

Guide to Successful Drip Irrigation For Landscape Professionals



The following information is offered by the Environmental Programs Division of the City of Santa Monica to promote the installation of effective, water-efficient and trouble-free drip irrigation systems in the City.

For more information visit www.smepd.org
or call (310) 458-8972

Brought to you by the City of Santa Monica's
Environmental Programs Division.
Water Efficiency Section
200 Santa Monica Pier, Suite K
Santa Monica CA 90401



1. Overview

The following information is based on extensive experience in water-efficient landscape irrigation aimed at effective, trouble-free drip systems that function well in urban installations. Keep in mind that installation contractors want to install systems that will not result in call-backs and maintenance contractors want rugged systems that lend themselves to the practices their workers have already learned. Most property owners want the same thing. This information was prepared with those ideas in mind.

2. Equipment

Whenever possible, equipment available from local suppliers of professional irrigation equipment has been identified below. However, due to limited experience and training at the retail level, you are probably going to have to order some of this equipment. Allow time in your job schedule to do so. Drip irrigation supplies available at Home Depot and OSH are, for the most part, specifically made for the homeowner market to sell at the lowest possible price. They may function less reliably than professional equipment.

POINT OF CONNECTION – See Detail 3c

Backflow Prevention - Unless antisiphon valves are to be used, specify an appropriately-sized reduced-pressure (RP) or pressure vacuum-breaker (PVB) device. Keep in mind that flow rates in drip irrigation are much lower than in spray systems. You may be able to use a smaller backflow device.

VALVE ASSEMBLIES – See Detail 3a & 3b

Valve assemblies for low-volume irrigation zones consist of three items: a **remote control valve**, a **pressure regulator** and a **filter**. *[If desired, a single master filter and/or master pressure regulator may be used for the entire system, located after the backflow device and/or master valve. In this case, if the system does not include a master valve, heavy-duty filters and pressure regulators that can tolerate constant pressurization must be used.]*

REMOTE CONTROL VALVE

A key factor for reliable low-volume systems is to choose a valve with a **minimum flow rate that is lower** than the zone flow rate. For the very low flows encountered in residential applications in Santa Monica, only a few valves will meet the requirement described above.

REMOTE CONTROL VALVE (continued)

Recommended brands / models:

In-line valves:

Buckner VBDW Series
Rain Bird DV, PEB or PESB Series
Superior 470 DI
Weathermatic 12000 Series

Antisiphon valves:

Rain Bird ASVF
Superior 850 DI

PRESSURE REGULATOR

As with valves, pressure regulators must have a **minimum** flow rate that is **lower** than the zone flow rate. For drip systems you can use a preset or adjustable pressure regulator. For microspray systems use an adjustable pressure regulator.

Recommended brands / models:

Preset:

Hendrickson PR5500 Series
Rain Bird PRF075BFF (Note: This device combines a 30 psi pressure regulator with a 3/4" wye filter. This is a good choice for retrofitting existing antisiphon valves.)
Senninger LF Series

Adjustable:

Bermad PRV Series

FILTER

Use a 150 – 200 mesh, wye or tee filter with a stainless steel screen.

Recommended brands / models:

Agricultural Products 1Y, 3/4Y or 3/4T;
Rain Bird QKCHK or RBY Series
Rain Bird PRF075BFF (Note: This device combines a 30 psi pressure regulator with a 3/4" wye filter. This is a good choice for retrofitting existing antisiphon valves.)

PIPING SYSTEM

PIPE

For lateral lines feeding Riser Units and for Header and Collector manifolds use rigid PVC pipe of the same type used for sprinkler systems. Pipe larger than 3/4" is seldom required for residential drip systems. Use Low VOC cement for joining the pipe.

Recommended pipe type: Class 315 or Schedule 40. Do not use Class 125 pipe.

RISER UNITS & HEADER / COLLECTOR MANIFOLDS – See Details 1a & 2a

These components are the transition points from below-grade piping to above-grade tubing.

DRIP TUBING & FITTINGS

For simple, trouble-free installations use only name-brand, 16mm (600 Series) or 18mm (700 Series) Polyethylene (PE) tubing for all landscape drip applications.

NOTE: Use of 1/4" or 1/8" *spaghetti tubing* or any drip irrigation device which utilizes this tubing, such as multi-outlet emitters, is not recommended for professional landscape installations. Use 1/4" tubing for container plantings only.

Recommended brand / model: Agrifim A620 or A700
 Rain Bird XT700
 Toro *Blue Stripe*

Use compression-type fittings that fit over the outside of the tubing. Use fittings matched to the size of your tubing or use Rain Bird *Easy Fit* fittings. For best results, do not use "twist-lock" type fittings or externally barbed, *insert* fittings.

WATERING DEVICES

DRIP EMITTERS (Drippers)

Drip emitters are the devices that regulate the water flow from the tubing at a specific rate, usually 0.5 or 1.0 gallons per hour (GPH). There are hundreds of types of drippers but only a few that work reliably, year-after-year in the landscape. The most commonly available, trouble-free drip emitters are based on a principle called *turbulent flow*.

If your plants are very widely spaced you can use plain PE tubing and insert drippers at each plant. However, for most landscape applications it is easier to use *emitter line*, (also referred to as *dripperline* or *dripline*). Emitter line consists of 16mm or 18mm PE tubing as described above with drip emitters pre-formed into the tubing at a pre-determined spacing. Most types of emitter line utilize *turbulent flow* emitters. For most landscape drip systems emitter line with 0.5 gallon (2 liter) drippers at 12" spacing works best.

DRIP EMITTERS (continued)

Recommended brand / model:

Individual drip emitters:

Agrifim Iso-Flo, Aqua-Flo or PC Plus

Rain Bird Xeri-Bug

Emitter Line:

Agrifim Dura-Flo

Rain Bird Landscape Dripline

Toro DL2000

As indicated in the note above, 1/4" emitter line is not recommended for professional landscape use.

CONTROLLER

Choose a controller with three or more programs that permits long (multi-hour) run times. Weather-based irrigation controllers (WBIC) are recommended. Call 310/458-8405 for information about possible rebates on WBICs for qualifying installations in Santa Monica.

ACCESSORIES

MULCH

Use shredded bark mulch. Do not use pebble-shaped mulch.

Recommended brand / model: Kellogg's Xerimulch or, for large installations, B.D. White Fir Walk-On Bark. Xerimulch is available through landscape supply dealers. B.D. White Company is located in Torrance CA; 310/ 370-5511

WIRE STAKES

Use U-shaped (not *shepherd's crook*), galvanized steel wire stakes.

Recommended type: 6 x 1 x 6, 9-gauge, galvanized steel soil staples; available from Aqua-Flo Supply; 310/915-5208.

SPECIAL EQUIPMENT FOR CONVERSION OF SPRAYHEADS TO DRIP – See Detail 4a

Rain Bird makes specialized devices designed specifically for the conversion of both Rain Bird 1800 and Toro 570 sprayheads to drip irrigation.

RETRO 1800

This device looks like a Rain Bird sprayhead, but it is actually an adapter that contains a pressure regulator and filter. When installed in place of an existing sprayhead, it becomes a connection point for drip tubing. When replacing Rain Bird brand sprayheads, only the interior parts need to be replaced. Note: The zone valve, originally designed to work with sprinklers, may have to be converted to a low-flow valve. See VALVE ASSEMBLIES above.

XC-1800 / XC-T-570

These are caps used to close off the unused sprayheads in the converted zone. Use XC-1800 for Rain Bird 1800's and XC-T-570 for Toro 570's.

3. Recommended Installation Procedures

PIPING

Install pipe system according to detail drawings using Layout #1 for randomly-placed plants or Layout #2 for linear, on-center plantings.

DRIP TUBING

Do not bury the tubing. Install the emitter line on grade according to detail drawings for the layout you have chosen. Because plant size and exact location within the zone may be changed during installation, the final location of the emitter line in relationship to each plant must be determined by the installer. Place tubing in such a manner as to evenly wet at least 60% of the root ball of each plant. For small plants one emitter may be sufficient. For larger plants, multiple rows of tubing will be required. Use galvanized hairpin type stakes to hold the tubing securely in place.

FLUSHING

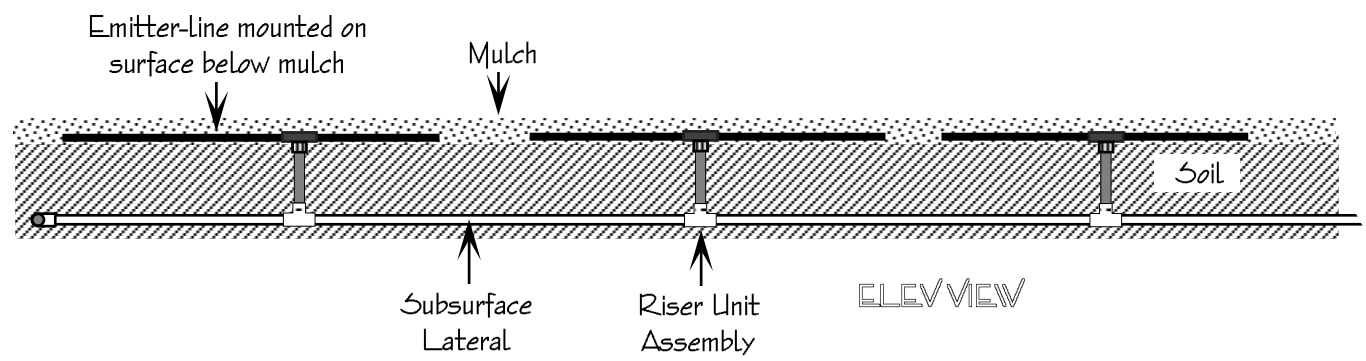
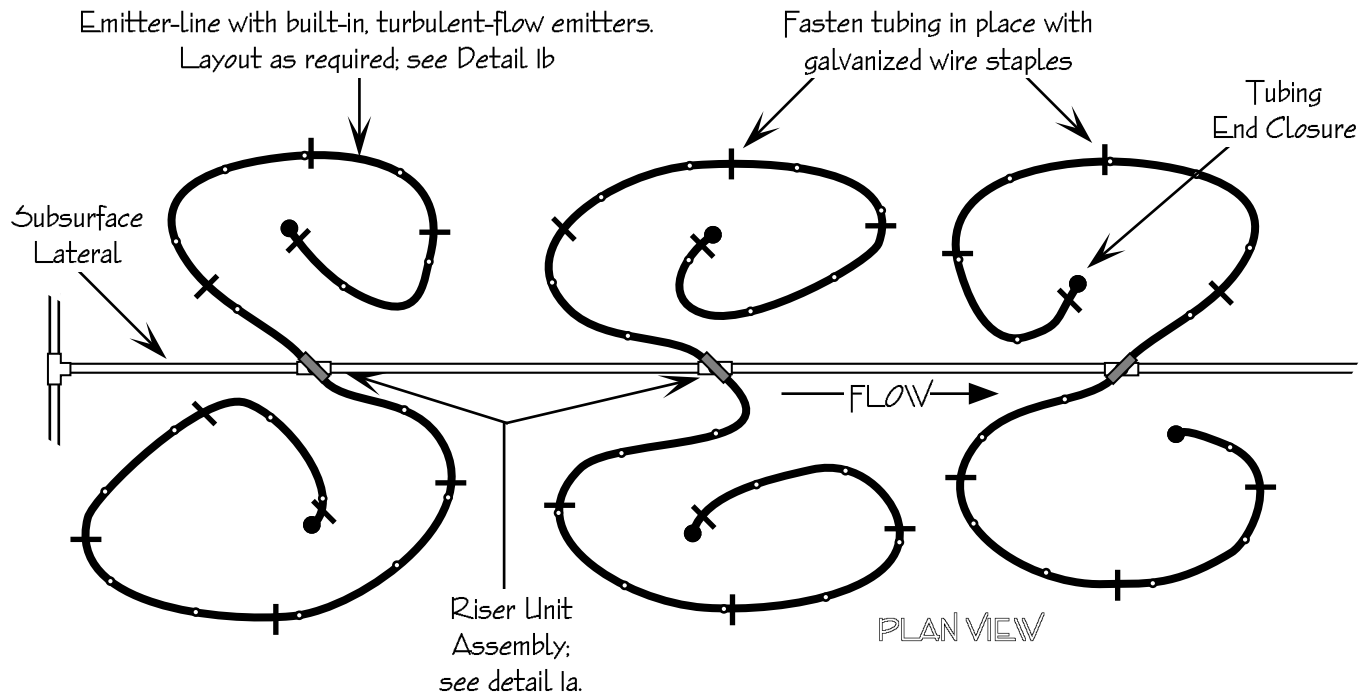
Flush all mains, laterals, manifolds and Tattletail / Flush Assemblies before connecting the tubing to the Riser Units or Header Manifolds. After installation of drip tubing, flush all sections again through Tattletail / Flush Assemblies or Collector Manifolds before closing off the tubing.

MULCH

Operate the system for a few weeks uncovered to allow for adjustment. When adjustment is complete, install 2"-3" of mulch.

Questions?

Call Bob Galbreath at the City of Santa Monica Environmental Programs Division at 310 / 458-8405



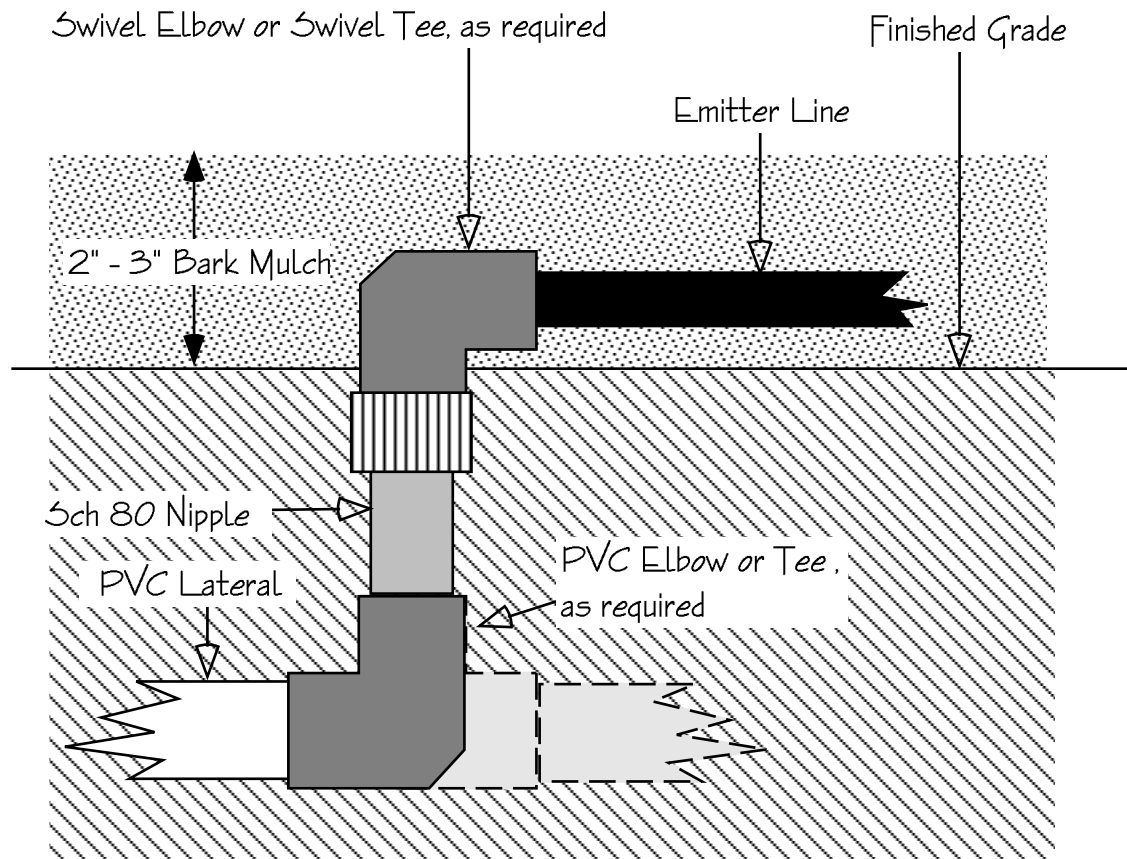
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1. RECOMMENDED DRIP IRRIGATION LAYOUT #1

RISER UNITS USED WITH EMITTER-LINE FOR NON-LINEAR, RANDOM PLANTINGS

REV 10/26/05

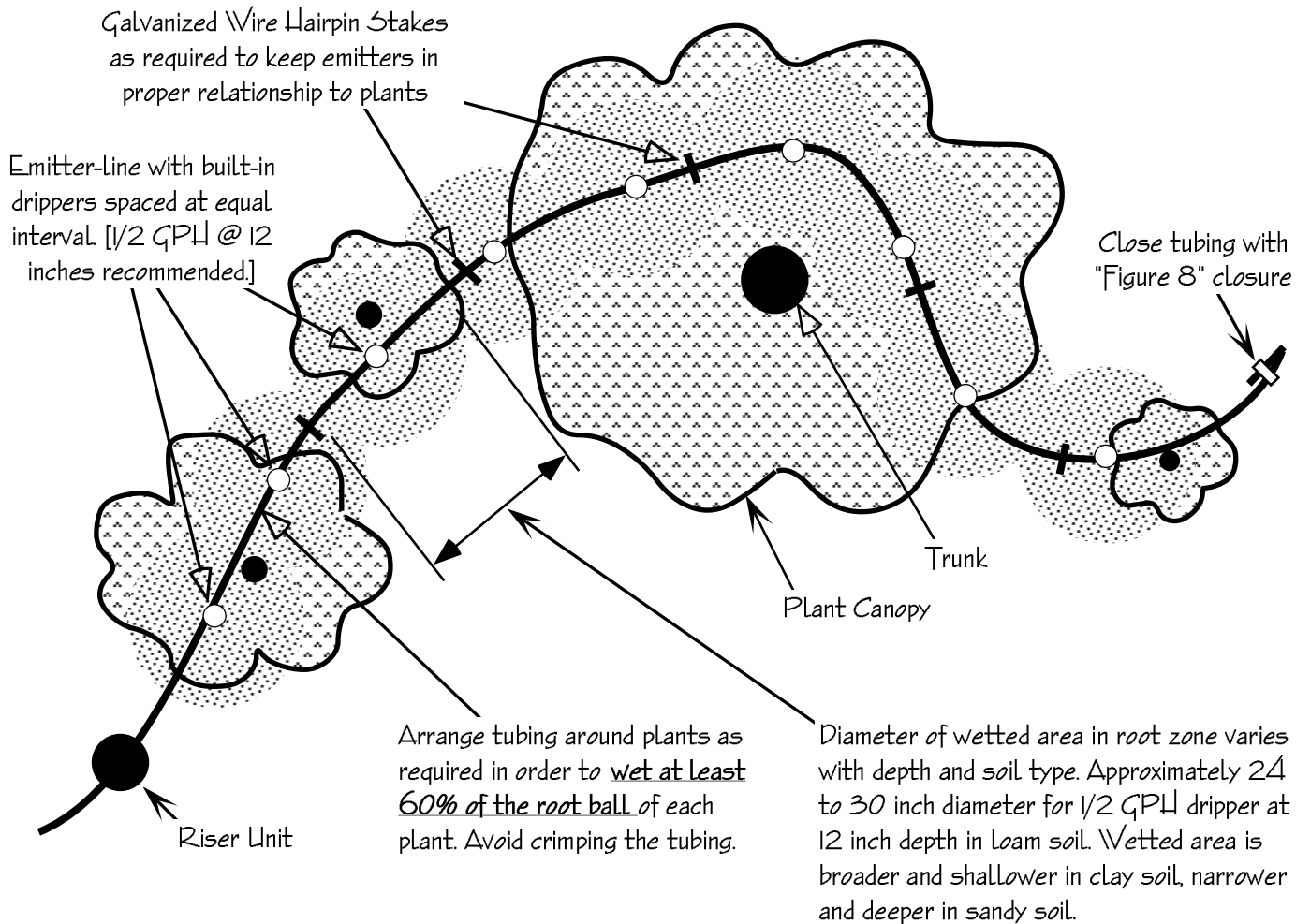
NOT TO SCALE

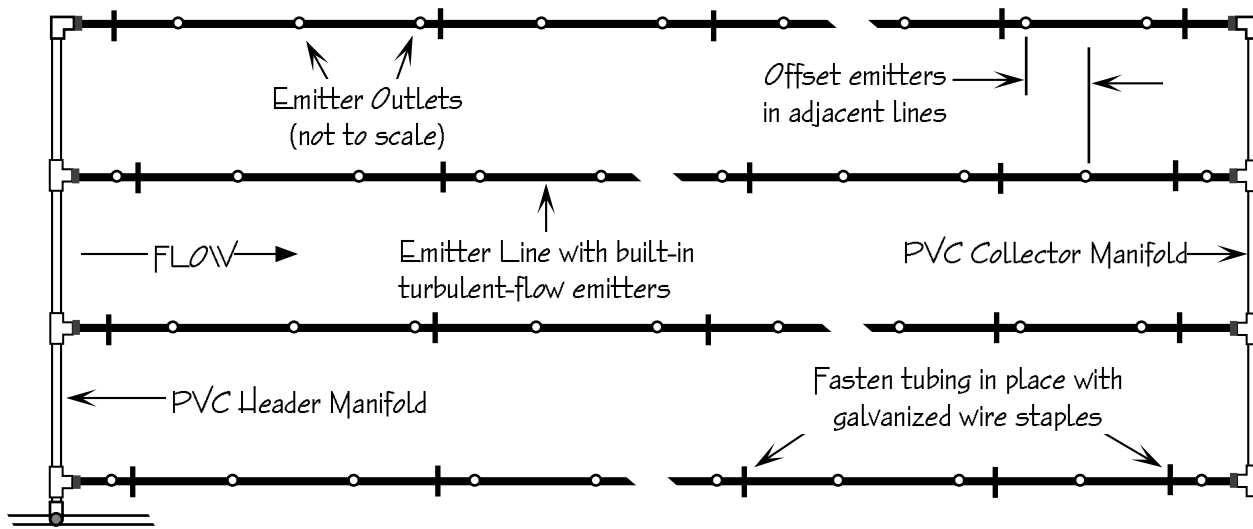


CITY OF SANTA MONICA - ENVIRONMENTAL PROGRAMS DIVISION
 1A. RECOMMENDED CONFIGURATION FOR DRIP IRRIGATION RISER UNITS

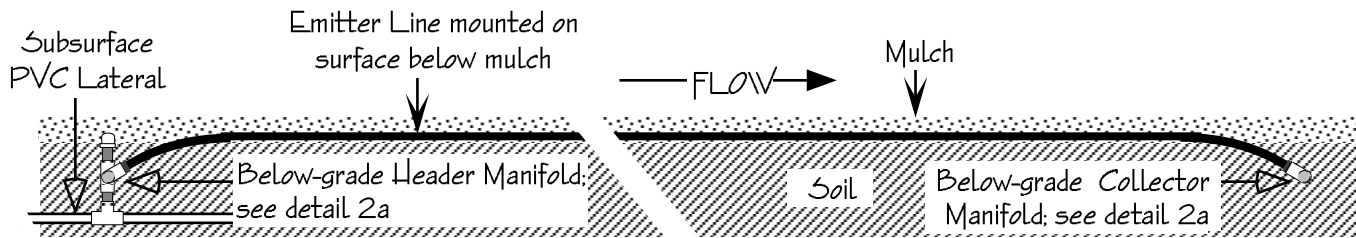
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NOT TO SCALE





PLAN VIEW



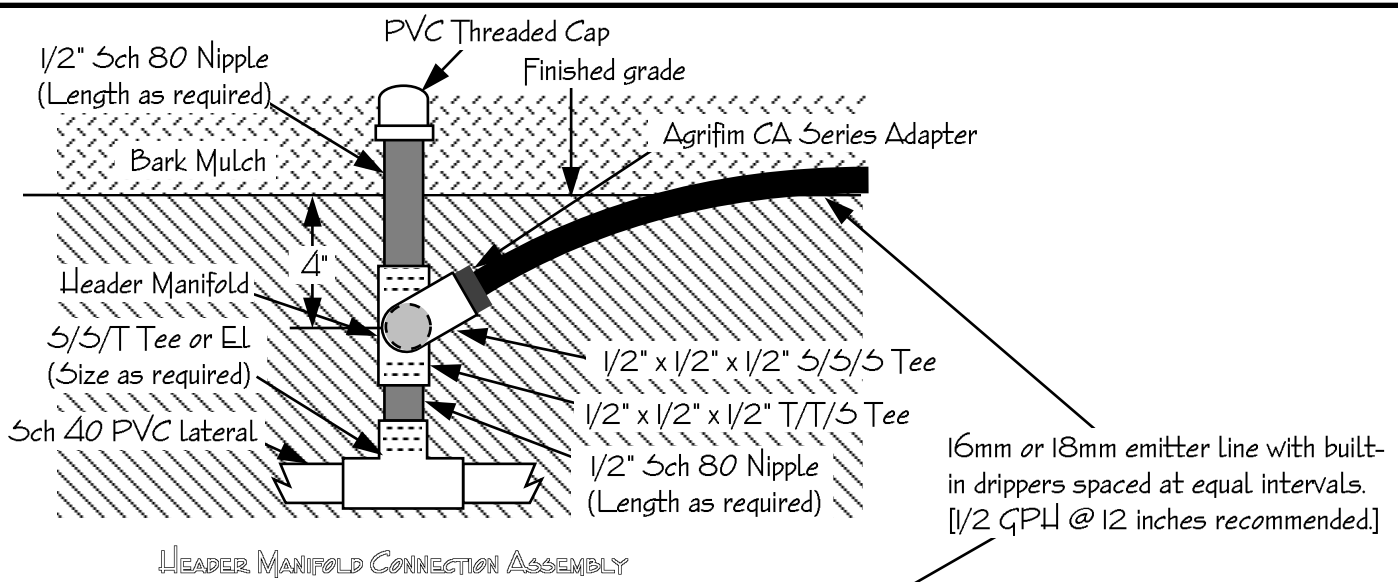
ELEVATION VIEW



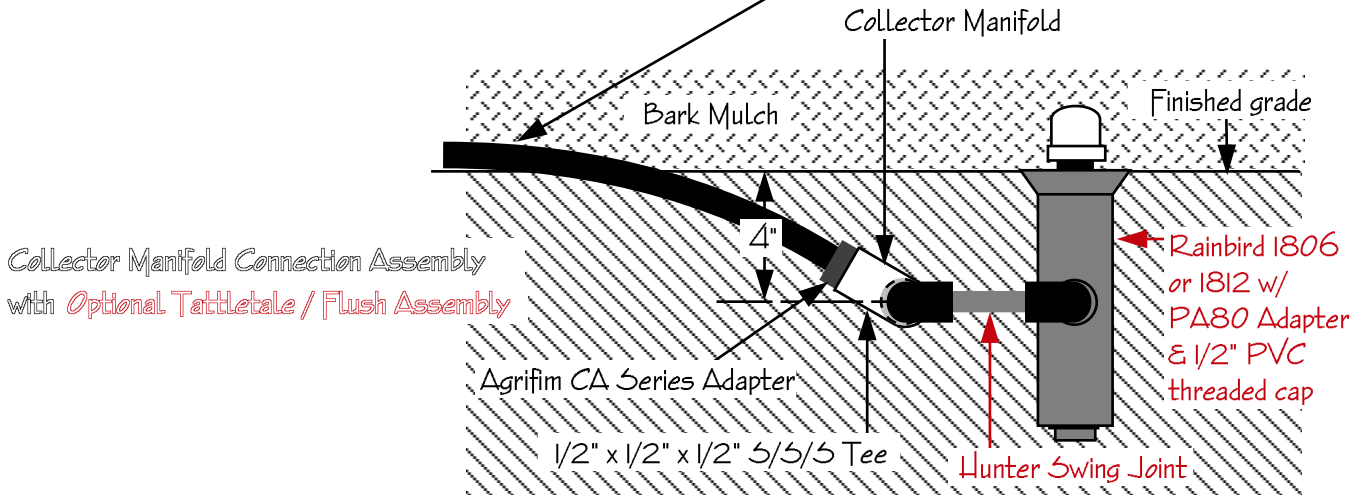
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 2. RECOMMENDED DRIP IRRIGATION LAYOUT #2 - HEADER & COLLECTOR
 MANIFOLDS USED WITH EMITTER-LINE FOR LINEAR, ON-CENTER PLANTINGS

REV 10/26/05

NOT TO SCALE



HEADER MANIFOLD CONNECTION ASSEMBLY



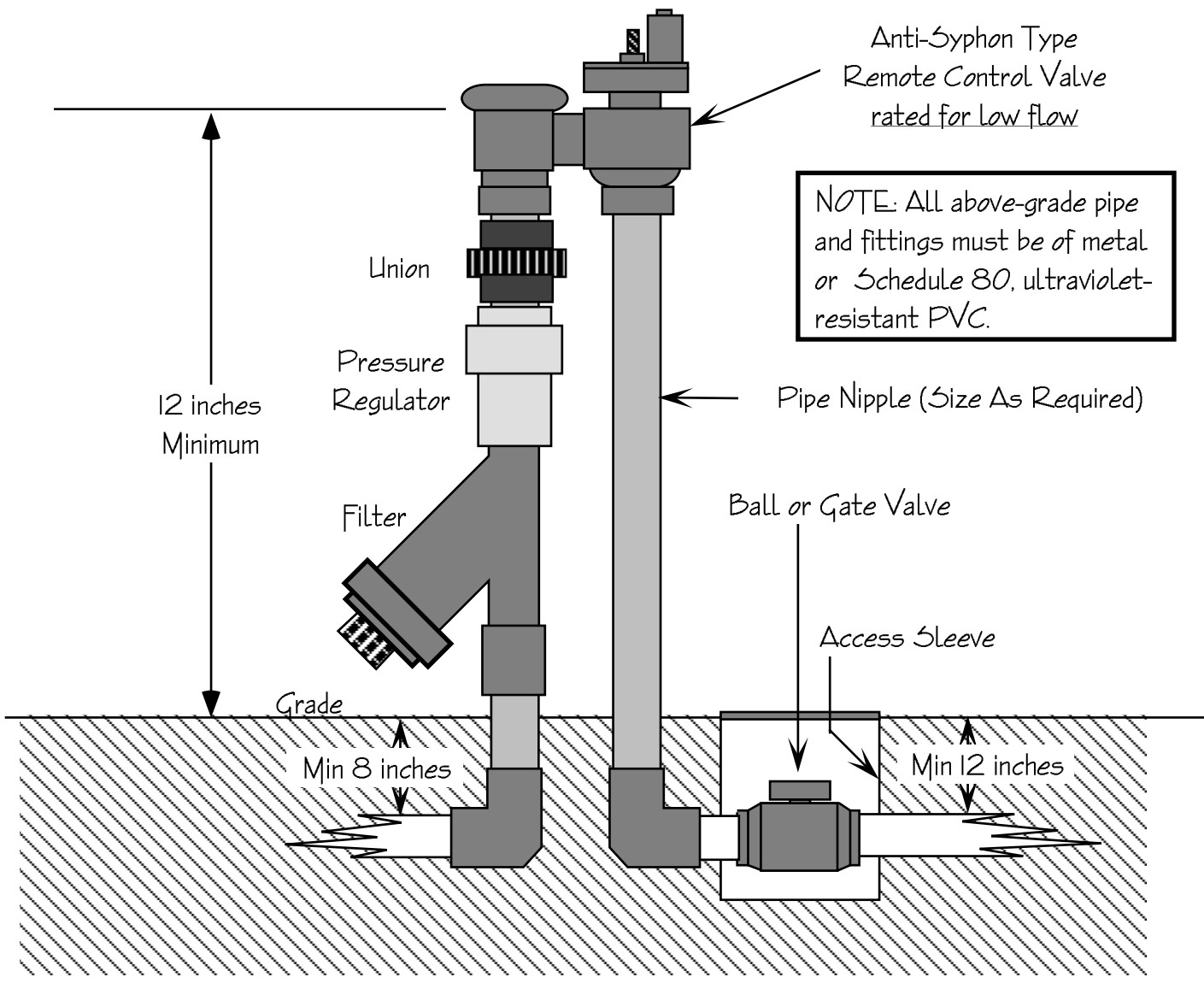
Collector Manifold Connection Assembly with *Optional Tattletale / Flush Assembly*



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 2A. HEADER & COLLECTOR MANIFOLD FOR DRIP LAYOUT #2
 WITH OPTIONAL TATTLETALE / FLUSH ASSEMBLY

REV 08/06/05

NOT TO SCALE



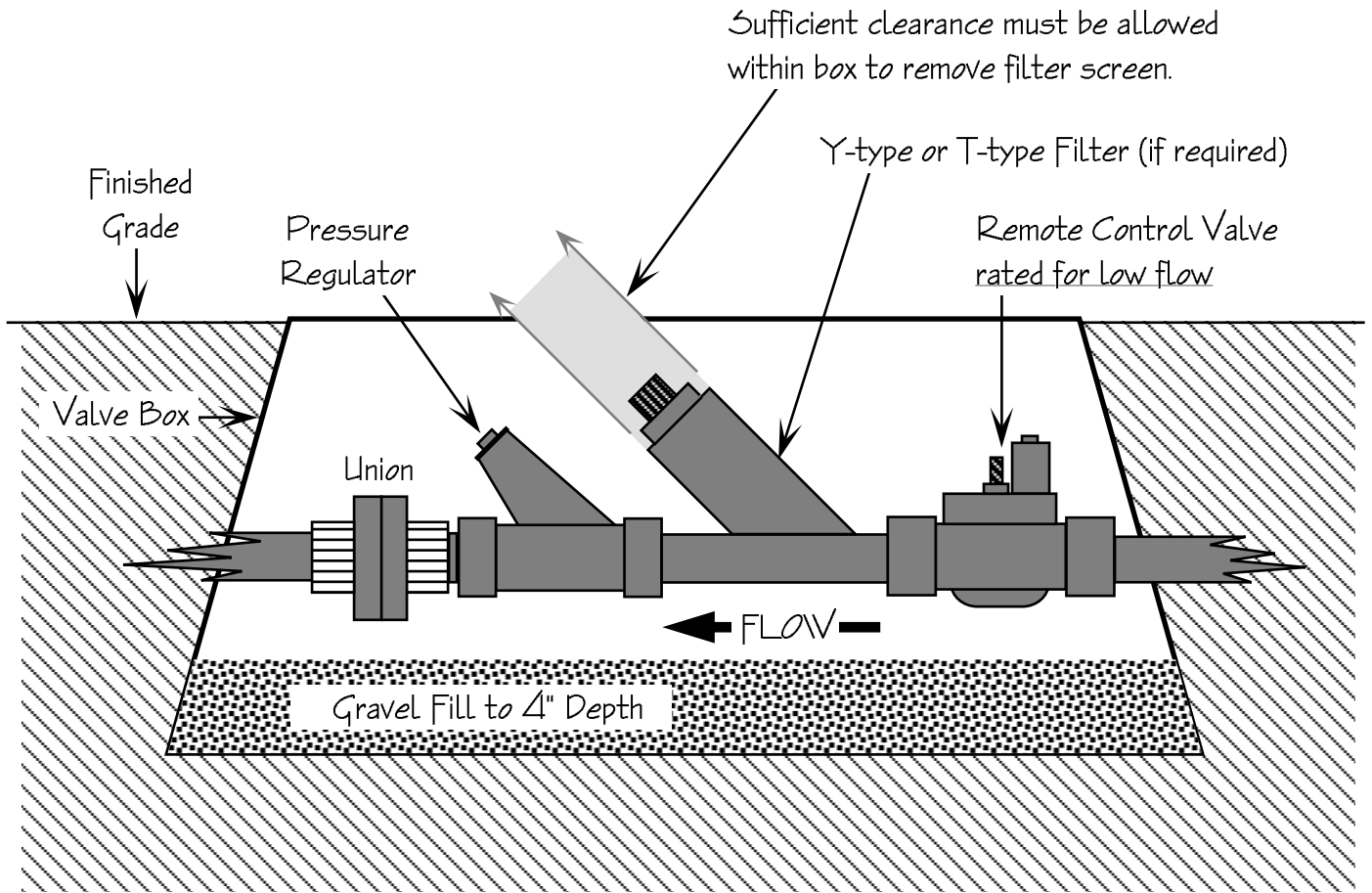
NOTE: ALL above-grade pipe and fittings must be of metal or Schedule 80, ultraviolet-resistant PVC.



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 3A. RECOMMENDED CONFIGURATION FOR ABOVE-GRADE VALVE ASSEMBLIES
 FOR RESIDENTIAL DRIP SYSTEMS

REV 09/06/05

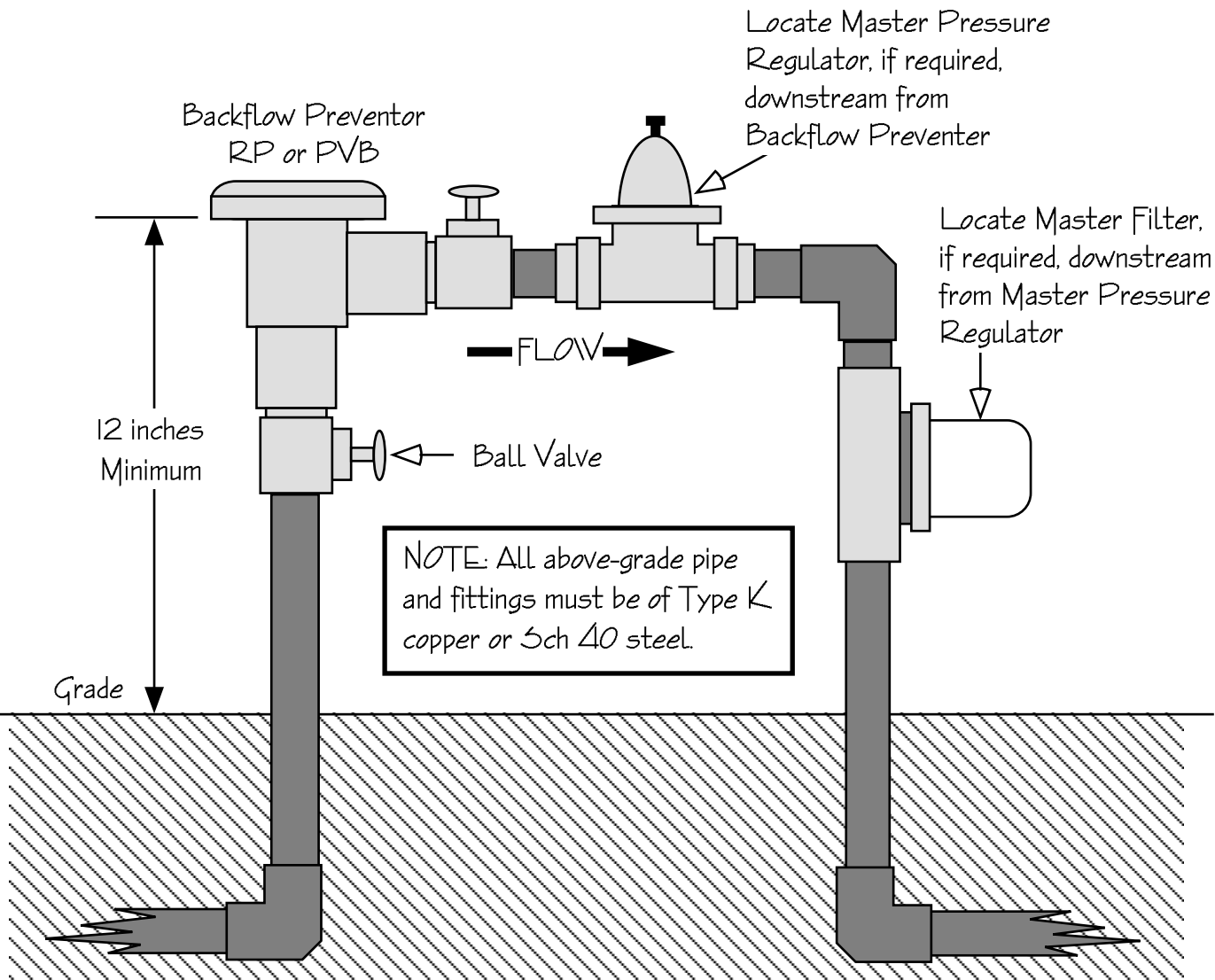
NOT TO SCALE



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 3B. RECOMMENDED CONFIGURATION FOR BELOW-GRADE VALVE ASSEMBLIES
 FOR COMMERCIAL DRIP SYSTEMS

REV 09/06/05

NOT TO SCALE

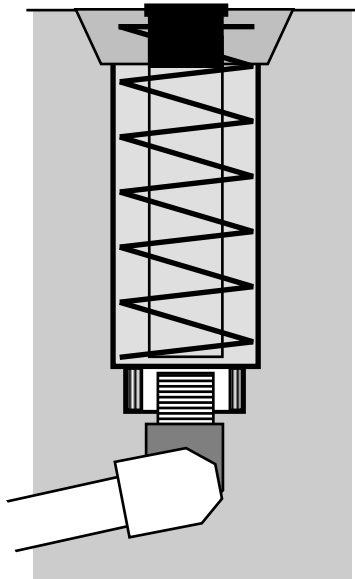


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 3C. RECOMMENDED CONFIGURATION FOR POINT OF CONNECTION DEVICES
 FOR DRIP IRRIGATION

REV 09/06/05

NOT TO SCALE

1. Existing
Rain Bird
Sprinkler.



2. Remove
cap, nozzle,
stem & spring
from sprinkler
body..



3. Install cap and filter assembly
portion of 1800 RETRO device.
Note: For brands other than Rain Bird,
the entire sprinkler body must
be replaced.

