

Section 32 00 00 – Exterior Improvements (Maintenance; Common Work Results; Schedules; Commissioning)

1. See also Division 01 for General Requirements.
2. See also Division 02 for Site Construction.
3. See also Division 03 for Concrete.
4. See also Division 31 for Earthwork.
5. See also Division 33 for Utilities.
6. See also appendices for various space type requirements.
7. ALL/ANY item that requires special tools and/or test equipment must be brought to the attention of the pertinent Owner FS personnel prior to specification and/or installation.
8. Tunnels, buried utilities, etc. must be located prior to exterior improvement work as applicable. If tunnel ceiling damage occurs this must be adequately repaired at the contractor's expense.
9. FS Cartographer locates shall be initiated through 'one-call' to City of Eugene.
10. Cut existing pavement prior to excavation with vertical, straight-line joints using saw designed for cutting pavement. Replace to condition of existing prior to cutting.
11. All exterior improvements are subject to FS review. Exterior improvements beyond standard landscape maintenance and replanting projects (e.g. landscape designs for new planting areas, retaining walls, or sidewalks) are also subject to CPRE review.

End of Section

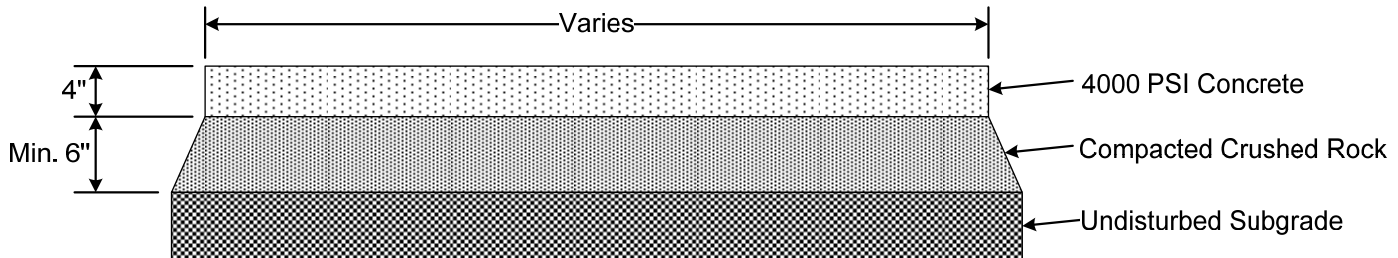
Section 32 10 00 – Bases, Ballasts, & Paving (Base Courses; Flexible Paving; Rigid Paving; Unit Paving; Aggregate Surfacing; Curbs & Gutters; Paving Specialties)

1. Vehicle loaded access shall be provided at building perimeters for the purpose of maintenance activities.
2. If utility vaults, metal covers, etc. are located in sidewalks the surface is to be textured to reduce slip hazards.
3. Use of exterior pavers requires prior CPRE and FS Exterior review and approval. If used installation methods shall eliminate sinking under vehicle traffic, preferably set with a concrete pad base vs. sand.
4. Walkways to loading/service areas:
 - a. Shall be designed and constructed to withstand heavy vehicle traffic.
 - b. Shall be as short in length as possible
 - c. Shall be 8ft wide at minimum. Walkways only, proper service or loading areas may be larger; see Loading Docks and Service Areas appendix.
 - d. Shall avoid conflicts with heavy volumes of bicycle and/or pedestrian traffic.
 - e. Shall avoid conflicts with trees and landscaping.

Section 32 10 00 – Bases, Ballasts, & Paving continued

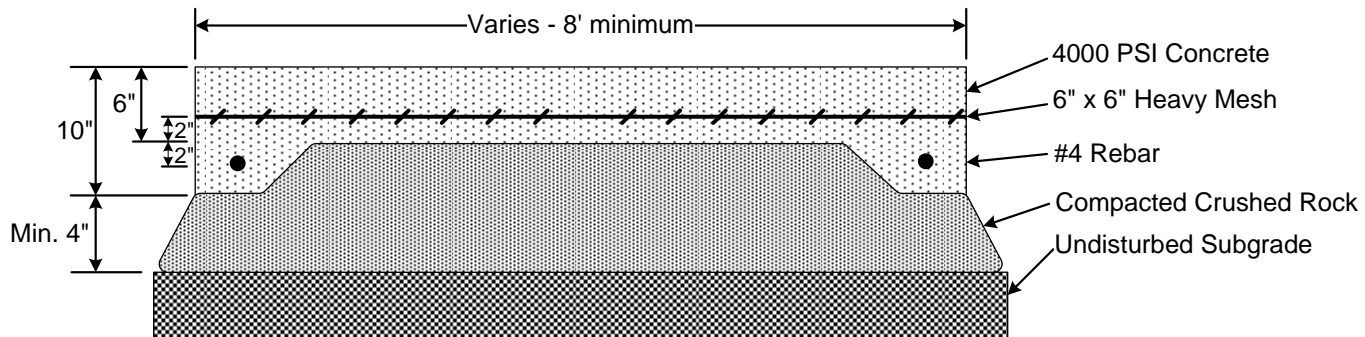
5. Sidewalks:

- a. Water vaults are not to be located in sidewalks.
- b. Standard sidewalk detail: Standard sidewalks designed to support pedestrian traffic only will have a minimum of 4 inches of 4000psi concrete with a 6 inch minimum of base rock.



Standard Walk
No Scale

- c. Vehicle loaded sidewalk detail: Sidewalks designed to support vehicle weight will have thickened edges and rebar to support vehicle weight; minimum of 6 inches of 4000psi concrete with a 4 inch minimum of base rock at the outside thickened edge.



Maintenance Vehicle Access Sidewalk
No Scale

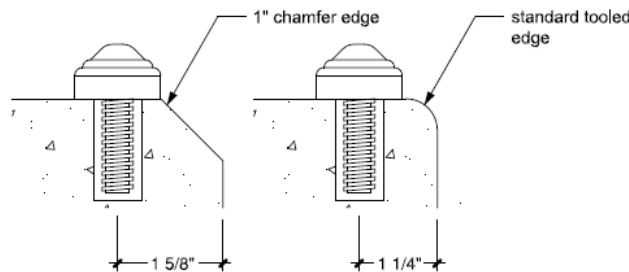
End of Section

Section 32 30 00 – Site Improvements (Retaining and Site Walls)

- 1. All seat and retaining walls less than 5ft in height must utilize anti-skating strategies; bumps or interruption strategies must be integrated in to the design of the concrete. Anti-skating bumps and/or strategies shall not be secured in mortar joints.

Section 32 30 00 – Site Improvements continued

2. Typical OFOI anti-skateboard bumps:



NOTES:

- Skateboard bumps provided by University (hot dip galvanized or standard green powder coated finish).
- 1 1/4" minimum on center set back from edge of wall.
- 2' to 3' spacing on center (depending upon wall material and jointing).
- Bumps to be anchored in a 5/8" hole by epoxy cement.

ANTI-SKATEBOARD BUMP
Typical Installation



End of Section

Section 32 80 00 – Irrigation (Pumps; Planting Irrigation)

1. Irrigation Systems:

a. Record Drawings:

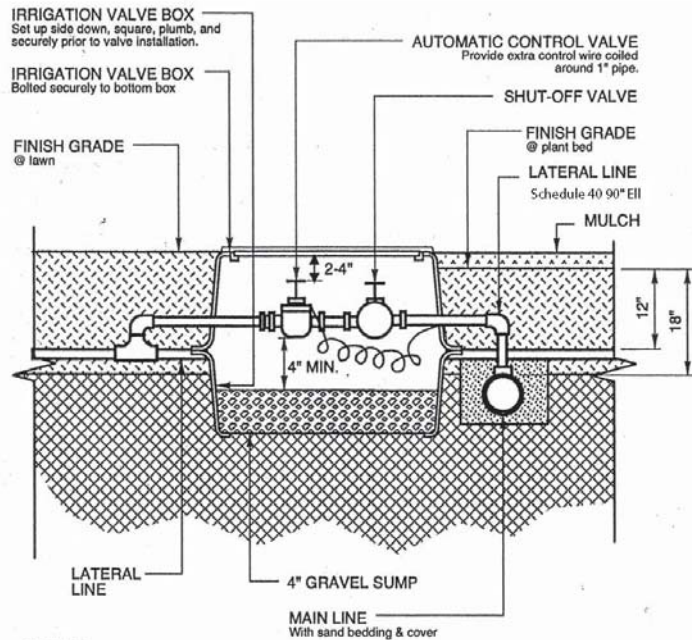
- Indicate two dimensions for all valves (including quick couplers and drain valves), stub-outs and mainline T's, L's and ends.
- Dimension mainline pipes and wire runs at the beginning, mid-point and end of each curve or at each change of direction, or at 25-ft intervals along the curve if longer than 50-ft.

b. Materials:

- Backflow Preventer: Use Conbraco top entry double check valves. Models must be designated for operation at an elevation with respect to the system.
- PVC Primer: Oatey Lo-V.O.C. purple primer #31903.
- Glue: IPS Corporation Weld-On 705 PVC or 721 PVC. Ensure that manufacturer's expiration date is not exceeded.
- Pipe, Fittings, Sleeves:
 - i. PVC Type I, NSF approved as per ASTM-D01784, D-1785, D-2242 and Product Standard 21/70, 22/70.
 - ii. All lateral lines are to be schedule 40 with solvent-weld connection fittings.
 - iii. PVC fittings to be schedule 40, solvent-weld type.
 - iv. All mainline pipes to be schedule 40.
 - v. No galvanized pipe or fittings may be used.
 - vi. Sleeves to be schedule 40 PVC.
- Manual Control Gate Valves:
 - i. Use USA manufactured valves, resilient seat gate valves.
 - ii. 125 PSI cold-water-rated, construction to be brass or bronze on 2-inches and under sizes.
 - iii. All gate valves to have wheel handled operations.

Section 32 80 00 – Irrigation continued

- Electric Remote Control Valves: Toro P-220 series with EZ Reg Pressure.
- Quick Coupling Valves: Rain Bird 44RC.
- Master Valves:
 - i. Normally open and same size as mainline.
 - ii. Mfg: 24V AC, Bermad 410
 - iii. Detail: Zone Valve Assembly from UO Tennis Courts and Field Renovation Project (L11.0)



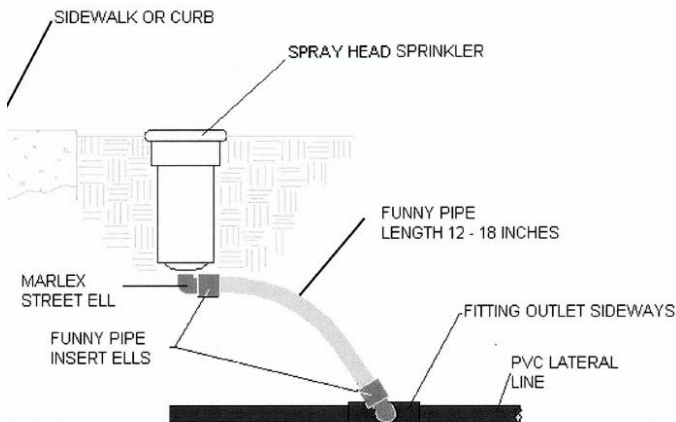
NOTES

- Use teflon tape

ZONE VALVE ASSEMBLY

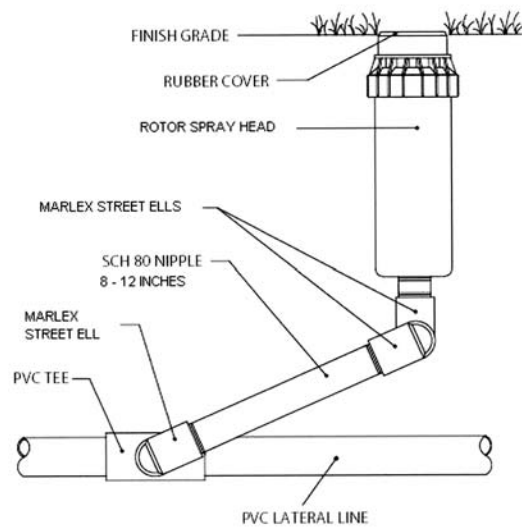


- Manufacturers known to be acceptable for valve covers and boxes:
 - i. Double-check valves: Carson 1730-18, T-Lid, green in color. (7-19-11 correction)
 - ii. Automatic control valves: Carson 1419-12, T-Lid, one valve per box, green in color. (7-19-11 correction)
 - iii. Quick coupler: Carson 910-10, T-Lid, green in color. (7-19-11 correction)
- Detail: Swing Joint Pop-up Spray Heads



Section 32 80 00 – Irrigation continued

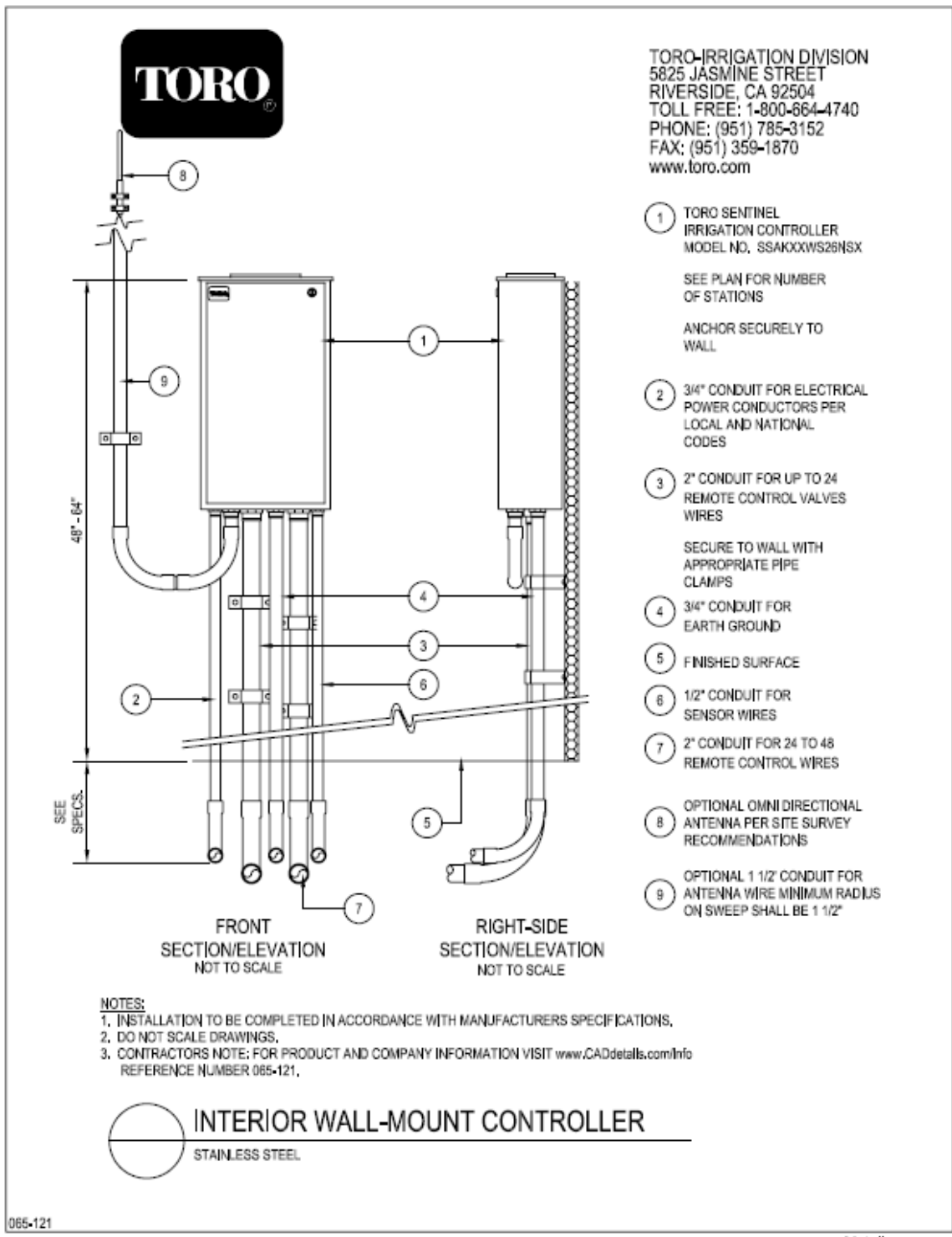
- Pipe Joint Tape:
 - i. Teflon on all threaded joints.
 - ii. 4 wraps of Teflon tape.
 - iii. No pipe dope.
- Sprinkler Heads:
 - i. Spray heads shall be Toro 570Z PRX COM series.
 - ii. Nozzles shall be Toro Precision Nozzles series or Toro Precision S Rotating Nozzles series.
 - iii. All rotor heads to be approved by FS Exterior Supervisor; either Rainbird 5000+ or 3500+.
 - iv. No drip or micro-sprays.
 - v. Detail: Rainbird & Toro Stream Rotors.



- Automatic Controller:
 - i. The Water Management System shall be a Toro Sentinel Water Management System and related Toro Sentinel equipment.
 - ii. The System shall include the following general components:
 - Sentinel Field Satellites
 - Sentinel Communication Hardware
 - Computer to Satellite Communications shall be Narrowband, UHF data radio
 - The irrigation flow sensor shall be a Toro Model TFS-150, TFS-200, TFS-300 PVC[TEE] Irrigation Flow Sensor sized the same as the mainline.
 - Cabinet shall be Toro Sentinel Stainless Steel exterior mounted cabinet, powder coated UO green.
 - The contractor shall supply to UO one (1) Toro RLS-RB Sentinel Retro-Link Assembly for systems with 24 or fewer stations. For systems with more than 24 stations the contractor shall supply to UO two (2) Toro RLS-RB Sentinel Retro-Link Assemblies.

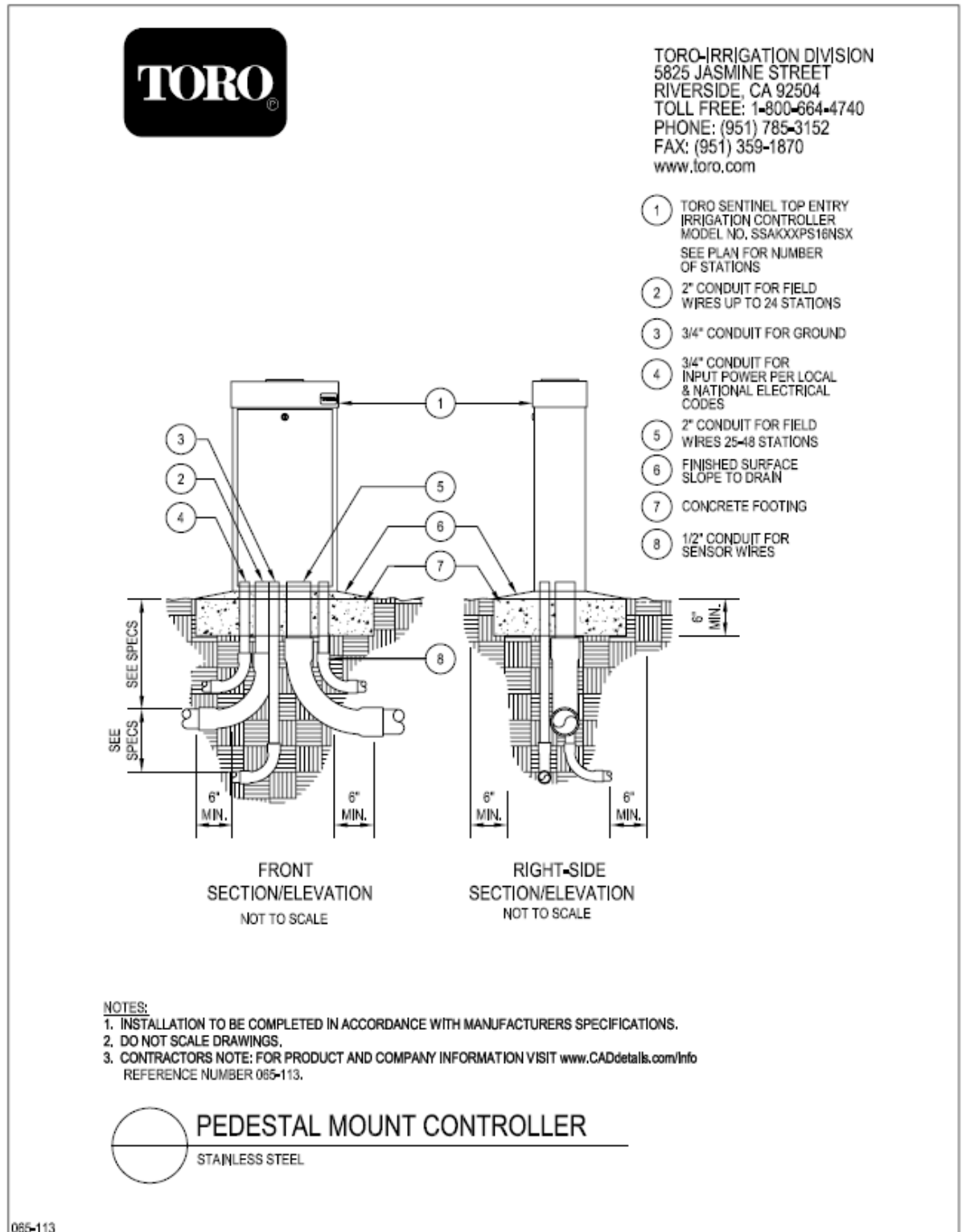
Section 32 80 00 – Irrigation continued

iii. Detail: Toro Sentinel Exterior Wall Mount Controller



Section 32 80 00 – Irrigation continued

Detail: Toro Sentinel Pedestal Mount Controller

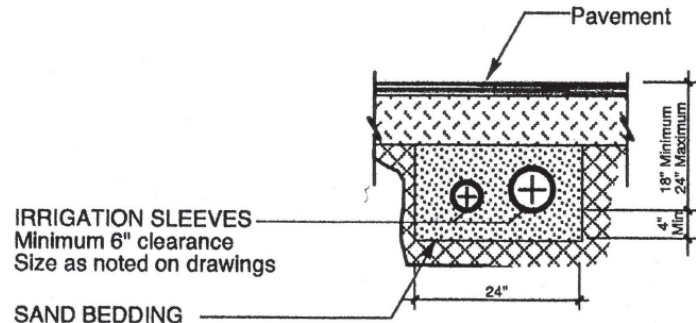


Section 32 80 00 – Irrigation continued

- Conduit and Fittings:
 - i. Under ground: Plastic, Class III, and Federal Specification W-C-1094.
 - ii. Above ground: Aluminum, Federal Specification WW-G-540.
- Wire:
 - i. Copper, ASTM B-3, #14 minimum.
 - ii. PE-39 cable from controller to flow sensor must be a single, un-spliced length.
 - iii. Two yellow AWG #12 control wires from controller to normally open master valve must be a single, un-spliced length each.
 - iv. Blue tracer wire AWG #14 along the entire mainline from the controller.
- Connectors: Scotch Lok 3570, 3M DBY.
- Backfill Materials:
 - i. See also Section 32 90 00 Soil Testing.
 - ii. Planting Areas: Native on-site soil, free of rocks and other deleterious materials. If rock or other deleterious materials are encountered, bed pipe with 4-inches of fill sand on all sides of pipe and/or wire.
 - iii. Paved Areas: All backfill to be fill sand under paved areas.
 - iv. Drain and Sump Areas: Pea gravel, 3/4-inch x 1/2-inch washed round rock.
- c. Construction:
 - Monuments: Carefully maintain bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed.
 - Trenching or Pulling Pipe:
 - i. Width of trench to be 1-1/2 times the pipe's outside diameter.
 - ii. Minimum cover depth to be:
 - ◇ 18-inch for main lines.
 - ◇ 12-inch for lateral lines.
 - iii. More than one pipe is permitted in the same trench:
 - ◇ 2 pipes may be stacked vertically if 4-inches of earth separates them.
 - ◇ 3 or more pipes must be laid 4-inches apart horizontally in trench.
 - Remove any rocks or other material from the bottom of the trench that might damage pipe.
 - Sleeve Installation:
 - i. Schedule 40 PVC pipe.
 - ii. Provide under sidewalks and other locations as selected by/with Owner to install irrigation system and allow future flexibility.
 - iii. Provide vehicle markers where sleeve ends are concealed.
 - iv. Extend sleeves a minimum of 1-foot beyond sidewalks on each side.
 - v. Run sleeves level and perpendicular to sidewalks and pavement.
 - vi. Empty sleeves are to be marked on the sidewalk with an 'S' stamped in the horizontal face of the concrete.
 - Threaded Plastic Pipe: Wrap joints with Teflon tape, 4 wraps.
 - Valve Covers and Boxes Installation:
 - i. Set all valve boxes at grade of lawn or shrub mulch surface.
 - ii. Ensure 48-inches of wire are coiled around 1/2-inch pipe in box.

Section 32 80 00 – Irrigation continued

- iii. 1” minimum clearance from any pipe.
- iv. All valve boxes are to be double stacked.
- v. Detail: Irrigation Sleeves from UO Tennis Courts and Field Renovation Project (L11.0).



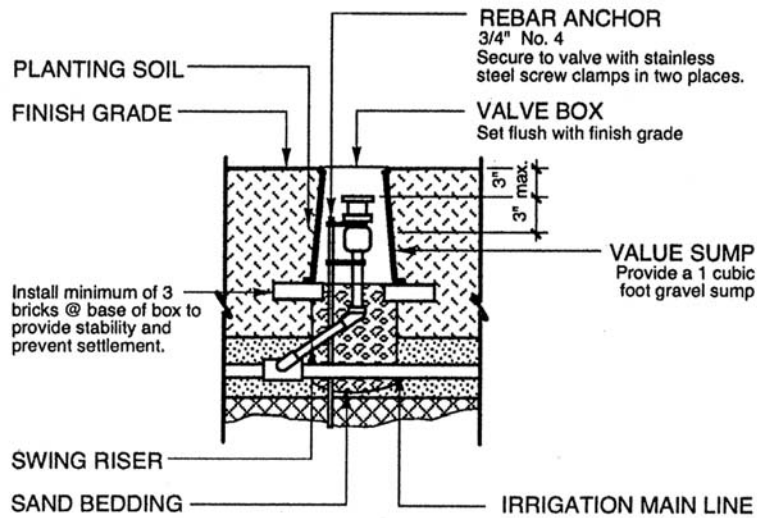
NOTES

- Extend sleeves beyond pavement edge or back of curb as noted in specifications. Cover open ends with duct tape.
- Install 2 x 4 red-top, wood location stakes @ both ends of all sleeves and leave 2" above top of curb or pavement.

- Flushing:
 - i. Flush main prior to installing valves.
 - ii. After piping risers and valves are installed, but prior to installing sprinkler heads, thoroughly flush piping system under full water head. Maintain flushing until all foreign matter is removed from the line.
 - iii. Cap risers immediately after flushing.
- Pressure Tests:
 - i. Isolate electric valves and test with a pressure pump after installing and before backfilling the mainline.
 - ii. Maintain 100 psi minimum pressure for at least 24-hours without leaks or pressure loss. Call for Landscape Architect and FS Exterior Supervisor inspection at beginning and end of this period.
- Automatic Control Wire:
 - i. Run low-voltage control wires in metal conduit to 12-inches below grade.
 - ii. Provide conduits as necessary where turning corners or going through walls.
 - iii. Install wire beneath mainline pipe and coil extra wire at each turn to allow for contraction of wire.
 - iv. Bundle wire together at 5-foot intervals with plastic tape or similar.
 - v. Install secure and plumb.
 - vi. Install wire in continuous runs with no splices.
 - ◇ IF splices are FS approved, make all splices in a valve box and note these on record drawings and provide an extra coil of each wire at each splice to allow for contraction of wire due to temperature or settlement of backfill.
- Quick-Coupling Valve Assembly:
 - i. Install plumb in valve box, with top of valve set 3-inches below top of box and grade.
 - ii. Open crushed rock in valve box to 4-inches below top of valve.
 - iii. Support quick coupler by attaching an 18-inch #4 rebar with 2 stainless steel clamps each side.

Section 32 80 00 – Irrigation continued

- iv. Detail: Quick Coupling Assembly from UO Tennis Courts and Field Renovation Project (L11.0).



NOTES

Use teflon tape or virgin teflon paste on all threaded pipe joints.

QUICK COUPLING ASSEMBLY

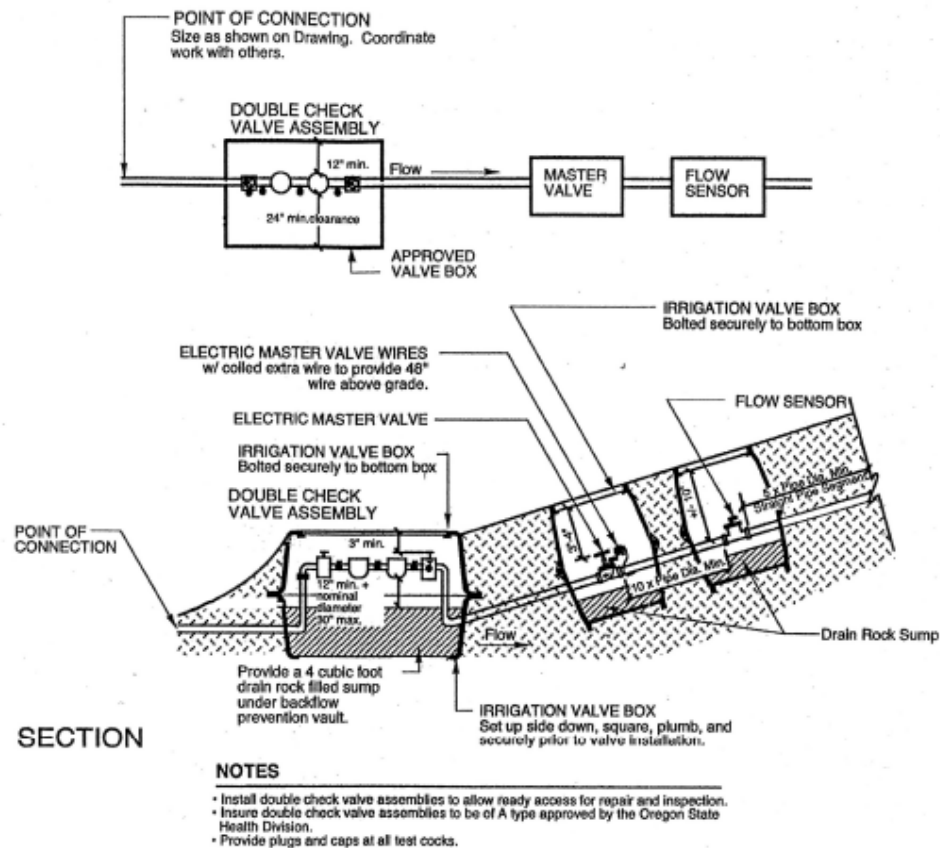
N.T.S.



- Sprinkler Head Installation:
 - i. Install all heads plumb or perpendicular to finished grade.
 - ii. Compact earth under pipe at sprinkler heads to prevent settlement from pulling sprinklers below grade.
 - iii. Install at center of symbol of drawings, except as follows:
 - ◇ Do not install any sprinkler body that is next to a sidewalk, curb, header, etc. higher than the top surface of the sidewalk or curb and leave 2 to 3-inches space from sprinkler rim to curb.
 - ◇ Part circle sprinkler heads next to buildings, 18 to 24-inches out from the building.
 - iv. Set head elevations in existing turf, set top of sprinkler flush with top of turf mat or 1/2-inch above earth grade, whichever is highest.

Section 32 80 00 – Irrigation continued

- Detail: Point of Connection Assembly from UO Tennis Courts and Field Renovation Project (L11.0)



POINT OF CONNECTION ASSEMBLY

N.T.S. 2
L11.0

2. Irrigation Audit Requirements:

- a. All irrigated landscape areas shall have a Landscape Irrigation Audit performed by a certified Landscape Irrigation Auditor, certified and in good standing with the Irrigation Association (IA).
- b. The auditor shall be retained by the PM independent of contractors associated with the project.
- c. The audits shall be conducted in accordance with the current edition of the IA's Landscape Irrigation Auditor's Handbook.
- d. The results of the audit shall be provided to the PM and installing Contractor in a report signed by the Auditor.
- e. The minimum efficiency requirements to be met in the audit are 60% distribution uniformity for all fixed spray systems and 70 % distribution uniformity for all rotary systems.
- f. All zones not meeting these minimums shall be corrected by the irrigation installer and retested to meet these specifications. Compliance with this provision is required before final acceptance of the system.
- g. A pre audit equipment review shall note any installation errors, necessary repairs, performance deficiencies and problems, etc., the review shall also have included verification of the installation and operation of all Toro Sentinel Central Controls System equipment, flow sensors, telecommunication paths etc. Any deficiencies shall be corrected by the installer before the audit begins.
- h. The audit report shall include the marked up drawing of the system design showing as built conditions. The drawing shall show the station numbers, station locations, sprinkler head locations, head types, nozzle size, and distance between sprinkler heads.

Section 32 80 00 – Irrigation continued

- i. As-Built drawing shall be provided to the auditor by the installation contractor prior to field precipitation measurements being collected.
- j. Auditor shall collect all data necessary to calculate precipitation rates (zone areas, flow rates), note and record soil types, root depths, sun exposure, slope and plant material characteristics for each zone. Auditor shall perform catch-can tests of each zone and mark corresponding catch-can location on the as built irrigation drawing. Shrubs zones precipitation catch-can measurements are to be taken before planting.
- k. Auditor shall measure flow rates, static and dynamic system pressures, and record catch-can quantities and locations for each zone.
- l. Audit report shall provide pressure readings per station, catch device readings and locations, distribution uniformity for individual stations, precipitation rates per station, and full database information for programming Toro Sentinel ET based central control software. The report shall include a Toro Sentinel data summary spreadsheet for Toro Sentinel Programming.

End of Section

Section 32 90 00 – Planting (Preparation; Turf & Grasses; Plants; Accessories; Transplanting)

1. Plants likely to require excessive maintenance shall be avoided or judiciously located with FS Exterior Supervisor prior approval. Avoid using plants as formal hedge plantings.
2. Wherever possible, and appropriate, plants are to be used to screen uses such as parking lots and service areas to soften the visual impact, vs. fences and similar barricades. Avoid using plants as formal hedge plantings.
3. 12 inches of soil is required for all lawn/grass areas.
4. 18 inches of soil is required for all tree, shrub, and planted areas.
5. Plantings are to be used as much as possible for sun shading.
6. Plantings must be chosen and placed carefully to minimize debris dropping onto buildings or into building systems.
7. Planting within drip lines of established trees is prohibited.
8. Grading:
 - a. Grass lawns shall have a maximum slope of 5:1.
 - b. Planted areas shall have a maximum slope of 3:1. Exceptions require approval from FS Exterior Supervisor.
 - c. Areas intended to be essentially level (such as squares and courtyards) shall be level to the eye but sloped sufficiently to provide adequate drainage. A gradient of from 1.5% to 2% is recommended.
 - d. Exterior ramps: 1:12 is the maximum allowed, and 1:20 sidewalks are preferred. Current ADA requirements must be followed.
 - e. Sidewalk grading is not to exceed 2% cross slope and not to exceed 5% running slope.
 - f. Grading within drip lines of established trees is prohibited.
9. Prior to final soil placement:
 - a. Remove all temporary construction sub-grades and construction debris.
 - b. Existing grade is to be aerated prior to final soil placement and planting.
 - c. No soil tillage under existing tree canopies.
 - d. Soil and imported soils are to be free of noxious weeds: horse tail; oxalis; morning glory; thistle; etc.
 - e. Soil testing is required prior to final soil placement to ensure prohibited items are not within the soil; zero tolerance. PM and FS Exterior Supervisor must be provided with either a test report and/or site visit to the pit prior to installation.

Section 32 90 00 – Planting continued

10. Vegetation on campus is to be planted and managed in a way that does the following:

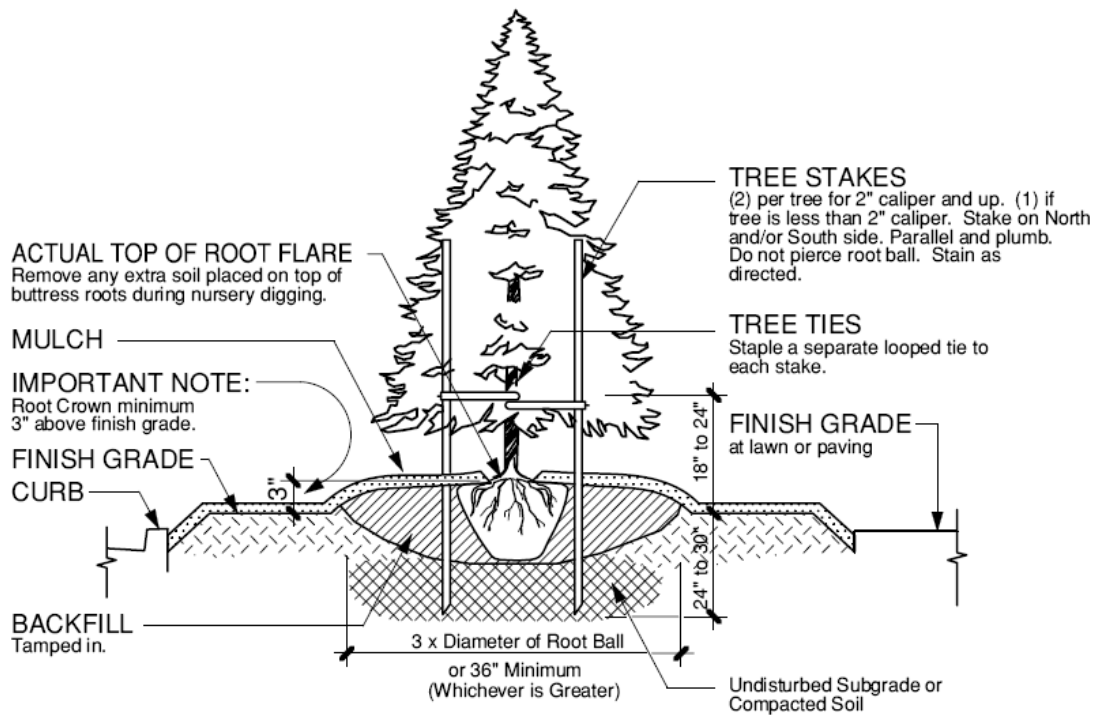
- a. Avoids excessive damage to buildings.
- b. Contributes to a safe campus environment.
- c. Reduces susceptibility to pest infestation.
- d. Minimizes reliance upon the use of pesticides.
- e. Contributes to the aesthetic quality and enjoyment of the campus as a whole.
- f. Contributes to the function of campus as an outdoor classroom.

11. Tree Locations:

- a. See also requirements of the Campus Tree Plan.
- b. To avoid debris falling into air intakes tree species and locations require special consideration, avoiding deciduous trees.
- c. Tree placement should be considered as energy conservation measures on SW exposures from sun and wind.
- d. Trees with fleshy fruits shall not be planted adjacent to paved areas or entries.
- e. Shade trees shall be planted a minimum of 12ft from buildings. Exceptions require approval from FS Exterior Supervisor.
- f. Ornamental trees shall be planted a minimum of 6ft from buildings. Exceptions require approval from FS Exterior Supervisor.
- g. Trees shall be planted to avoid debris falling into air intakes and other building systems, discoloring exterior walls, and impacting locations requiring special consideration.
- h. Trees shall not be planted so that maintenance issues such as the following become an ongoing issue:
 - Clogged gutters.
 - Discolored exterior walls
 - Plugged air intakes.
 - Misshapen or leaning trees creating hazard conditions.

Section 32 90 00 – Planting continued

12. Coniferous tree planting detail to be followed:



NOTES:

- Trees planted too deeply will not be accepted.
- Remove tree ties and stakes one year after planting unless directed otherwise.
- Provide trees planted in lawn with minimum 5 foot diameter bark area.
Hold bark away from trunk.
- Remove burlap from top of root ball.

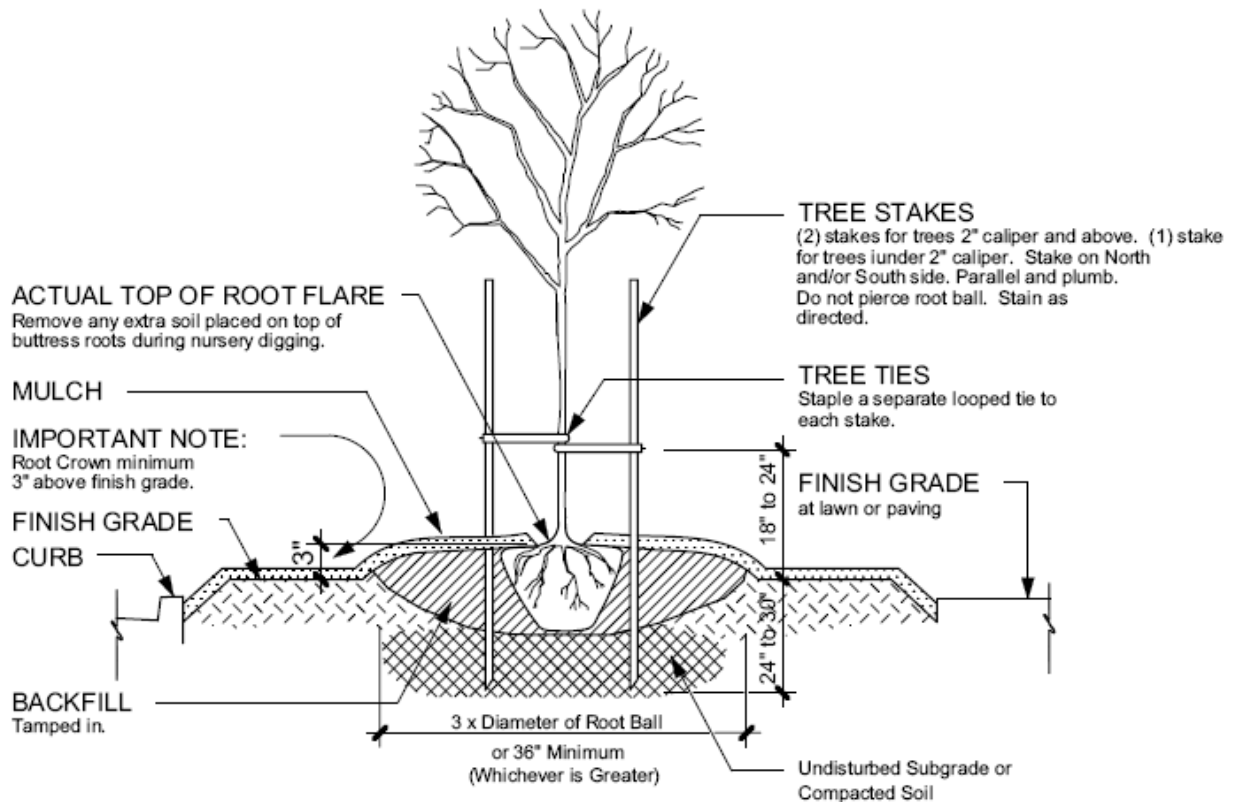
CONIFEROUS TREE
Planting and Staking

NTS

2

Section 32 90 00 – Planting continued

13. Deciduous & Broadleaf Evergreen tree planting detail to be followed:



NOTES:

- Trees planted too deeply will not be accepted.
- Remove tree ties and stakes one year after planting unless directed otherwise.
- Provide trees planted in lawn with minimum 5 foot diameter bark area.
Hold bark away from trunk.
- Remove burlap from top of root ball.

DECIDUOUS & BROADLEAF EVERGREEN TREE
Planting and Staking

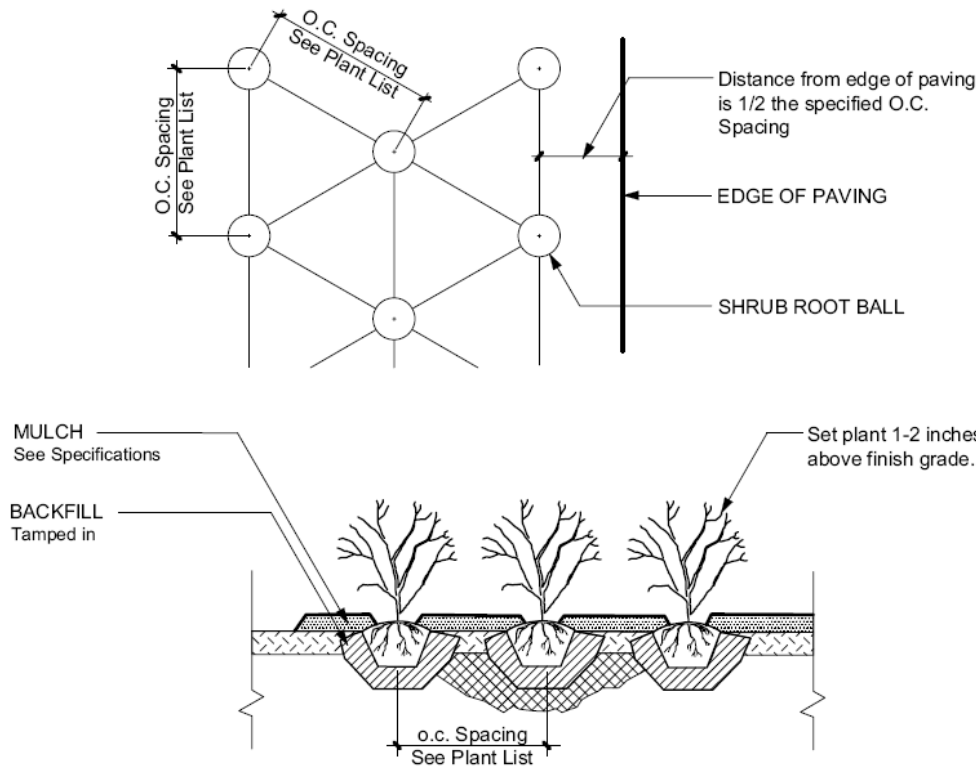
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Section 32 90 00 – Planting continued

14. Shrubs and perennials shall be planted a minimum of 3ft from buildings. Exceptions require approval from FS Exterior Supervisor.

15. Shrub Planting Detail to be followed.



SHRUB & PERENNIAL
Triangular Planting

NTS **3**

16. Landscape Materials NOT Approved for Planting on U of O Campus:

- a. All items listed as State Invasive Species.
- b. *Invasive Ornamental Species, on Native Plant Society of Oregon’s List.
- c. Prohibited Trees:
 - *Ailanthus altissima** - Tree of Heaven
 - *Cornus florida* – Flowering Dogwood
 - *Populus trichocarpa* – Black Cottonwood
 - *Ginkgo Biloba* – Female Ginkgo
 - *Norway Maple* – Straight Species
- d. Prohibited Street Trees:
 - *Liquidambar styraciflua* – Sweetgum
 - *Platanus x acerifolia* – London Plane Tree
 - *Platanus occidentalis* – American Sycamore
 - *Acer saccharinum* - Silver Maple
 - ALL Conifer species

Section 32 90 00 – Planting continued

e. Prohibited Shrubs:

- *Buddleia davidii**-Butterfly Bush
- *Cotoneaster spp.**-Cotoneasters
- *Juniperus spp.*(*j. virginiana*)*-Junipers
- *Lonicera nitida*-Box Honeysuckle, and *Lonicera pileata*-Privet Honeysuckle
- *Juniperus spp.* (*j. virginiana** and selected varieties) – Juniper
- *Large Cistus spp.*
- Minimize use of shrub dogwoods.
- *Prunus laurocerasus**(*except dwarf varieties*)- English Laurel
- *Prunus lusitanica**- Portugal Laurel
- *Ilex crenata*- Japanese Holly
- *Hebe spp.*- Hebe Species
- Minimize use of dogwoods.

f. Prohibited Perennials:

- *Iris pseudocorus**-Yellowflag Iris
- *Lythrum salicaria**-Purple Loosestrife
- *Polygonum cuspidatum**- Japanese Knotweed
- ALL Bamboo species, unless contained.

g. Prohibited Groundcovers:

- *Arctostaphylos uva-ursi* -Kinnickinnick, Bearberry
- *Euonymus coloratus*- Purple Wintercreeper
- *Fragaria spp.* Ornamental Strawberries
- *Hedera helix**- English Ivy
- *Hypericum perforatum**- St John's Wort
- *Vinca minor, Vinca major**- Periwinkle, Vinca

End of Section

END OF DIVISION 32