402 bubblers in perforated pipe. Two lodge poles with two twist braces nailed into stakes to support the tree. See the City approved Specifications and Details for exact types of materials and placements.

	<b>NAME</b>	<b>TYPE</b>	<b>MAX. HEIGHT</b>	<b>MAX SPREAD</b>
<b>1</b>	Cerdidium microphlium	Little Leaf Palo Verde	30'	20'
<b>2</b>	Juniperus osteoperada	Utah	30'	5'- 10'
<b>3</b>	Parkinsonia aculeate	Mexican Palo Verde	15'- 30'	15'- 25'
<b>4</b>	Pinus eldarica	Mondell Pine	30'- 80'	15'- 30'
<b>5</b>	Pinus eldarica	Afghan Pine	30'- 80'	15'- 30'
<b>6</b>	Pinus halepensis	Aleppo Pine	30'- 60'	30'- 50'
<b>7</b>	Pinus pinea	Italian Stone Pine	40'- 80'	30'- 50'
<b>8</b>	Tilia Americana	American Linden	40'- 60'	20'- 25'
<b>9</b>	Zelkova serrata	Sawleaf	60'	40'- 60'

### H. RABBIT RESISTANT PLANTS FOR ZONE 10

Due to the weather conditions and lack of vegetation in a lot of the areas of the High Desert we have experienced a lot of developers having problems with rabbits eating their plants. The following plant list for Zone 10 is provided for your use.

	<b>NAME</b>			
<b>1</b>	Artemisia (Sage)			
<b>2</b>	Ash			
<b>3</b>	Barberry			
<b>4</b>	Beard Tongue			
<b>5</b>	Black Dalea			
<b>6</b>	Blue Euphorbia			
<b>7</b>	Boxwood			
<b>8</b>	Butterfly Bush			
<b>9</b>	Cinquefoil			
<b>10</b>	Columbine			
<b>11</b>	Coreopsis			
<b>12</b>	Cotoneaster			

<b>13</b>	Dahlia			
<b>14</b>	Daphne			
<b>15</b>	Daylily			
<b>16</b>	Euphorbia			
<b>17</b>	Fairy duster			
<b>18</b>	Flowering Quince			
<b>19</b>	Glossy Abelia			
<b>20</b>	Heavenly Bamboo			
<b>21</b>	Hesperaloes			
<b>22</b>	Holly			
<b>23</b>	Juniper			
<b>24</b>	Kerria Japonica			
<b>25</b>	Leucophyllums			
<b>26</b>	Lilac			
<b>27</b>	Little Leaf Cordia			
<b>28</b>	Most Dasytirion			
<b>29</b>	Oregon Grape			
<b>30</b>	Pink Fairy duster			
<b>31</b>	Redbud			
<b>32</b>	Rosemary			
<b>33</b>	Sage			
<b>34</b>	Salvia			
<b>35</b>	Sumac			
<b>36</b>	Tju,e			
<b>37</b>	Trailing Dalea			
<b>38</b>	Trailing Desert Broom			
<b>39</b>	Verbenas			
<b>40</b>	Woolly Butterfly Bush			
<b>41</b>	Yarrow			

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	<b>MATERIALS</b>		<b>DESCRIPTION</b>	<b>BRAND/PART#</b>
1.	<b>Backflow Preventer, Reduced Pressure Principle</b>	a.	¾" through 2" diameter, with wye strainer and ball shut-off	FEBCO 825Y-BV-S or equal
		b.	2 ½" through 10" diameter, without wye strainer, with resilient seat, NRS gate valves	FEBCO 825Y-RW or equal
		c.	2 ½" through 10", with wye strainer, 150# flange connections with blow-out port	WILKINS 975 or equal
2.	<b>Backflow Enclosures</b>	a.	Aluminum alloy, vented with locking mechanism	"STRONG BOX" SERIES SBBC-AL or equal
		b.	Aluminum Alloy, vented, insulated for cold weather protection with locking mechanism	"STRONG BOX" SERIES SBBC-AL1 or equal
		c.	R-30 insulation blanket is required on backflows 2" or smaller.	Best choice is USA or equivalent
3.	<b>Gate Valves</b>	a.	2" and smaller – threaded bronze body, NRS, star or cross handle	NICO T-113K for 150 WOG or HAMMOND IB645 or equal
		b.	2 ½" and larger – threaded ductile iron body, NRS; 2" square top stem, resilient seat wedge, epoxy coated inside and out	WATEROUS 500 SERIES or equal
		c.	2 ½" and larger – mechanical/flange joint body, NRS; 2" square top stem, resilient seat wedge, epoxy coated inside and out	WATEROUS 500 SERIES with appropriate gaskets or equal
4.	<b>Ball Valves</b>	a.	Brass body, threaded with handle	HAMMOND 8204 or NIBCO 580 or equal
5.	<b>Angle Valves</b>	a.	2" and smaller (without union) – bronze body cross handle, threaded ends	HAMMOND IB643 or NIBCO T-311 or equal
6.	<b>Quick Coupling Valves</b>	a.	Two piece body with locking rubber lid, 1" inlet	RAINBIRD 44NP or equal
		b.	¾"x1" single slot couplet key	RAINBIRD 44K or equal
		c.	1"x ¾" swivel ell	RAINBIRD SH-1 or equal
		d.	1"x1" swivel ell	RAINBIRD SH-2 or equal
7.	<b>Remote Control Valves</b>	a.	Plastic body, globe pattern, threaded ends, flow control stem with cross handle, electric solenoid	RAINBIRD PEB-PRS-D or equal
8.	<b>Pressure Regulator</b>	a.	Bronze body, threaded ends, adjustable stem with locking feature and internal filter screen, 50 to 200 psi range, 300 psi inlet, 25 psi to 75 psi range	1" through 3" – WILKINS 600 SERIES or equal 1" through 3" – WILKINS 500 SERIES or equal
9.	<b>Central Control System (Rain Bird Maxi-Com)</b>	a.	Master Valve – 3" diameter or larger	BERMAD or equal 710P
		b.	Master Valve – 2" diameter or smaller	RAINBIRD GB SERIES brass valve or equal

	<b>MATERIALS</b>		<b>DESCRIPTION</b>	<b>BRAND/PART#</b>
		c.	Flow Sensor – 4" diameter or smaller	RAINBIRD LFS SERIES brass or equal installed with an unspliced shielded cable in 1 ¼" conduit. Paige electric cable # P-7162-D or equal
		d.	Larger than 4" diameter	SATTLE with insert type sensor
		e.	Cluster Control Unit (CCU) 28-RMK	Outside – RAINBIRD CCU 28 – RMK Inside- RAINBIRD CCU 28W - RMK
<b>10.</b>	<b>Sprinklers</b>	a.	4" pop-up with scal-a-matic check valve in head, pressure-regulating stem as required, ½" inlet	RAINBIRD 1804-SAM or equal
		b.	12" pop-up with scal-a-matic check valve in head, pressure-regulating stem as required, ½" inlet	RAINBIRD 1812-SAM or equal
		c.	Plastic nozzles should be specified on the plans, if they are to be used, to fit Rain Bird 1800 and 600 series, fixed arc spray nozzles	RAINBIRD 1800-B MPR SERIES or equal
		d.	Fixed arc, to fit Rain Bird 1800 and 600 series	RAINBIRD B-SS SERIES or equal
		e.	Variable arc nozzle 0-330 degree, spray type, plastic body, to fit Rain Bird 1800 and 600 series	RAINBIRD X-VAN or equal ("x" denotes the spacing)
		f.	Impacts – Stainless steel, full or part circle, plastic nozzles with distance control.	RAINBIRD 5000 – SAM, RAINBIRD FALCON 6504 or equal
<b>11.</b>	<b>Bubblers</b>	a.	All full circle, pressure compensating, ½" inlet, plastic body, nonadjustable	RAINBIRD 1401 SERIES
<b>12.</b>	<b>Boxes</b>	a.	Green plastic boxes for all valves and wires with two #8 stainless steel metal fasteners, 1" length round head and spanner drive	
		b.	Supply 2 spanner screwdrivers per ten valve boxes.	BROOKS or equal
<b>13.</b>	<b>Valve Markers</b>	a.	3" diameter domed had valve survey markers, solid brass with 2" shank, stamped with ¼" lettering with each valve type and it's number (for areas that are 15' or greater)	BEN MEADOWS CO. 101328 or equal
<b>14.</b>	<b>Booster Pump Assembly</b>	a.	Simplex water pressure booster system as designed and fabricated by Barrett Engineered Pumps and provided by Imperial Technical Services (714) 792-2920. The system shall be a completely prefabricated system with pump, piping, electrical and structural elements. The entire booster pump assembly shall be UL listed and approved.	
		b.	Pump shall be:	1) (GA Series) Single stage end suction close coupled centrifugal, cast iron bronze fitted construction, equipped with mechanical shaft seal, back pullout design. Impeller shall be threaded directly to the end of the shaft. Pump shaft shall be stainless steel with no sleeve. Pump shall be directly coupled to a C-face electric motor.

	MATERIALS		DESCRIPTION	BRAND/PART#
				2) (C### Series) single stage end suction close coupled centrifugal, cast iron bronze fitted construction, equipped with mechanical shaft seal, back pullout design. Impeller shall be keyed and locked to the shaft with a hex head impeller nut and washer. Pump shaft shall be high strength S.A.E. 1045 carbon steel protected in the stuffing box area by a replaceable bronze shaft sleeve. Pump shall be directly coupled to a C-face electric motor.
				3) (CR Series) Vertical Multi-Stage Centrifugal. Pump construction shall be cast iron stainless fitted with cast iron casing, stainless steel impellers and bowls. Pump shall be equipped with tungsten carbide mechanical seal. Pump shall be directly coupled to a C-face electric motor.
		c.	Electric motor shall be of the squirrel cage induction type suitable for full voltage starting. Motor shall be ODP to aid in cooling. Electric motor shall be rated for continuous service. The motor shall have horsepower ratings such that the motor will carry the maximum possible load to be developed under the designed pumping conditions and not overload the motor beyond the nameplate rating of the motor. Motor shall have a 1.15 service factor. The motor shall conform to the latest NEMA Standards for motor design and construction.	
		d.	Pump Control Panel shall have a NEMA 4X plain front non-metallic enclosure with padlock latches. This includes power and control re-settable thermal circuit breakers, heavy duty magnetic starter with adjustable overload protection, hand-off-auto switch to select mode of operation, and heavy duty numbered terminal strips for power and control wiring lead terminations.	
		e.	Metal oxide varistor protected pump start relay(s) incorporated in panel to start pump with signal from each irrigation controller.	
		f.	All system piping shall be type "L" copper. All fittings shall be copper or brass, with unions or flanges to allow for system disassembly or major component removal. System shall incorporate an integral full size bypass line with isolation valve to allow for pump removal and repair without disrupting water supply to system.	

	MATERIALS		DESCRIPTION	BRAND/PART#
		g.	Isolation valves shall be all brass quarter turn ball valves with hard chrome ball on lines 2" and less. Isolation valves shall be lug style butterfly valves with Buna-N elastomeric seats, ductile iron nickel coated disc, and stainless steel stem with handle and 10 position galvanized memory plate on lines 2' ½" and greater.	
		h.	Gauges shall be 2 ½" diameter face, glycerin filled with stainless casing and brass internals.	
		i.	Flow activated paddle style magnetically coupled flow switch, sensitive to flows as low as 1 fps, mounted on piping and interconnected to time delay relay to shut down pump on no-flow conditions, time delay relay adjustable from 0 to 5 minutes.	
		j.	Pump system shall be mounted on a structural aluminum skid with mounting flanges on front and back to allow for mounting of skid to concrete pad. Skid equipped with pipe support on suction and discharge piping. All nuts and bolts and washers to be heavy zinc coated steel on skid and piping. Skid shall include mounting hardware for integral aluminum enclosure.	
		k.	The system enclosure shall be vandal and weather resistant, marine grade aluminum alloy 5052-H32 construction with rectangular punch-outs for viewing and heat dissipation. The enclosure shall be low profile hinged top design with padlock provision. The cover shall be secured to the concrete pad with stainless steel hardware.	
		l.	Pump Assembly shall include the following option(s):	1) (VFD) Where specified by the System Design Parameters, a Variable Frequency Drive system to convert incoming 1 phase power to 3 phase power for the motor.
				2) VFD system to receive feedback signal from system mounted stainless steel pressure transducer, and in conjunction with internal software driven PID control loop maintain customer adjustable constant system discharge pressure by varying the speed of the pump in response to varying system load.

	MATERIALS		DESCRIPTION	BRAND/PART#
		m.	The services of a victory representative or trained service professional shall be made available on the job site to check installation and perform the startup and instruct the operating personnel. A start up report containing voltage and amperage readings, suction and discharge pressure readings, estimated flow conditions, and general operating characteristics shall be submitted to the owner.	
		n.	Four sets of operating and maintenance manuals shall be provided to the owner after startup and shall include parts manuals for major components, performance curve for pump, general sequence of operations, and electrical schematic for control panel.	
15.	<b>Product</b>	a.	Conduit	All Communication cable interconnect conduit and conduit fittings shall be 1 1/2" Schedule 40 PVC pipe, unless otherwise noted.
		b.	Conductors	1) Communication Path – Link Radio communication for the irrigation interconnect as required from the Cluster Control Unit(s) (CCU) to the satellite unit(s) shall be 2 watt, 450 MHz Data radio/modem unit(s) with RS-232 cable from CCU and satellite unit to radio/modem unit (9 pin only), RG-58 antenna cable, antenna (as specified).
				2) The flow sensor wire shall be a two conductor of ICEA class B, 16 AWG 7 strand, conforming to ASTM B-3 and B-8, aluminum shield with drain wire, and shall have a jacket of .50 sunlight and moisture resistant PVC as manufactured by Paige Electric, Inc. (product #P7162D).
				3) Flow sensor wire may be extended to a maximum distance of 2,000 feet from the location of the assembly to which it is connected. Wire shall be installed in a 1" PVC Schedule 40 pipe.
				4) All conductors shall be the same type and shall be of the sizes shown on the drawings as required for proper operation of the systems.

	MATERIALS		DESCRIPTION	BRAND/PART#
		c.	Wire Splices	1) Conductors shall be installed with no underground splices, unless absolutely necessary and unavoidable. Any and all underground splices that are required to be made, must be approved by the Architect, and shall be placed in a suitable type valve box for easy access.
				2) Wire splices on the two conductor cable communication wires shall be made with 3M DBY splice kit.
16.	<b>Controller</b>	a.	Automatic Controller(s) and Related Equipment	1) Controller(s) shall be as indicated on the drawings, and will be manufactured by Rain Bird Sprinkler Manufacturing Corp. Controller shall be installed per manufacturer's specifications, as shown on the drawings, and as specified herein. All controllers shall be Rain Bird Model #ESP-SAT-XX.
				2) The irrigation system controller shall be of a hybrid type that combines electromechanical and microprocessor based circuitry capable of fully automatic, semi-automatic, and manual operation. The controller will be housed in a weather proof, lockable 16 gauge seamless steel cabinet suitable for wall mounting or free standing pedestal mounting.
				3) The controller shall operate on a 117 VAC 10% at 60 Hz and be capable of actuating up to two 24 VAC, 7 VA, solenoids per station plus a master valve or pump start relay. The controller shall operate two (up to nine) stations plus the master valve simultaneously. Controller output and input shall be protected against severe electrical surge.
				4) The controller shall have four separate irrigation programs (A, B, C & D) which may have different start times, watering days and station timing. Each program shall be capable of up to 8 start times per day.

	MATERIALS		DESCRIPTION	BRAND/PART#
				<p>5) The controller shall have 12, 16, 24, 28, 32, 36 or 40 stations, each capable of an operating time of 0 to 2 hours in one minute increments. Stations assigned to the Drip program shall be capable of an operating time of 0 to 59 minutes in 1 minute increments and 1 to 12 hours in 10 minute increments. The controller shall be capable of automatic sequential stacking to avoid overlapping operation, except for the Drip program, which will operate concurrently with the other programs.</p>
				<p>6) The controller shall provide a separate water budget feature for each of the A, B, and C programs. Water budget shall allow simultaneous adjustment for all stations on a program from zero% of set running time to 200% of set running time. Adjustments shall be in 10% increments.</p>
				<p>7) The controller shall have a 365-day calendar with day-of-the-month OFF feature. Programs will run on an ODD/EVEN day cycle, day-of-the-week ON/OFF cycle or in cycles from 1 to 99 days. In addition, the controller shall have a programmable rain shut down from 1 to 99 days.</p>
				<p>8) The controller shall have a master valve/pump start circuit for use with a master valve to pressurize the system when the irrigation cycle starts, or to activate a remote pump start relay to run the pump during the irrigation cycle. The master valve/pump start circuit shall be ON/OFF programmable by station.</p>
				<p>9) The controller shall be capable of being operated manually at any time. A manual single station, a group of stations or a program can be selected to run for a programmed time or a new time setting without affecting the normal program.</p>
				<p>10) The controller shall be capable of operating a variable test program without affecting the controller's normal program station times. The variable test program shall be from 1 to 9 minutes. This feature shall be functional even during rain shutdown.</p>

	MATERIALS		DESCRIPTION	BRAND/PART#
				<p>11) The controller shall have Cycle + Soak water management feature that is capable of operating each station for a maximum cycle time and a minimum soak time to reduce water run-off and puddling. The maximum cycle time shall not be extended by water budgeting.</p>
				<p>12) The controller shall have internal non-volatile memory capable of program memory retention for a minimum of 10 years without power. The controller shall include a NiCad 9 VDC rechargeable battery and recharging circuit which will maintain and run the time of day operation during power outages of up to 48 hours. Recharging circuit shall also be used for counting down the program-in-progress during a power outage and allow programming of the controller when disconnected from the main power supply.</p>
				<p>13) There shall be status indicator lights for each station plus the master valve circuit. Each station plus the master valve will be protected by a diagnostic circuit breaker which will allow that station to be bypassed during the program. These lights will indicate station operation and circuit integrity.</p>
				<p>14) An indicator for sensor status will be on the front panel along with a switch to suspend sensor operation. This indicator and override will work with a sensor wired to the controller's sensor terminals.</p>
				<p>15) During operation the unit shall provide a monitoring readout indicating station in operation and time remaining. The satellite shall have a 12 hour AM/PM or 24 hour clock.</p>

	MATERIALS		DESCRIPTION	BRAND/PART#
				<p>16) Under all normal operation, all station timing of the satellite unit shall be done by the central control computer through the CCU and not according to the times programmed at the satellite. The programming on the satellite unit itself shall only be functional in case of emergency, should the communication link between the satellite and the CCU is lost. It shall be strictly for a stand-by operation of the satellite in case of emergency. The change over to the stand-by program and/or back to the central control status shall take place automatically and not require a trip to the field to set each satellite unit to the back-up mode or the central mode.</p>
				<p>17) The controller, when operated by the CCU shall be capable of random access or operations of the individual stations and is not required to be operated in numerical sequence. Any of the stations may be repeated anywhere within the scheduled cycle of operation as often as desired and for a different amount of time on each repeat, if so desired. It shall also be possible to place any individual station in as many different scheduled cycles as may be desired. There shall be no limit or restrictions as to the number of individual scheduled cycles a given station may be scheduled in at any one time.</p>
				<p>18) In local field control and operation, the controller shall be capable of being manually operated on any one of the stations for single-station operation, any portion of a cycle or a complete cycle manually started, as desired. This shall be possible without moving the central control – independent station control satellite switches from the central control position. When the central control-independent station controller satellite switch is in the independent station controller satellite position, the satellite unit will ignore all central control communications and programming and respond only to its own programming as to start days, start times, and individual station timing, operating the stations as programmed and performing all functions as normal stand-alone controller.</p>

	MATERIALS		DESCRIPTION	BRAND/PART#
				19) The controller shall have two internal jumpers to allow the operator the opportunity to choose from either a factory default or no default and from an electronic style backup verses mechanical style backup.
				20) Each controller unit shall be capable of being programmed in the field (at the time of installation) to respond to one of 28 different signals (or channels) from the CCU. The unit shall be capable of being reprogrammed to a different signal (channel) at any time. Satellites of 32 or 40 stations shall use 2 different signals (or channels).
17.	<b>Cluster Control Unit Assembly</b>	a.	The number and location of the cluster control unit(s) shall be shown on the drawing and shall be as manufactured by Rain Bird Sprinkler Manufacturing Corporation.	1) CCU shall be no less than twenty eight channels (CCU-28).
		b.	Each cluster control unit shall have a separate two-wire path to the satellite controllers under its control. This wire link shall be of the wire type, installed and herein specified. Through Link Radio communication, the CCU shall have a separate radio path to the satellite controllers under its control. The radio link shall be of the type, installed and herein specified.	
		c.	The cluster control unit shall connect directly to the telephone company lines via standard connector Model RJ11C, in full compliance with part 68, FCC docket 19528 or local telephone company standards.	
		d.	The cluster control unit assembly shall be pre-assembled by Imperial Technical Services (ITS) in a "Strong Box" stainless steel weatherproof, vandal resistant, lockable enclosure with flush mounted handle as manufactured by V.I.T. products, Inc., per article 2.7. The complete assembly shall be listed with Underwriters Laboratories, Inc., with a 3R rating.	
		e.	The cluster control unit assembly (product # ISA series) shall consist of a stainless steel enclosure with a removable backboard, key operated on/off switch, ground fault circuit interrupter duplex receptacle and ground rod, wire and clamp. This assembly shall also include a 117 volt line primary protection (product #SP).	

	MATERIALS		DESCRIPTION	BRAND/PART#
		f.	The cluster control unit assembly group shall include a rain gauge roof or pole mounted assembly (Link Radio product # LSRG or LSRGP) as shown on the drawings to be properly located to avoid interference from trees and buildings and connected to the nearest cluster control unit. This assembly shall consist of a rain gauge pulse decoder and mounting bracket.	
		g.	The cluster control unit assembly shall be covered by a five-year limited warranty. Warranty service shall be performed in the field on the site where the equipment is located.	
		h.	All components shall be properly wired to the appropriate terminal strip.	
18.	<b>Satellite controller and/or Cluster Control Unit(s) (CCU) Enclosure(s)</b>	a.	The enclosure shall be of a vandal and weather resistant nature manufactured entirely of 304 grade stainless steel. The main housing shall be louvered upper and lower body to allow for cross-flow ventilation. A stainless steel backboard shall be provided for the purpose of mounting electronic and various other types of equipment. The backboard shall be mounted on four stainless steel bolts that will allow for removal of the backboard. The required enclosure types shall be one of the following: 16" top entry, 18" X 52" electrical meter/controller, or 18" double-wide front entry.	
		b.	The inside door area shall provide adequate storage for plans, operating instructions and scheduling information.	
		c.	The enclosure door shall have a continuous stainless steel piano hinge, carriage bolted on one side and a three point locking mechanism on the other side. The handle controlling the locking mechanism shall be located at the base of the door and be concealed within the surface of the door. A stainless steel cam style lock shall be mounted in the door and a provision for a padlock shall be included within the locking mechanism.	
		d.	The enclosure shall be manufactured with a continuous drainage channel which mates with a teardrop shaped, hollow center, water-tight, thermoplastic door seal. The above described product shall be a NEMA 3R Rain-proof enclosure as listed by the Underwriter Laboratories, Inc.	
		e.	Controller enclosures shall be "Strong Box" manufactured by V.I.T. Products, Inc.	

	MATERIALS		DESCRIPTION	BRAND/PART#
		f.	Controller number(s) and remote control access number(s) shall be neatly stenciled onto outside of enclosure door in 2" high letters using paint designed for direct application onto stainless steel.	
19.	<b>Satellite Controller/Enclosure Assembly</b>	a.	The number and location of the satellites shall be as shown on the drawings.	
		b.	All satellite assemblies shall be linked to a CCU via link radio.	
		c.	The satellite assembly shall be pre-assembled by ITS in a "Strong Box" stainless steel weatherproof vandal resistant lockable enclosure with flush mounted handle as manufactured by V.I.T. Products, Inc., per article #18. The complete assembly shall be listed by Underwriters Laboratories, Inc., with a 3R rating.	
		d.	The satellite assembly (product # IRA series) shall consist of a stainless steel enclosure, stainless steel removable backboard, terminal interface board with radio remote receptacle, key operated on/off switch, a ground fault circuit interrupter duplex receptacle. Ground rod, wire and clamp shall be provided with two or multi-conductors paths only.	
		e.	The satellite assembly shall include a 117 volt line primary protection assembly (product #SP).	
		f.	The satellite assembly shall have a master valve relay assembly (product #MVR) when more than one satellite is connected to the same master valve. This assembly shall consist of a 24 volt relay and socket.	
		g.	The satellite assembly shall have a Flow Sensing Assembly and shall consist of a pulse transmitter and a tee mounted sensor only (product #LFS series).	
		h.	The satellite assembly shall be covered by a five-year warranty. Warranty service shall be performed in the field on the site where equipment is located.	
20.	<b>Radio Remote Control Equipment</b>	a.	Remote control components shall be as manufactured by Remote Control Technologies, WA. As provided by ITS.	
		b.	Remote control receiver cards shall be a RCA permanent controller mount unit(s).	1) TRC shall be compatible with all electromechanical slid state and hybrid controllers.
				2) Output 24 VAC to pump start or master valve.
				3) Activate up to 7 valves plus pump start or master valve at once.

	<b>MATERIALS</b>		<b>DESCRIPTION</b>	<b>BRAND/PART#</b>
				4) Programmable operating time of two (2) minutes to two (2) hours.
				5) 20 minute default shut-off time.
				6) Power is 24 VAC from controller.
		c.	Remote control transmitter (RCX) kit(s) shall include a hand-held remote control transmitter with belt clip, battery charger/transformer 115 to 15 VDC, 11 volt NiCad battery and flexible antenna with BNC connection to unit. Transmitter shall have an effective range of one mile.	
<b>21.</b>	<b>Data Collection</b>	a.	Each controller shall also include data collection (#DAT Series).	
		b.	The data collection shall be represented by the number of stations on the specified controller (12-40 stations).	1) The satellite assembly shall include #DATXX for the purpose of MAXICOM data collection for a XX station ESP satellite controller. This data collection is for the purpose of inputting collected field data such as station locations and types, flow data and precipitation rates (per manufacturers catalog), into a MAXICOM central computer and software for creating irrigation schedules.

## **XI. Specification Detail Pages**

### **Hardscape**

1. "A" Curb Detail
2. LMAD Curb/Wall Detail
3. LMAD Curb/Wall Detail (Variance)
4. LMAD Standard Wall Detail
5. Mow Edge

### **Irrigation**

6. Bubbler & Swing Joint Assembly
7. Bubbler in Sleeve
8. 16"x16" Top Entry Controller Assembly (ICA6 Series)
9. 18"x24" Controller Assembly (ICA2 Series)
10. 18"x32" Metered Controller Assembly (ICA5 Series)
11. Minimum Grounding Requirements
12. Grounding Wires in Grid Detail
13. Maxicom CCU (Wall Mount)
14. Maxicom Dual Flow Sensors Detail
15. Maxicom ESP-SAT Field Satellite Controller
16. Flow Sensor
17. Maxicom Flow Sensor Detail
18. Stainless Steel Meter Pedestal
19. Pop-Up Spray Sprinkler
20. Pop-Up Rotor Sprinkler (Small Radius)
21. Backflow Preventer Enclosure
22. Reduced Pressure Backflow Preventer
23. Pressure Regulator
24. Pull Box & Connectors
25. Thrust Block Configurations
26. Triangular Grid Plan View Detail
27. Ball Valve
28. Assembly Detail Drip Remote Control Valve
29. Gate Valve (3" or Smaller)
30. Quick-Coupling Valve
31. Remote Control Valve

### **Landscape**

32. Ground Cover Detail
33. Planter Strip at Street Medians

- 34.** Shrub Planting Detail
- 35.** Tree Planting Detail
- 36.** Tree Pruning (Dec. to Feb.)
- 37.** Trenching Requirements
- 38.** Vine Planting Detail
- 39.** Drip Distribution Detail

### **Repair Section/Obsolete Specs**

- 40.** Small Cover Box Detail
- 41.8** Port Emitter in Box Detail
- 42.8** Port Emitter Layout Detail
- 43.** Multi-Outlet Emitter in Box Detail
- 44.** Master Valve-Flow Sensor, Pump Start, & Rain Sensor for Multiple  
Controllers (Central Control)
- 45.** Omni Antenna on a Pole
- 46.** Pop-Up Rotor (Large Radius Throw)
- 47.** Combination Air Valve
- 48.** Flush Valve Detail
- 49.** Flanged Gate Valve (4" or Larger)