

CITY OF RIVERSIDE

PUBLIC WORKS LANDSCAPE SPECIFICATIONS AND GUIDELINES REVISED 12/2017

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SECTION I

PLAN PREPARATION

I-1. GENERAL

- A. Standard Sheet Size/Title Blocks: Plans for public landscapes shall be prepared on a standard sheet size of 24" x 36" using the City Standard Public Works Title Block as available through the City's website.
- B. Maintenance Responsibilities: All areas proposed to be maintained by the City, whether within the dedicated rights of way or in public landscape easements, shall be noted on the plans.
- C. Delineate Planting Areas: All plans shall delineate the project area, distinguishing building coverage and paved surfaces from landscape planting areas.
- D. Drawing Scale: Plan scale(s) used for irrigation plans shall be of the maximum size of 1" = 20'-0" or as otherwise determined to be acceptable by the City's plan checker, based on the legibility of the plan when reduced for controller chart purposes.
- E. City Approval of Revisions: Once plans are approved by the Public Works Department, any revisions to approved plans shall also be subject to approval by the Department, and approval thereof shall be recorded in an appropriate revision block on each sheet with approval initials and date by the City official approving the change. The revisions approval block shall identify the revision by "delta number" (triangle within which the revision number is identified), and all revisions on each corresponding sheet shall be marked with the respective "delta number" and the area of the change shall be "clouded" or "bubbled" to indicate the extent of the change.

I-2. TITLE SHEET The first sheet of each set of plans shall include the following information:

- A. Project Information: Title sheet shall clearly show the Project Title, to include project name, tract/parcel map number, and the type of plans (e.g. Median Landscape, Parkway Landscapes, Trails, etc.).
- B. Developer: Show development firm name, address, telephone number, FAX machine number, E-mail address, and project representative's name and telephone number with extension number, if different than the firm's office number.
- C. Location Map: Provide a location map clearly showing nearest arterial intersection, street names, north arrow, and project location.
- D. Vicinity/Key Map: Provide a Vicinity/Key Map (either separately, or if scale permits, doubling as the vicinity map) showing the following:
 - 1) Street configuration (showing curb alignments) within and/or adjacent to the tract or project.
 - 2) Street names.
 - 3) North arrow.
 - 4) Match line, as applicable.
 - 5) Project limits
- E. Plan Index: Provide an Index of all Sheets within the full set of plans.
- F. General Notes: Incorporate the appropriate version of General Notes for Public Landscape Construction as provided by the City Plan Checker in the initial Public Landscape Plan Check.
- G. Summary of Landscape Quantities:
 - 1) Grand total square footage (horizontal measure) of all landscape areas within the project limits (includes decorative pavement & trails surfaces) _____ SF
 - a) Subtotal square footage of 2:1 slope areas _____ SF
 - b) Subtotal square footage of plantings by type:

- i) Turf _____ SF
- ii) Groundcover _____ SF
- c) Decorative pavement _____ SF
- d) Decomposed granite pavement _____ SF
- 2) Numbers of specimen trees (i.e. 24" box size or greater, 10' Brown Trunk or larger) listed by size _____ EA
- 3) Total linear feet of planter "edges" where "edge trimming" is required (includes both sides of concrete mow curb separating groundcover areas from mown turf) _____ LF

H. Maintenance Responsibilities:

- 1) Total square feet of all areas to be maintained by the City _____ SF
- 2) Total square feet of all areas to be maintained by an Association or other private entity (i.e. someone other than the City) _____ SF

I-3. ALL SHEETS: All sheets in the set (including the first sheet) shall bear the following information:

A. Title Block: From left to right along the bottom margin shall include:

- 1) Dig Alert Logo & contact number.
- 2) Bench Mark Information.
- 3) Registered Landscape Architect's seal including license number, date of expiration and signature.
- 4) Landscape Architect's firm name, address, telephone and FAX numbers, E-mail address, name and signature of plan preparer, and date plans were prepared.
- 5) Revisions Block.
- 6) City Approvals Block.
- 7) Project Title.
- 8) Sheet Title.
- 9) Plan number as assigned in the public landscape plan check process. This number is to be displayed in the lower right hand corner of each sheet with text reading horizontally within the Plan Number box provided.
- 10) Sheet number (formatted as "Sheet ___ of ___").
- 11) Plan Check Reference Numbers as assigned in the public landscape plan check process.

B. Key Map (required when full project limits are not presented on a single sheet): provide on each sheet to show which portion of the overall project is represented by scaled plans on that sheet.

C. Consecutively Numbered: All sheets within the set of plans shall be consecutively numbered.

I-4. PLAN VIEWS: Each plan view of the project shall include the following information:

A. Title, Scale and North Arrow.

B. Limit of Work Line: shall reflect the limits of the project.

C. Match Lines: shall be labeled to provide adequate reference for identification and cross referencing between sheets.

D. Legends: Either provide a legend on the first sheet of a given type together with a cross-reference note on each subsequent sheet referring back to the sheet bearing the legend, or provide a legend on each sheet.

E. Base Information: Provide the following base information on all plan views:

- 1) Street Names: Clearly label all streets with their official names within and adjacent to the project;

- 2) Label Land-Use of Adjacent Parcels: Clearly label the designated land use (e. g. residential, commercial, governmental and industrial, vacant/zoned residential, etc.) for all adjacent parcels, and shall show all existing improvements and (where known) all proposed structures, surface improvements, vegetation, etc., within a minimum of 20 feet beyond the common property line between the public landscape project limits and the adjacent parcels;
- 3) R/W, Easement and Parcel Lines: All rights of way, easement and parcel lines of record shall be clearly shown and labeled;
- 4) Proposed Improvements: Provide graphic representations clearly distinguishing existing versus proposed improvements;
- 5) Drainage Improvements: Graphic representation of all drainage inlets, structures and drain lines including notation of their inlet and invert elevations, pipe materials and sizes., and minimum depth of cover;
- 6) Underground Utilities: Show all existing underground utilities of record and all proposed underground utilities with notation of the depths of cover for each; and,
- 7) All "existing" versus "proposed" surface structures.

I-5. GRADING PLANS: Public Landscape Plan Checks shall include submittal of the precise grading plan for the proposed public landscape area. Grading plans may be prepared as a separate set of plans from the public landscape plans:

- A. Topographic Information: Provide topographic information with minimum one foot contour intervals, clearly indicating "existing" versus "proposed" contours.
- B. Curb and/or Pavement Elevations: are to be provided for all "proposed" paving at appropriate control points (e. g. beginning and end of curb returns, at regular intervals along a curb line, concrete pad corners, walkway intersection corners, etc.) as well as "existing" elevations at connection points to existing pavement and other existing improvements.
- C. Retaining and Property Line Walls/Fences: Grading plans shall include horizontal and vertical control information for all retaining and property line walls/fences to be located within the public right of way and/or public landscape easement areas.
- D. Drainage: Grading plans shall show all proposed drainage systems and features, including storm drains, french drains, under drains, inlet and outlet structures, lined and unlined swales, ditches and flowlines, etc.

I-6. IRRIGATION PLANS: The following information shall be provided on all irrigation plans:

- A. Coordination: The Landscape Architect shall coordinate with the other design professional(s) preparing separate street, storm drain, sewer and water plans for a given project so that all sidewalks, storm drain, sewer and water lines that pass through or are impacted by the public landscape area are properly shown on the landscape plans and reflect the final approved locations for each. The Landscape Architect shall coordinate with the utility purveyor and the other designer(s) to ensure that both water and electric utility services for the irrigation system are located appropriately, per City Standards.
- B. POC: Provide Point of Connection information for each irrigation system, including:
 - 1) Water Source Purveyor (e. g. City of Riverside, Western Municipal Water District, Eastern Municipal Water District, other).
 - 2) Type of Water Service (e. g. potable domestic, non-potable or reclaimed).
 - 3) Service Address (to be "as-built" by the Contractor installing the irrigation system).
 - 4) Meter number and size in inches (to be "as-built" by the Contractor installing the irrigation system).

- 5) Pressure Elevation Zone.
 - 6) Minimum static water pressure typically available at the meter, as well as maximum pressure on record.
 - 7) Maximum anticipated demand expressed in gallons per minute (GPM).
 - 8) Minimum pressure at the meter required to operate the system (including all pressure lost to friction and elevation differences).
 - 9) Backflow device size.
 - 10) Pressure Regulator size and setting (as applicable).
- C. Water Service Approval Block: indicating the water purveyors approval of the proposed water service location, type (potable, non-potable or reclaimed) and size.
 - D. Controller Information: Provide full Irrigation controller information, including controller model number, number of stations, vandal resistant enclosure manufacturer and model number, service address for electric service (to be "as-built" by installing contractor and stenciled on enclosure door as specified).
 - E. Electric Service Approval Block: indicating the power purveyor's approval of the proposed electrical service location, meter number, buss size, voltage and amperage, and type (metered or non-metered).
 - F. Irrigation Legend: Provide a comprehensive irrigation legend showing all pertinent data for materials and equipment to be used in the system with reference to corresponding installation details and standard details. Irrigation legend shall include symbols for all materials used in the system (including control wire and sleeves), shall be located on the first sheet on which the symbols are used, and shall either be repeated or cross referenced on all subsequent sheets.
 - G. Valves: Each valve used shall be graphically shown on the plans (includes isolation ball valves, master control valves, remote control valves, manual and quick coupler valves, pressure regulating valves, air relief valves, etc.).
 - H. RCV's: All remote control valves shall be identified by station number assigned, the maximum GPM demand of the valve as designed and the valve size.
 - I. Lines: All lines shall be graphically marked to indicate their design size.
 - J. Utility Information: All water and electrical source information shall be shown, identifying the responsible utility purveyor, the location of each meter, and each service address as assigned by the purveyor (or if no street address is so assigned, Contractor shall obtain a street address for the controller from the City of Riverside Building & Safety Division and record this address on the irrigation "as-built" plans).
 - K. Booster Pumps: All irrigation pumps/boosters shall be shown on the plans, and shall include full operational requirements, including wattage, amperage, voltage, horsepower, boost range, size, maximum GPM flows, etc.
 - L. Calculations: Irrigation pressure loss calculations shall be provided for each service, to include: 1) the largest station; 2) the station furthest from the source; and, 3) the smallest station served.
 - M. Irrigation Designer's Information: If the irrigation system is designed by someone other than the Landscape Architect whose seal is shown on the plans, the Irrigation designer's name, firm name, address, telephone and FAX number, and E-mail address shall be provided on each irrigation sheet, including the details sheet.

SECTION II

PLAN REVIEW PROCEDURES

II-1. GENERAL:

- A. Preliminary Design Meeting: Prior to initiating bid document preparation, the individual who will design the public landscape shall contact the Public Works Department to schedule a Preliminary Public Landscape Design Meeting. Attendees shall include the designer, representatives of the Planning Department and Public Works Department who are assigned to process the plans for the project, and if desired, the Developer's representative. The purpose of this meeting will be to review the extent of public landscape areas being contemplated, to review a preliminary conceptual design (as prepared on tissue in a "sketch" format by the designer) to illustrate the proposed planting scheme(s) for all planting areas, to confer on the plant palette to be used and the corresponding type of irrigation system to be provided. Using drip irrigation for groundcovers, shrubs and subterranean drip for turf is required. If subterranean drip irrigation cannot be utilized on turf a minimum of 2' spacing of sprinklers from any hardscape is required.
- B. Plan Review "Turn-Around-Time": The City's goals for Public Landscape Plan Check reviews are to provide review comments within a two week (10 working days) time frame for initial submittals, and within a one week (5 working days) time frame for subsequent submittals. The Public Works Department staff person assigned will endeavor to meet these goals within the resources available, however, this turn around time cannot be guaranteed since the City has no control over the number or complexity of projects which may be submitted at any one time.

II-2. SUBMITTAL REQUIREMENTS & FEES:

- A. Public Landscape Plan Check Submittal Requirements: Once the conceptual landscape plan, plant palette and type of irrigation design to be used has been approved by the City, the designer may commence construction document preparation. A total of two sets of prints of all plan sheets, a preliminary project cost estimate and a check in payment of the Public Landscape Plan Check initial fees shall be submitted to the Public Works Department as a single packet to be considered a complete submittal for plan check purposes. Packets that do not have all items required will be returned to the applicant without review. A separate submittal packet will be needed for those projects also subject to the Planning Department's Landscape Design Review Process. Please check with your assigned Planner in the Planning Department for Planning's submittal requirements.
- B. Public Landscape Plan Check Fees: "Plan Check Fees are based on the valuation of the proposed improvements as calculated on the Construction Bond Estimate form. As a part of the first submittal, payment of the Plan Check **Base Fee** is **required**. Upon completion of the plan check process, the remaining balance of the Plan Check Fee shall be paid. This is required prior to issuance of a Construction Permit."

- ### **II-3. INITIAL PLAN REVIEW ("1st Check"):**
- Comments will be provided to the applicant in two forms; written comments cross referenced to individual plan sheets, and redlined comments written directly on a "Redlined Set" of the plans. If the E-mail address(es) of the developer and/or designer are provided, electronic versions of the 1st Check Comments can also be provided in advance of hard copies. The "Redlined Set" of plans and a signed hard

copy of the Review Comments will be returned to the applicant either directly via U.S. Mail (or pick-up at the front counter at applicant's option), or when the project is also subject to Planning Department Design Review, via the Planning Department's Planner assigned to the Project.

- II-4. AGREEMENT AND BOND FORMS:** As a part of the 1st check review, Landscape Agreement and Bond Forms will be prepared by the Public Works Department and will be forwarded to the Developer either 1) via the Public Works Department (for inclusion in the "Dear Sir" letter associated with Tract recordation) where being processed as a part of a mapping (tract or parcel map) process; or via the applicant who submits the Landscape Plans when the project is not a part of a tract or parcel map process. See Appendix B for Sample Forms. (Agreement and Bond requirement authority is per Subdivision Code Section 18.220.020 Improvement Security)
- II-5. SUBSEQUENT PLAN REVIEWS:**
- A. Resubmittals: Plan resubmittals shall include two clean sets of prints of the revised plans together with the "Redlined Set" of plans from the previous review. Loss of or failure to provide the "Redlined Set" as a part of subsequent submittals will likely result in additional staff time charges being posted against the "trust account" for the subsequent review, so applicants are encouraged to include the redlined set.
 - B. Comments from Subsequent Reviews: If comments are significant in number or nature, they will be provided as written comments and/or redlined comments. If the comments are minor (as determined by the Plan Checker), they can be provided by E-mail without the need for further plan transmittals back and forth.
- II-6. FINAL PLAN APPROVAL:** Once sets of plans have been submitted, reviewed and found to be in a form acceptable to the Public Works Department, and once both the electric and water service purveyors have signed the originals, and Landscape Agreements and Bonds have been posted, an appointment can be made with the Public Works Department Plan Checker to sign the original plans (note: for Tracts, the submittal of agreements and bonds can be deferred pending final submittal for recordation of the map, but all agreements and bonds must be submitted and accepted before the map can record). One of the two sets of prints submitted will be stamped as the "Public Landscape Permit Set" and will be forwarded to the Public Works Landscape Maintenance Inspector for issuance with the Public Landscape Construction Permit. Once plan originals have been fully signed by the City, they shall be placed on file with the Public Works Department (under authority of Subdivision Code Title 18, Section 18.220.030 Improvement Plans). For any and all revisions to approved plans, the originals must be checked-out from Public Works, and must be resubmitted and re-approved as a "Revision" to the approved plans, or the changes made will not be recognized as legitimate changes by the City and construction delays may occur. The City shall not be liable for delays resulting from "un-approved" revisions to approved plans.
- II-7. PUBLIC LANDSCAPE CONSTRUCTION PERMIT:** No construction activity (other than rough grading which is the subject of a separate plan review and permit process through the Public Works Department) shall commence within the public landscape area until the Public Landscape Plans have been approved and a Public Landscape Construction Permit obtained by the Developer. Failure to obtain a proper permit may result in "double fees" being applicable. See Section IV of this manual for information regarding obtaining the required permit.

II-8. SURETY RELEASE: All surety releases shall conform with the requirements of Subdivision Code Section 18.220.140. No public landscape surety may be released until the project is inspected and accepted in writing by the appropriate City Public Works Department representative. The public landscape performance surety will not be released until the required one-year plant establishment period has been completed by the developer and the project has been assumed for maintenance by either the City or the HOA as applicable. The payment portion of the surety will be released six months following release of the performance portion, provided no claims are forthcoming.

SECTION III

DESIGN STANDARDS

III-1. GENERAL

- A. Public Works Department Standards: All materials and installation work for public landscapes shall conform to the Public Works Department's standards and shall be installed per the Standard Specifications Sections **02441 Irrigation** and **02483 Planting** (See Exhibits Standard Specifications)
- B. "Greenbook" Standard Specifications: All work within the public right-of-way and within landscape easement areas shall also conform to the Standard Specifications for Public Works Construction ("Greenbook"), latest edition adopted by the City, as written and promulgated by the Joint Cooperative Committee of the Southern California chapter of the American Public Works Association and Southern California Districts Associated General Contractors of California, published by Building News, a division of BNI Publications, Inc., 3055 Overland Avenue, Los Angeles, California 90034, (310) 202-7775. Copies of the "Greenbook" may be purchased over the counter at the City of Riverside's Public Works Department, 4th Floor, City Hall, 3900 Main Street, Riverside, CA 92522.

III-2. GRADING AND DRAINAGE: (See also Standard Specification Section 02110 Grading)

- A. City Ordinances and Regulations: All grading work shall conform to the City's grading ordinances and regulations. Contractor shall be responsible for obtaining all grading and other permits as required.
- B. Slope Grades and Benches: No planting area within either the public right of way or landscape easement areas shall be graded to exceed a slope of 2:1. Benches of a minimum of 30" in width shall be provided at both top and toe of all 2:1 slopes to facilitate irrigation system installation and landscape maintenance efforts.
- C. Minimum Cross Slopes and Flow Line Gradients: No planting area shall have less than a minimum 2% cross slope, nor less than a 1% gradient along an earthen flow line. Where drainage gradients of less than 1% are encountered, special provisions such as concrete ribbon gutters or drain lines and grated inlet drains shall be provided to ensure positive drainage of all landscape areas.
- D. Gradients in Turf Areas: Gradients for sloped turf areas shall not exceed a maximum of 20% (5:1 max.) at mid-slope, and shall "transition" at both top and toe to allow for proper mowing heights without scalping or bridging of turf during mowing operations. Minimum sheet drainage on turf shall be 2% to a minimum 1% flowline.
- E. Transitions: All changes in gradients within turf areas shall transition through a minimum 30' radius vertical curve to avoid scalping or bridging.
- F. Jute Netting: shall be provided on all slopes 3:1 and steeper, and along flow-lines and wherever erosion becomes evident at any time during plant establishment.
- G. Sheet Drainage: Wherever possible, all medians, parkways and common areas shall be designed to sheet drain at a minimum 2% to the curb and gutter along the street. Where no curb and gutter exists, areas shall be graded to drain to storm drain inlets or other appropriate drainage facilities.
- H. Median Grade: Medians shall be designed to drain internally to storm drain inlets wherever possible. Where storm drains are not available, the median grades shall either be crowned or cross sloped (as determined by the Public Works Department), depending upon which method better approximates a 2% sheet flow to the curb. Under no circumstances shall drainage from medians, parkways or common areas be allowed to

- drain onto private property.
- I. Avoidance of Concentrated Flows: All grading designs shall incorporate provisions to prevent concentrated flows across public sidewalks and over curbs and/or retaining walls.
 - J. Positive Drainage Required: All grading designs shall provide positive drainage, and shall avoid the creation of even temporary water ponds in any landscape areas.
 - K. Subsurface Drainage Facilities: Where subsurface drainage systems are used:
 - 1) Lines shall be sized and slopes designed to be self-cleaning based on the anticipated flows.
 - 2) All lines shall be PVC or concrete, minimum of 12" in diameter, with a d-load sufficient to withstand occasional vehicular traffic, and shall be installed with a minimum of 12" of cover.
 - 3) Drain inlets shall be grated, with bolt-down traffic rated grates.
 - 4) Wherever subsurface drainage systems are used, a secondary drainage path must be provided that avoids "spill" onto any private property or across any property lines.
 - L. Drainage from Behind Retaining Walls: Special provisions shall be made (interceptor drain inlets, ribbon gutters, french drains, etc.) to handle surface run-off as well as subsurface water concentration behind retaining walls.

III-3. TRAILS/GENERAL NOTES

Public Works will be responsible for improved trails (those that are paved) the inspection and maintenance of parkway and reverse frontage landscaping adjacent to trails when such landscaping is adjacent to a street and there is a clear delineation between the trail and the parkway.

A. Grading:

- 1) The cross slope on all trails shall not exceed 2% maximum.
 - 2) Wherever feasible, based on the natural "lay of the land", all trails shall be designed to be fully accessible per the Americans with Disabilities Act (ADA) and State of California Title 24.
 - 3) Trails shall generally be designed at less than 5% (<20:1) longitudinal gradient.
 - 4) For short distances, accessible trails may be designed as a ramp or series of ramps with a maximum longitudinal gradient of 8.333% (12:1), but must be provided with continuous hand rails along such lengths. Where bottom rails are not provided, curbs are required.
 - 5) Where total ramped lengths exceed 30 feet, landings shall be provided spaced at a maximum of 30 feet on center. Generally for grades exceeding 5%, it is preferred that short intermittent ramps be used rather than using a single long continuous ramp.
 - 6) Subject to the prior written approval of the City, where the natural "lay of the land" precludes the design of trails within the above parameters, trail segments may be designated and marked with signage as a "Non-Accessible Trail". In such case, the trail may be constructed without handrails, but shall be designed with switchbacks as necessary to provide a maximum longitudinal gradient of 10%.
- B. Structural Section: The trail's structural section shall consist of a minimum of 3" of decomposed granite paving, color as approved by the inspector, which has been mixed with the specified binder and placed and compacted over compacted subgrade per the binder manufacturer's standard specifications for heavy use areas, all per City standard specifications (See Specifications Section **02210 Grading**). Trail bed subgrade shall be compacted to a minimum relative compaction density of 90% to a depth of 12" prior to

placement of D.G. Trail D. G. shall be compacted to a relative compaction density of 90%.

- C. Trail Dimensions: Trail bed width shall be a minimum of 10 feet as measured from edge to edge perpendicular to the center line of the trail (or outside edge of mowcurb to outside edge of mowcurb where trails abut irrigated landscape areas).
- D. Trail Fence: A two rail PVC Trail Fence is required on the street side of all trails parallel to secondary and arterial City streets. The trail fence on residential streets may be located adjacent to the right of way line to separate the trail from residential property. Where a given trail segment is designated for equestrian use the fence shall be continuous the full length of a given block (with interruptions only at driveway openings where they occur). Where a given trail segment is not designated for equestrian use, the fence shall be installed for 150 feet in either direction at all street intersections/curb returns and intermittently along the street where trails are parallel to the street. Step-over's shall be provided (as a means of controlling trail use by motorized vehicles) where trails leave the public right of way.
 - 1) A continuous two-rail trail fence per City standards shall be provided on the street side of trail segments that parallel an arterial street. Where residential properties face the street, the trail fence shall be provided on the private property side of the trail bed to separate the trail from the property front and/or side yard, and shall have openings at driveways and walkways which connect to the street.
 - 2) The trail fence is not required where trails are not adjacent to a roadway.
- E. Concrete Mowcurbs: are required wherever the trail abuts an irrigated landscape area, but may be omitted where the trail abuts natural lands (native indigenous plants in a wilderness setting with no irrigation system).
- F. Trail markers: shall be provided along all trails at a maximum of 75 feet on center. Where trail fences are a part of the project, marker decals shall be affixed to the fence posts, where no fence is required, marker decals shall be affixed to both sides of the City standard Carsonite drive stakes and the stakes shall be installed within the trail easement adjacent to the edge of the trail on alternating sides of the trail.
- G. Motorized Vehicle Barriers: Wherever trails leave the street right of way and cross property not adjacent to a street, barriers to motorcycles and other motorized vehicles shall be provided.
- H. Use Non-Poisonous Plants: Where trails are approved for equestrian use, landscape plantings used to separate trails from private property and/or sidewalks shall be selected to avoid use of plants with any poisonous plant parts.

III-4. ACCENT FEATURES

- A. Decorative Pavement: Shall be of the color and pattern as approved by the Planning Department. For median islands, a continuous strip of decorative pavement, minimum 12" in width shall be provided at the back-of-curb along both sides of the median. This pavement shall match the decorative pavement used at the island noses as approved by Planning.
- B. Signs: All signs or markers of any sort within any Public Landscape area shall require the review and approval of the City. All other signs are subject to the review and approval of the Planning Department for issuance of a sign permit, and of the Public Works Department for issuance of an encroachment permit.
- C. Accent Lighting:
 - 1) Lighting designed primarily to accent landscaping, buildings, signs, etc., and located

within the public right of way or public landscape easement areas shall be the responsibility of the adjacent private property owner for installation and maintenance. Such lighting may only be installed upon the review and approval of the various City departments affected. Review and approvals typically include, but are not necessarily limited to, Planning, Public Works, and Public Utilities. All such lighting shall be subject to the issuance of both an encroachment permit (as issued by Public Works) and an electrical permit (as issued by the Building & Safety Division of the Planning Department).

- 2) No accent lighting is permitted within the public right of way without the prior written approval of all affected departments.

III-5. IRRIGATION

A. **General:** All irrigation systems shall be designed as Netafim drip systems and shall include:

- 1) For vandal resistance and durability to the extent feasible, with special consideration given to placement of the irrigation controllers and water services.
- 2) To deliver a minimum of an inch and one half of water within seven days, within watering time limited to the hours of 11 PM to 6 AM. Irrigation water application rate shall be designed so as not to exceed the infiltration rate of the soil, and system shall be programmed to prevent even temporary water ponds and to minimize runoff.
- 3) To operate at the lowest available pressure per the water purveyor's records. Master valves with flow sensors shall be provided for all mainlines serving Parkways and Median islands.
- 4) To meet the watering needs of all plant materials used within the design area. Separate stations shall be used for full shade, part shade, and full sun areas. Separate stations shall be used for groundcover/shrub areas vs. turf areas.
- 5) To eliminate fogging, overspray and discharge onto areas not intended for irrigation and/or beyond the work limits (includes streets, sidewalks, adjacent properties, etc.).
- 6) To provide uniform coverage throughout each station.
- 7) With proper backflow protection per the water purveyor's standards.
- 8) With a pressure regulator valve whenever the highest recorded static pressure at the meter exceeds the typically available static pressure by more than 20%. Regulator valve when used shall be set at one hundred ten percent (110%) of the minimum pressure required to operate the irrigation system as designed.
- 9) **Using drip irrigation for groundcovers, shrubs and subterranean drip for turf is required.** If subterranean drip irrigation cannot be utilized on turf minimum 6" high pops spaced a minimum of 2' from any hardscape is required. A fertilizer injector will be required.
- 10) Drip irrigation is the required system. If drip irrigation cannot be utilized the maximum head spacing's is as follows:
 - a) Small sprinkler heads with radius throws of up to and including 15 feet shall be spaced "head to head".
 - b) Intermediate sprinkler heads with radius throws of greater than 15 and up to 40 feet shall be spaced at a maximum of 66-2/3% of their diameter.
 - c) Large sprinkler heads with radius throws of 40 feet or more shall be spaced at a maximum of 55% of their diameter.
- 11) With irrigation lines, valves and fittings sized to keep water velocities under five

feet per second (5 fps).

- 12) With isolation gate valves per City standards to allow shut-down of various portions of the irrigation system on a single water source, without the need to shut down the entire system. Each portion shall not exceed 6 control valves. Isolation valves shall be installed per City Standard Detail **2015, Isolation Valve in Box/Gate Valve**.

B. Placement of Components:

- 1) Wherever possible, water services and irrigation controllers shall be located in the parkway at mid-block, but not less than 150' from the beginning of curb return (BCR) at the nearest intersection. The Landscape Architect shall coordinate the electrical and water services with the Civil Engineer and Utility Purveyor(s).
- 2) Remote control valves shall be set in shrub areas wherever possible. Do not locate remote control valves in any area designated for recreational use (such as athletic fields or trails).
- 3) All valves shall be installed with ball valve assembly within valve boxes as specified, with each box set a minimum of three feet from any adjacent box, and each valve in its own box manifold set ups not allowed. Valves and boxes shall be installed per City Standard Detail **2010, Remote Control Valve**
- 4) Slopes:
 - a) Lateral lines on slopes shall be installed generally parallel to topographic contours along the slope face.
 - b) Irrigation valves and constant pressure mainlines shall be designed and installed at the bottoms of slopes wherever possible.
 - c) Provide separate control valves to operate heads at the top, toe, and intermediate slope areas.
- 5) Provide a minimum of 12 inches of separation, measured both vertically and horizontally, between all lines. See Standard Detail **2001, Trenching & Line Placement**
- 6) Lines Beneath the Street: All irrigation lines beneath the street shall be constant pressure lines installed within a rigid sleeve of either Schedule 40 PVC (see further information regarding sleeving below).
- 7) Quick coupler valves shall be provided at a maximum of 50 feet from the ends of all median and parkway landscape areas. For shrub and groundcover areas, valves shall be spaced at a maximum of 75 feet on center. For turf areas, valves shall be spaced at a maximum of 150 feet on center with the intent that all areas of a planting bed can be reached with a 50' hose, and all areas of the turf can be reached with a 75' hose. Install quick coupler valves per Standard Detail **2014, Quick Coupler Valve**.

C. Electric Service:

- 1) Where electric service is available from the City Public Utilities -Electric Division, electric service(s) for all landscapes to be maintained by the City (other than Landscape Maintenance Assessment Districts - "LMAD's"), shall be "non-metered" type, installed per City Standard Detail **2016, Non-Metered/Metered Electric Service**.
- 2) All electric services from purveyors other than the City of Riverside Public Utilities, and all electric services for all landscapes to be maintained by parties other than the City (such as HOA's, MPOA's LMAD's, private parties, etc.), service type shall be a "metered" electric service installed per Standard Detail **2016, Non-Metered Metered/Metered Electric Service**.
- 3) The electric service address, as assigned by the power purveyor, shall be stenciled

on the outside of the controller enclosure door.

D. Water Service:

- 1) Potable/Domestic Water: Shall be metered and provided with backflow protection in accordance with water purveyor's standards and State regulations.
- 2) Reclaimed/Non-potable Water:
 - a) Use of a reclaimed and/or non-potable water source will require prior written approval of the City and is subject to the availability of a City of Riverside, Public Utilities Department approved source.
 - b) For systems using reclaimed water, system installation shall conform with all State regulations and all regulations of the water purveyor. All piping, fittings and valves used shall be color coded ("purple pipe") to identify the system as "non-potable/reclaimed" water piping as applicable. In addition to pipe color coding, warning tape shall also be provided on all constant pressure lines where reclaimed water is used. Warning tape shall be red in color with the words "CAUTION RECLAIMED WATER" imprinted in minimum one inch high letters, black in color. Imprinting shall be continuous and permanent.
 - c) Quick coupler valves used on non-potable/reclaimed water systems shall be as manufactured by **Rainbird Irrigation Products** and shall **not** accept any other manufacturer's quick coupler valve quill.

E. Sleeving:

- 1) All sleeves shall be sized to accept the line and fitting sizes or wire count for which they are intended, and shall be sufficiently sized to provide for easy removal and replacement of the line/wire, preferably from either end of the sleeve. Sleeves shall be a minimum of twice the line size diameter (but in all cases must be sized to accept the line fitting outside diameter).
- 2) Control wire shall be separately sleeved from irrigation lines and each irrigation line shall be separately sleeved from all other lines pull boxes shall be installed at each end of any crossings street or median.
- 3) All sleeves shall be installed in a manner to avoid all changes in direction and depth. Bends turns and tees will not be permitted within sleeves. All sleeves for pipe lines shall be placed so that a minimum of 25 feet of clearance is provided at each end of the sleeve to allow for ease of subsequent removal and replacement of full lengths of pipe within the sleeve.

F. Anti-drain Valves: Wherever irrigation heads show evidence of draining the lines after valve shut-down, provide anti-drain valves within head risers, or integrally within the head, as necessary. Do not install in-line anti-drain valves in the lateral.

G. Details for Non-standard Components: Provide construction details for all irrigation components proposed for use that are not in accordance with City standards.

H. Stub-outs for Future Use:

- 1) Stub-out spare control wire(s), in quantities as determined by the City during the initial plan check. Spare wire shall terminate with a three foot coil in valve boxes at each end of each area served by a given controller.
- 2) Stub-out requirements for future extension of irrigation system (mainline, control wire, laterals, etc.) beyond the limits of the current project shall be as determined by the City.

I. Drip Irrigation: **Use of drip or subterranean irrigation shall be required on all public maintained right of way landscapes.** When it is necessary to use Turf in Medians subterranean drip shall be utilized. If subterranean drip irrigation cannot be utilized on

turf a minimum of 2' spacing of sprinklers from any hardscape is required. The setback shall be 2' from curb face to eliminate overthrow into streets the use of hardscape shall be supplemented in the 2' buffer space to add a maintenance walking strip with prior written approval of the City, and shall only use materials/manufacturers which have been previously approved by the City. Multi-outlet spaghetti tube type systems are unacceptable and will not be approved. All drip irrigation systems shall include a fertilizer injector system.

III-6. PLANTING

A. General:

- 1) All plant material shall comply with City standard specifications.
- 2) All tree species shall conform to City approved species for use in public landscapes as street trees.

B. Pre-plant Weed Control Measures: If any live weeds exist on or adjacent to the site at the beginning of work, in addition to the weed control measures specified in the Standard Specifications Section **02483 Planting**, all live weeds shall be sprayed with a non-selective herbicide as recommended and applied by a licensed pest control advisor and applicator. Leave sprayed weeds intact for at least fifteen (15) consecutive days to allow systemic kill, after which the area shall be cleared and grubbed, removing all weeds and plant parts to a minimum of 1/4" below the ground surface. Once the irrigation system is operational, perform additional weed control measures as specified in **02483 Planting**.

C. Trees: The following criteria shall apply to the placement of all trees:

- 1) Provide the following minimum clear distances between the all trees and the following site features when placing trees:
 - a) 35 foot minimum and according to species as measured from trunk to trunk between all trees (both existing and new).
 - b) 18 inches from the Right-of-way line to all trees.
 - c) 5 foot between all walls and all trees.
 - d) 5 foot between all utilities (including but not limited to sewers, gas lines, water lines, meter vaults, catch basins, storm drains, drain lines, etc.) and all trees.
 - d) 10 feet between edges of all private driveways and private walkways and all trees
 - e) 10 feet between all fire hydrants and all trees.
 - f) 20 feet between all light standards and all trees.
 - g) Root barriers may be required at the Inspectors discretion, size to be determined by tree species and proximity to hardscape.
- 2) Provide a minimum vertical clearance for tree limbs of:
 - a) Fourteen and one half feet (14.5') over streets (includes parking lanes).
 - b) 10 feet over trails.
 - c) 8 feet over sidewalks
- 3) Minimum sizes for all tree species including Palms shall be:
 - a) Brahea/Erythea Palm tree species 6' brown trunk
 - d) All other palm species 10' brown trunk
 - e) All other tree species 36" box

D. Obstructions:

- 1) Sight Obstructions: No plantings of any sort shall be placed where they constitute a hazardous sight obstruction to vehicular, bicycle, equestrian and/or pedestrian traffic. The interpretation of the City Traffic Engineer as to what constitutes a

hazardous sight constraint shall govern in all cases.

- 2) Irrigation Coverage and Drainage: No shrubs or trees shall be located so as to interfere with either irrigation coverage or drainage flow-lines.

E. Medians and Intersections:

- 1) All medians, or portion thereof, measuring less than 5 feet in width (as measured from back of curb to back of curb) shall be paved full width with non-slip or textured (decorative) concrete, and shall not be irrigated and planted.
- 2) At street intersections, the first parkway/street tree from the intersection shall be placed at a minimum distance of 35 feet from the beginning of the curb return (BCR) on rights of way less than 88' in width, and a minimum of 50 feet from the beginning of the curb return (BCR) on rights of way of 88' in width and wider.
- 3) All shrub and groundcover plant selections for medians and parkway intersection areas shall be limited to species which at a mature height, without pruning, do not exceed 30" above the top of the adjacent traveled lane, including all blooms/fruit displays, seed pods and other seasonal growth. Parkway intersection areas are defined as those planting areas within the triangular right of way area at the intersection as defined by a line connecting the two points extending down each cross street to the approved placement for the first street tree planting (35 feet from BCR or 50 feet from BCR dependent on street size) on the respective street.
- 4) Tree species selected for medians shall take into consideration the median width and proximity of the traveled lane to the trees, the tree canopy height at maturity, the rooting characteristics of the planting and its potential for damage to curbs, as well as the attractive nuisance problems associated with edible fruit trees within medians.
- 5) **Use of drip or subterranean irrigation shall be required on all public maintained right of way landscapes.** When it is necessary to use Turf in Medians subterranean drip shall be utilized. If subterranean drip irrigation cannot be utilized on turf a minimum of 2' spacing of sprinklers from any hardscape is required. The setback shall be 2' from curb face to eliminate overthrow into streets the use of hardscape shall be supplemented in the 2' buffer space to add a maintenance walking strip with prior written approval of the City, and shall only use materials/manufacturers which have been previously approved by the City. Multi-outlet spaghetti tube type systems are unacceptable and will not be approved. All drip irrigation systems shall include a fertilizer injector system.

SECTION IV

INSPECTION PROCEDURES

IV-1 GENERAL

- A. Surety: Prior to commencement of any work within the Right of Way a form of surety, as acceptable to the City, must be provided by the Developer to guarantee both the installation of the planned improvements and the payment of workers and suppliers for the project. Permits may not be issued, nor work commence, until acceptable sureties have been posted.
- B. Permits Required: Both a Public Landscape Permit as issued by Public Works, and a Public Works Construction Permit as issued by Public Works, are required prior to commencement of any construction activity for landscape improvements within a public right of way. The **Public Landscape Permit** may be obtained by contacting the Public Works Department, at (951) 826-5311. The **Public Works Construction Permit** may be obtained at the Public Works Counter, 4th Floor, City Hall, 3900 Main Street, Riverside, 92522. All fees and charges associated with issuance of all required permits shall be paid at the time of permit issuance. The Public Landscape Permit will be issued together with a stamped set of the approved landscape plans marked "Public Landscape Permit Set". This permit set and the permit card must be available on-site for all public landscape inspections.
- C. Approved Plans: Permits will not be issued without "approved" plans. Public Landscape Plans are required to be approved by the Planning, and Public Works Departments prior to permit issuance. Any changes or revisions to the "approved" plans, must similarly be approved by these same departments to be valid as "approved" plans for installation of improvements (see Section II, Plan Review Procedures). City Approved Plans will typically bear signatures and/or initials of representatives of the approving department(s) to evidence their approval.
- D. Compliance with Building Codes, Title 24 and ADA: It is the Contractor's responsibility to ensure all improvements as installed are in full compliance with all applicable codes and regulations, particularly with respect to Building codes, and Title 24 & ADA accessibility regulations

IV-2 INSPECTION REQUIREMENTS:

- A. Public Landscape Inspections: Contractor is responsible to call for all required inspections. Inspection requests must be received a minimum of 48 hours (two working days) in advance of the time inspection is needed. The Public Works Landscape Maintenance Inspector may be contacted at (951) 826-5311 for inspection requests. Both the Public Landscape Permit Card and the Public Landscape Permit Set of approved plans must be available on-site to obtain required inspections.
- B. Pre-Construction Meeting: A pre-construction meeting of the Contractor, Landscape Architect/Designer, Public Works Landscape Maintenance Inspector and Developer is required prior to commencement of any construction activity. This meeting shall generally be held on-site and shall include the following agenda items:
 - 1. Review of All Approved Plans including grading and drainage, construction, irrigation, and planting.
 - 2. Required Permit: Prior to the pre-construction meeting, Contractor shall obtain the Public Works **Construction Permit**. The **Public Landscape Permit** may be obtained after the Public Works permit has been issued, and may be obtained either prior to the pre-construction meeting or at the pre-construction meeting (contingent

upon proper form of payment being provided). Payment of the permit fees shall be in the form of a check made out to the City of Riverside in the full amount of the initial inspection fee.

3. Coordination with Utility Purveyor(s) for water and electric service.
4. Compliance with other Regulatory Agency Requirements:
 - a) SWPPP/NPDES requirements
 - b) Title 24/ADA requirements
 - c) Public Utilities Requirements
 - d) OSHA requirements
5. General Discussion of project elements.
6. Work Schedule.

C. Inspections Required: The following stages of work will require inspection and approval by the Public Works Landscape Maintenance Inspector:

1. Rough grade required prior to any trench layout.
2. Trench layout for mainlines and sleeve locations prior to paving;
3. Main line and control wire installation prior to pressure test;
4. Hydrostatic pressure test of main line with line center loaded, prior to installation of any valves:
 - a) All constant pressure lines shall be tested under hydrostatic pressure of 150 psi for a period of not less than two consecutive hours. Contractor shall furnish all necessary equipment, including force pump and pressure gauges. Install pressure gauges at each end of each line segment being tested and at point of connection;
 - b) All hydrostatic tests shall be performed in the presence of the Public Works Maintenance Inspector with the force pump disconnected from the line being tested. No such lines shall be backfilled until they have been tested, inspected, and accepted in writing;
5. Backfill and compaction of main line trenches;
6. Soil amendment and rototilling operations amending soils to minimum 6" depth. Contractor shall provide bills of lading for all soil amendment materials being incorporated into the soil;
7. Lateral line trenches;
8. Installation of lateral lines, sleeves, risers and flushing of each station;
9. Backfill and compaction of lateral line trenches;
10. Construction of mow curbs,
11. Paved trails
12. Finish grades prior to planting;
13. Wire connections for all low voltage and service voltage wiring, including electric service to controller;
14. Weed control measures prior to planting;
15. Irrigation coverage test prior to planting;
16. Plant materials delivered on-site prior to installation;
17. Planting pit excavations and soil backfill amendment prior to planting;
18. Hydro seed materials prior to hydro seeding. Contractor to provide bills of lading for all hydro seed materials;
19. Installation of plant material, fertilizer tablets, tree stakes and braces, guys and anchors, and tree guards;
20. Final irrigation system operational test (prior to final acceptance), to include

flushing of all filters, cleaning of all heads, verification of valve boxes and heads at specified heights per standards, no runoff onto streets and irrigation time settings being properly re-adjusted for established plantings and the season;

21. Final planting inspection (prior to final acceptance), to include all turf areas freshly mown (within 24 hours of inspection), all groundcover and turf neatly edged, all trash, clippings, dead plant material and weeds removed from the site, all plantings not showing vigor or that have been damaged shall be replaced.
22. Inspection of entire installation for "start" of Plant Establishment Period. Results of this inspection shall be confirmed in writing by the City;
23. Periodic inspections (quarterly for one-year plant establishment period) throughout the duration of the Plant Establishment Period, results of these inspections to be confirmed in writing by the City;
24. Final Acceptance Inspection, contractor shall provide "as-built" plans, written certification of the backflow device having been recently tested and accepted by the water purveyor, and all other turn-over items being provided to the City. Final Acceptance shall be confirmed in writing by the City. Contractor shall continue to maintain the entire landscape area until the City's written confirmation of final acceptance has been received.

IV-3 RELEASE OF LANDSCAPE IMPROVEMENT BONDS/SURETY:

- A. The developer's surety posted to guarantee the installation of all landscape improvements will not be released until Final Acceptance of the project following completion of the required Plant Establishment period. For most public landscapes, the Plant Establishment Period shall be a minimum of one (1) year. Once the City's letter acknowledging final acceptance of the project has been issued, the release process for the surety can begin. Developer should anticipate a minimum two week processing time for the issuance of a release letter for the Performance portion of the surety. The Payment portion (labor and materials portion) will be released six months thereafter, barring the City receiving any claims of non-payment from either material men or labors who worked on the project.
- B. Notice of Completion: Developer shall file a Notice of Completion with the County Recorder's Office at the end of the one year plant establishment period upon receipt of the City's letter of Final Acceptance of the project.

Section V

Appendixes



PUBLIC WORKS LANDSCAPE PLANS & SPECIFICATIONS SUBMITTALS CHECK LIST

PROJECT TITLE: _____ CITY PLAN CHECK CASE NUMBER: _____
 SUBMITTED FOR: 1ST 2ND 3RD 4TH PLAN CHECK (If later specify which) _____ DATE RECEIVED BY CITY: _____ DEVELOPER: _____
 LANDSCAPE ARCHITECT: _____

(FIRM NAME) _____ (FIRM)
 (REPRESENTATIVE'S NAME & E-MAIL ADDRESS) _____
 (STREET ADDRESS) _____ (STREET ADDRESS)
 (CITY/STATE/ZIP CODE) _____ (CITY/STATE/ZIP)
 (Telephone/FAX Number) _____ (Telephone/FAX)

Submittals:

- Plans (2 sets landscape, 1 set street & grading)
 - Specs (1 set - **do not** incorporate into plans)
 - Agronomic Soils Report w/recommendations (1 copy if available)
 - Cost Estimate for R.O.W. Landscape Improvements (1 copy)
 - Irrigation Calculations (Largest, smallest, furthest)
 - Catalog Cuts (for specialized equipment - when requested by Plan Checker)
- General:**
- 24" x 36" standard sheet size w/City Standard Title Block
 - Complete set of plans (w/all sheets listed on the Title Sheet Index) (DO NOT)
 - Project Limits, building coverage, paved vs. landscape areas, R.O.W. line clearly labeled/defined
 - Maintenance Responsibilities defined
 - City Standard Details to be incorporate into Plans

All Sheets:

- Plan Check Numbers (PC-xxxx-L-M-PKWY/PRP0x-xxxx)
- Sheets numbered as _____ of _____
- Maximum Plan Scale: largest scale still adequately legible when reduced for irrigation controller charts. (Absolute max. 1" = 40'-0"; 1"-20' preferred)
- North Arrow on each sheet/plan
- Match Lines
- Street Names
- Handicap ramps clearly shown (applicable for trails plan check purposes).

Title Sheet:

- Location Map
- Vicinity/Key Map(s) w/street configuration accurately shown
- Plan Index
- Public Landscape General Notes
- Total square footage of entire landscape area, including

- decorative pavement and trail areas as applicable
- Total numbers of trees by size
- Project Title/ Tract #/ Cross Streets or Address
- Approvals Signature Blocks for:
 - Planning Department - Design Review
 - Public Works Department
 - Water Purveyor
 - Electric Purveyor
- Revisions Block
- Landscape Architect's firm name, representative's name and e-mail address, firm address, phone # and FAX number, LA seal and signature & license expiration date
- Developer's firm name, representative's name & e-mail address, firm's address, phone # and FAX number

Irrigation Plans:

- Location(s) of Water Meter(s) and P.O.C Information:
 - Service address
 - Meter size & number
 - Water Source Type (Potable/reclaimed/well)
 - Available pressure range in PSI
 - Peak demand in GPM
 - Backflow device provided (potable only)
 - Calculations (longest, largest, smallest)
 - Equipment legend/cross reference on each sheet
 - No cross connections
 - No drinking fountains connected to irrigation
 - No hose bibbs on reclaimed water
 - Strainer provided at backflow
 - Isolation/section valves per standards
 - Quick coupler valves at 75' o.c.at shrub areas/150' o.c. @ turf, 50' from end(s) of project planted area (project limits/ends of median islands)
 - All details per City standards

Planting Plans:

- All trees on approved Tree List
- All trees at minimum 24" box size and minimum 35' separation
- Adequate sight distances clear of trees provided at intersections

- Consistency of landscape treatment with previously approved landscapes/existing landscapes within the same block/vicinity
- All planting details per City standards
- Maximum/minimum slopes provided for turf areas/g.c. areas
- Concrete mow curbs provided per standards
- Vine plantings provided per standards.

Specifications Check List:

- Inspections: Pressure Test/Start of Maintenance/Final Acceptance
- 48 Hour Notice: start work/paving/trenching/digging plant pits/tree planting/hydro seeding or sodding
- Main lines $\geq 1/2"$ Class 315/ $\leq 2"$ Sch 40
- Lateral lines minimum SCH 40
- Sleeves minimum SCH 40, 2x line size
- Fittings for lines, minimum SCH 40
- Fittings for swing joints, minimum SCH 80
- QCV's min. 1" diameter two piece body w/quill and bent nose hose bibb
- Valve boxes: concrete with hinged locking cast iron lids marked for valve type
- RCV's: Rainbird series or City approved equal
- Low Voltage Control wire min. #14 control, min. #12 common
- Depth of cover: $\geq 3"$ = 24"/ $\leq 2-1/2"$ = 18"/laterals = min. 12" to max 16"/Control wire = min. 18"
- Flush/adjust/coverage test/pressure test @ 150 psi for min. 2 hours
- Furnish Turn-over Items:
 - Calsense products as specified
 - 4% extra stock of each type head and nozzle used
 - 2 keys for each Controller enclosure
 - 1 valve box key
 - 1 quick coupler quill with up-kink hose bibb
 - Record drawings/controller charts
 - Minimum one (1) year Plant Establishment Period

B. Standard Specifications

SECTION 02211 - TRAIL GRADING AND CONSTRUCTION

PART 1 - GENERAL

1.01 **STANDARD SPECIFICATIONS:** The provisions of the "Standard Specifications for Public Works Construction" shall apply except as modified herein.

1.02 **SCOPE:** The Work of this Section shall consist of furnishing all labor, materials, equipment, appliances and services necessary for the execution and completion of all **Trail Grading and Construction Work** as shown on the Plans and as described in the Specifications including, but not necessarily limited to, the following:

- Rough grading as shown on the plans, including cut, fill, backfill and backfill compaction
- Subgrade preparation for D. G. paving including any over-excavation and re-compaction as may be required
- Excavation of soils for all trail fence posts and structures
- Excavation, backfill and compaction of soils for all mow curbs
- Soil compaction as required;
- Protective measures;
- Dust and noise abatement;
- Borrow from and/or export to a local borrow/disposal site as directed and as necessary for a balanced grading operation;
- Fine grading of the work site;
- Decomposed Granite Paving;
- Soil testing as required;
- Coordination with Work of other Sections;
- Clean-up; and,
- Erosion Repairs, Guarantees and Warranty Work.

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**
Finish Grading in Landscaped Areas Section 02483

1.04 **QUALITY ASSURANCE:**

A. **Other Requirements:** All Work of this Section shall comply with the requirements of the following:

1. The Grading Code of the City of Riverside.
2. The Soils Engineering Investigation Reports for the site prepared by Soils Engineer (see Appendix___).

B. **Tests and Inspections:**

1. All Work in this Section shall be subject to the observation and testing as required by the Soils Engineer selected by City. The Soils Engineer will submit a compaction report to the Public Works Department Representative certifying Contractor's compliance with the Plans, Specifications, Soils Reports and City Grading Ordinance in placing all fills and backfills. The Soils Engineer will conduct all specified tests to insure compliance. The

Soils Engineer will also test, identify and make recommendations on borrow site fill materials as specified in this Section.

2. The number and location of soils tests shall be at the discretion of the Soils Engineer to assure uniformity and compliance with the City Grading Ordinance, and shall be at least one test per two vertical feet of fill, but not less than one test per 500 cubic yards, all as approved by the Public Works Department Representative.
3. The costs of services of the Soils Engineer for specified field density and maximum density tests, compaction reports and certificates of compliance, will be borne by City except that additional tests and recompactions made necessary by inadequate compaction, inadequate materials provided by Contractor, or inaccurate excavations shall be paid for by Contractor.

1.05 GRADING A "BALANCED" OPERATION: It is the intent of the Plans and Specifications that the grading shall be a balanced operation with site material. No import nor export is contemplated. If during grading operations an excess or deficiency of earth becomes apparent, Contractor shall notify the Public Works Department Representative immediately in writing and ask for direction in adjustment of plan grades such that the grading shall be completed with site material conforming as nearly as possible to the finish grades shown and insuring positive drainage all at no additional cost to City.

1.06 WATER: See Special Provisions Section **7-8.5 Temporary Light, Power, and Water** regarding temporary construction water.

1.07 JOB CONDITIONS:

A. Protection of Existing Items:

1. Contractor shall furnish, place and maintain all shoring and bracing as may be required for protection of existing structures and utility services during execution of the Work.
2. All bench marks, monuments and other reference points shall remain undisturbed unless specifically directed otherwise by the Public Works Inspector.

B. Coordination with Others:

1. Contractor shall give written notice to the Public Works Department Representative, utility agencies, and other legal authorities prior to starting Work.
2. Contractor shall coordinate Contractor's operations with other trades, utility agencies, and other affected public departments to assure continuity for both access and service of all utility service distribution lines, in conformance with applicable requirements of these organizations. No services to any property shall be impeded.

C. Abandoned and Unknown Utilities:

1. Abandoned lines, meters and boxes, obstructions or piping, shall be removed, plugged, or capped in accordance with the requirements and approval of the agencies affected, or as directed by the Public Works Inspector. Coordinate all such Work with applicable mechanical or electrical trade having responsibility. Remove all abandoned utility lines, pipes, or conduits, to a point outside new construction lines.
2. Where unmarked utility lines or other underground obstructions or piping are uncovered within the Work area, notify the agencies or service utility companies having jurisdiction and take necessary measures to prevent interruption of service. Should such lines or

services be damaged, broken, or interrupted through Contractor's own negligence, those services shall be repaired immediately by the party designated by the utility owner, at Contractor's expense. If an unmarked utility is damaged other than through the negligence of Contractor, Contractor's responsibility is limited to providing immediate and proper notification of the damage to the utility owner so that repairs can be made. Contractor shall cooperate with the utility owner and provide access for repair work.

PART 2 - MATERIALS

2.01 D.G. PAVING:

- A. **D.G.:** Shall be color as approved by the Inspector to match existing, decomposed granite free of silt, clay, weed seed, and any other deleterious material, conforming with Section 400-2.3 Disintegrated Granite, per the Standard Specifications and as approved by the Public Works Department Representative. Contractor shall provide a one pound sample to the Public Works Department Representative a minimum of 35 days prior to ordering materials for the review and approval of the Public Works Department Representative.
- B. **Stabilizer:** Shall be "Stabilizer" as manufactured by Stabilizer Solutions, Phoenix, AZ PH: 1/800/336-2468; "Poly Pavement" as manufactured by Poly Pavement Co, Los Angeles, CA 90036 PH: 323/954-2240, or City approved equal.

2.02 **DRAIN ROCK:** Drain rock for all sumps and french drains shall be pervious backfill as specified in Standard Specifications, Section **300-3.5.2 Pervious Backfill.**

2.03 FILL MATERIAL:

- A. **Required Approval:** All fill material must be approved by the Soils Engineer and the Public Works Department Representative. .
- B. **On-site Material:** On-site excavated materials may be used for fill as approved by the Soils Engineer and the Public Works Department Representative.

2.04 **GRANULAR BEDDING MATERIAL:** Where called for on the Plans, granular bedding material shall be crushed stone or pea gravel conforming to the following grading:

<u>Sieve Size</u>	<u>% Passing</u>
3/4"	100
1/2"	95
#4	5

2.05 IMPORT:

- A. **Landscape Fills:** All import soil used for fill in landscape areas shall be Class 'A' topsoil per Standard Specifications, Section **212-1.1 Top Soil, General.**

- B. Structural Fills: All import soil used solely for structural fill shall be non-expansive, predominantly granular material free from organic contaminants, and capable of attaining the required compacted densities.
- C. Approved Samples: Samples of all import soil, as obtained by the City's Inspector at the borrow site, must be approved by the Public Works Department Representative prior to start of import of soil to the Project site.

2.06 TRAIL FENCE: Trail fence shall be a heavy duty two rail white vinyl fence designed for agricultural uses. Fence rails shall be nominal 2 x 6 x 16' ribbed type, with minimum 0.11 inch wall thickness. Posts shall be nominal 5" square by minimum 6' length with minimum 0.20 inch wall thickness, installed with a minimum 24" bury at 8' on center. Use aluminum inserts at all end, corner and gate posts (both latch and hinge sides), or fill with concrete.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Work Sequence: All demolition, clearing and grubbing of objectionable materials must be completed to the satisfaction of the Public Works Department Representative before starting any earthwork grading and excavation.
- B. Survey: See Special Provisions Section 2-9.3 **Survey Service** regarding responsibility for provision of all survey services as necessary for horizontal and vertical control points, layouts, lines and levels, and staking of the Work.
- C. Allowable Gradients: Trails shall be constructed in the field to comply with the following maximum and minimum gradients.
 - 1) Cross Slope: Trail cross slope shall be between 1% minimum and 2% maximum.
 - 2) Longitudinal Gradients:
 - a) Accessible Trails: Trails designated for ADA access shall not exceed a longitudinal slope of 5% (20:1) unless configured as an Accessible Ramp.
 - b) Non-Accessible Trails: Trails designated as non-accessible, must be so marked, and generally shall not exceed a longitudinal gradient of 10% (10:1). However, slopes steeper than this for short distances may be allowed under the following conditions:
 - Maximum of 15% slope for distance of 500' or less.
 - 20% slope permitted only in unique situations and limited to 100' or less.
 - Under no circumstances shall any slope exceed 20%.
 - c) Alternate Trail Designs: Where the natural terrain is so steep that provision of a trail at more than 20% gradient is required, to decrease grade, terrace steps may be used.
 - 3) Accessible Ramp Systems: All ramps shall not exceed a maximum slope of 8.333% (12:1). Ramps shall not exceed a maximum of 30' in length between landings. All landings shall not exceed a maximum cross slope of 2% in any direction. All landings shall be sized at a minimum of 60" x 60" or the width of the trail whichever is greater, all per ADA requirements. All ramps and landings shall be provided with accessible handrails.

- 4) Trail Edge: Where adjacent to developed landscape areas, the trail D.G. shall be contained by a concrete mowcurb on each edge of the trail tread. Where adjacent to native landscapes, no mowcurb is required and may be omitted.
- 5) Trail Fence and Markers: All trails along public streets shall be fenced and marked per Trails Standard Details.
- 6) Crossing Concrete: Where the trail is designated to cross concrete aprons and sidewalks, such aprons and sidewalks shall be constructed of concrete with rough broom or rake finish to prevent slipping. Where such areas exist, they shall be removed and replaced with rough broom finish concrete, or shall be heavy sandblasted in place to provide an equivalent non-slip surface..

3.02 ROUGH GRADING:

- A. Conformance with Plans: Rough grading of the site shall be completed in accordance with indicated contours, elevations, and limit lines shown on the Plans and shall allow for the depths of slabs, paving, sub-base, topsoil, and controlled fills.
- B. Grading Tolerances:
 1. Sub-grades to receive slabs and pavements shall be graded to a tolerance of plus or minus one-half (1/2) inch, and shall be compacted as specified below in Sub-section 3.04 **CONTROLLED FILL**, paragraph G. Relative Compaction Requirements, subparagraph 1. Slabs & Pavement Subgrades.
 2. Tolerance for rough grading in all other areas is 1/10th of a foot.
 3. In all areas, appearance and positive drainage will be factors in the acceptability of grades.
- C. Compacted Lifts: Graded material shall not be left in loose layers, but shall be stockpiled for use in controlled fill or compacted in thin layers as grading takes place in accordance with the requirements for controlled fill.
- D. Scarification: Shall be performed on all areas indicated to receive paving to depths as indicated in the soils report. In the absence of a soils report, scarification shall be to a minimum depth of six (6) inches or to a depth permitting twelve (12) inches of controlled fill whichever is greater.
- E. Engineer's Approval: Contractor shall obtain the Soil Engineer's approval of all scarified surfaces prior to placement of fill.

3.03 CONTROLLED FILL:

- A. Landscape Fills: The topmost 12" of fill in all landscape areas shall be topsoil.
- B. Rocks: Rocks larger than two (2) inches in diameter shall be removed from all fills to be compacted.
- C. Lifts: Fill material shall be spread in uniform lifts of six (6) to eight (8) inches of un-compacted thickness.

- D. Moisture Content: Prior to starting compaction, the fill material shall be brought to optimum moisture content by spraying with water if too dry, and aeration if too wet.
- E. Mixing: Thoroughly mix each lift to assure uniform distribution of water content.
- F. Allow for Shrinkage & Subsidence: Bring fills to suitable elevations above required grades to provide for effects of shrinkage and settlement.
- G. Relative Compaction Requirements:
 1. D.G. Pavement Subgrades: For all areas designated to receive D.G. pavement and within a perimeter five (5) feet outside these areas, each lift shall be compacted to a minimum of 90% of maximum density as determined by ASTM D1557-78.
 2. Planting Areas: Where fill is required in planting areas each lift shall be compacted to a minimum of 85% maximum density.
 3. Mechanical Equipment: Perform all compaction by suitable mechanical equipment and methods approved by the Soils Engineer.
- H. Contractor's Responsibility: During the grading operations, inspection and field tests will be carried on by the Soils Engineer. However, Contractor is responsible to ensure obtaining the required degree of compaction and the proper moisture content. Where compaction of less than the specified percentage is found, additional compaction effort shall be made with adjustment of the moisture content as necessary until the minimum specified compaction is obtained.
- I. Over-excavation Due to Unsuitable Materials: Excessively wet material, material in any soft or spongy spots, and material in standing water shall be over-excavated to such depth as directed by the Soils Engineer and replaced with suitable material, properly compacted.

3.04 EXCAVATION: Contractor shall perform all necessary excavation work for trail fence footings and mowcurbs and shall perform any additional excavation work necessary to provide ample room for installation of concrete forms where required. The bottom of all excavations shall be level and free from loose material, and shall be brought to the indicated or required grades in undisturbed earth. All excavations shall be kept free of standing water. Contractor shall perform all pumping, draining, and dewatering as may be necessary to keep excavations free of standing water while carrying on the Work. Should excavations for footings, through error, be excavated to a greater depth or size than indicated or required, such additional depth or size shall be filled with concrete at Contractor's expense.

3.05 OPEN TRENCH OPERATIONS: Shall conform with Standard Specifications Section 306-1 **Open Trench Operations**, as modified by the following:

- A. General: Add the following to Standard Specifications Section 306-1.1.1 **General**:
 "Where trench is close to existing pole mounted lights, catch basins, or other structures that are to remain, Contractor shall brace as necessary to prevent dislocation of such structures. In the area of any such structures, the trench backfill shall be compacted to 90% to the full depth of the structure."

B. Unsuitable Material: Add new subsection 306-1.1.7 as follows:

3.06-1.1.7 Unsuitable Material. The conditions and requirements for the determination and disposition of unsuitable material encountered during open trench operations shall be in accordance with Standard Specifications Section **300-2.2 Unsuitable Material**.

C. Trench Backfill: Shall conform with Public Works Department Standard Drawing No. 453.

3.06 BACKFILLING:

A. Material: Select site material shall be used for backfill of trenches and shall be free from large stones and clods. Material shall be as approved by the Soils Engineer.

B. Pre-Conditioning and Placement:

1. Layers of backfill shall be pre-conditioned by moistening with water, the amount to be controlled to insure optimum moisture conditions for the type of fill material used. Excess water causing saturated earth beneath footings, walks, and curbs is unacceptable.
2. Backfill shall be deposited in layers of maximum six inch thickness.
3. Backfill shall be compacted by suitable means to a minimum relative compaction of 90%.
4. All trenches shall be backfilled in accordance with this Section, and may be tested at the discretion of the Engineer.

3.07 FINE GRADING: Fine grading, as specified under this Section, is a separate operation from finish grading as specified under Section **02483 Planting**. Fine Grading Work is to commence upon completion of all trenching and backfill operations, and prior to soil preparation.

Upon completion of Fine Grading Work all areas shall slope to drain without water pockets or irregularities and shall conform to the intent of all Plans and Specifications after thorough settlement and compaction of the soil. Fine grading should allow for Soil Preparation Work as specified under Section **02483 Planting**, such that finish grades shall meet the elevations indicated on the Plans. Tolerance for fine grading is 1/4 inch, plus or minus. Any corrections to the Grading Work required to obtain proper drainage and to bring it into conformance with the intent of the Plans and Specifications and City codes shall be performed by Contractor at no additional cost to City.

3.08 DECOMPOSED GRANITE: Stabilizer shall be mixed with decomposed granite in proportions as recommended by the manufacturer for "high traffic" usage. Pre-mixed D.G. and stabilizer shall be placed in lifts, wetted and compacted as specified by the stabilizer manufacturer to a minimum relative compaction of 90%. D.G. pavement shall be smooth, free of rills, dips, and flow lines, such that surface water will properly drain off the surface of the pavement. Contractor shall provide as a turn-over item a minimum of 10 pounds of stabilizer product per 1000 lineal feet of trail being installed.

3.09 DUST AND NOISE ABATEMENT: During the entire construction period, site areas shall be kept sprinkled (either with water or an approved dust palliative) as necessary to minimize dust in the air and annoyance to surrounding properties. Adhere to the requirements of City ordinances for dust and noise control.

SECTION 02441 - IRRIGATION

PART 1 - GENERAL

1.01 STANDARD SPECIFICATIONS: The provisions of the "Standard Specifications for Public Works Construction", current edition, shall apply except as modified herein.

1.02 SCOPE: The Work of this Section shall consist of furnishing all labor, materials, equipment, appliances and services necessary for the execution and completion of all **Irrigation Work** as shown on the Plans and as described in the Specifications including, but not necessarily limited to, the following:

- Provide complete operating irrigation systems with no runoff onto streets;
- Installation of new and refurbishment of existing irrigation systems as necessary to provide complete operating irrigation systems for all planting areas within the Work Limits with no runoff onto streets;
- 120 volt electrical service for and connection to the controller;
- Irrigation Controller within lockable Controller Enclosure as designated on the Approved Plans;
- Coordination with Work of other Sections and/or City Inspectors;
- Sleeving;
- Testing;
- Clean-up;
- As-Built by means of Global Positioning System (GPS);
- Replacements, Repairs, Guarantees and Warranty Work.

1.03 RELATED WORK:

Planting

02483

1.04 SUBMITTALS:

- A. Materials List: Contractor shall submit a complete materials list for approval by the Public Works Landscape Inspector prior to performing any Work. Catalog data and full descriptive literature must be submitted whenever the use of items different than those specified is requested. Notarized certificate must be submitted by plastic pipe and fitting manufacturer indicating that material complies with the Project Specifications, unless material has been previously approved, and used on other projects by City. Material list shall be submitted using the following format:

<u>Item</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model No.</u>
1	Pressure Supply Line	Lasco	Sch. 40
2	Lawn Head	Rainbird	1800
3.	etc.	etc.	etc.

B. "Record" Prints to Reflect 'As-Built' Conditions:

1. Record accurately on one set of blue-line prints all changes in the Work constituting departures from the Plans, including changes in pressure and non-pressure line locations.

2. The changes and dimensions shall be recorded in a legible and workmanlike manner to the satisfaction of the Public Works Landscape Inspector. Prior to final inspection of the Work, submit "record" Mylar prints reflecting the 'As-Builts' condition of the system to the Public Works Landscape Inspector's for approval and records. GPS coordinates for each item listed below, shall be noted on the plans and recorded on Compact Disk (CD) in WR format, on an Excel spread sheet to City for approval.
3. Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavement, etc.). Data to be shown on "record" prints shall be recorded day-to-day as the project is being installed.
4. Show locations and depths of the following items:
 - a) Point of connection, Water Meter and Backflow Device. (GPS)
 - b) Routing of irrigation pressure lines (dimension maximum 100 feet along routing).
 - c) Gate valves. (GPS)
 - d) Irrigation remote control valves, master valves filters, etc. (GPS)
 - e) Quick coupling valves. (GPS)
 - f) Routing of control wires.
 - g) Controllers. (GPS)
 - h) Flow Meters. (GPS)
 - i) Related equipment (as may be directed).
5. Maintain record prints on site at all times.

1.05 INSPECTIONS:

- A. Inspections will be required for:
 1. Pressure test of irrigation main line.
 2. System layout.
 3. Coverage test.
 4. Final inspection/start of maintenance.
 5. Final acceptance.
- B. Inspection Requests: Contractor shall notify the Public Works Landscape Inspector a minimum of 48 hours (two working days) in advance for all inspections including the following:
 1. Pressure supply line installation and testing
 2. System layout/to insure no runoff onto streets
 3. Coverage tests/to insure no runoff onto streets
 4. Final Inspection
- C. Evidence of Inspection by Others: When inspections have been conducted by other than the Public Works Landscape Inspector, Contractor shall show evidence of when and by whom these inspections were made.
- D. Requirements for Inspection: No inspection is to commence without "record" prints available on the site. In the event Contractor calls for an inspection without up to date "record" prints, without completing previously noted corrections, or without preparing the system for inspection, the inspection may be canceled.

- E. Closing in Un-inspected Work: Do not allow or cause any of the Work of this Section to be covered up or enclosed until it has been inspected, tested and approved by the Public Works Landscape Inspector.
- F. Coverage test: When the irrigation system is completed, Contractor shall perform a coverage test in the presence of the Public Works Landscape Inspector to determine if the water coverage for planting areas is complete and adequate. To assure that no water is spilling onto the street. The Public Works Landscape Inspector must accept this test before planting may commence.
- G. Hydrostatic test:
 - 1. Prior to the installation of any valves, all pressure lines shall be tested under a hydrostatic pressure of 150 psi for a period of not less than two hours. Ball valves and pressure gauges shall be installed at all terminating ends of the mainline and the remainder of all points in between shall be capped and the line fully charged with water after all air has been expelled from the line.
 - 2. All hydrostatic tests shall be made in the presence of the Public Works Landscape Inspector or Inspector's designated representative. No pressure line shall be backfilled until it has been inspected, tested, approved in writing, and the mainline and valve locations have been noted on the "record" prints.
 - 3. Contractor shall furnish the necessary force pump and all other test equipment, and shall perform the test.

1.06 TURNOVER ITEMS:

- A. Controller Charts:
 - 1. "Record" prints must be approved by the Public Works Landscape Inspector before charts are prepared.
 - 2. Provide one controller chart for each automatic controller. The chart shall show the entire area covered by the controller, preferably in a single sheet. The chart shall be a reduced copy of the approved "record" print. Reduce the print to a size that is the maximum dimensions that will fit within the controller door without folding. If the controller sequence is illegible at this reduction scale, the chart may be provided as a "multi-sheet" chart to provide adequate legibility.
 - 3. Each control station on the Chart shall be marked with a different color to show its area of coverage.
 - 4. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being minimum 20 mils in thickness. The chart shall be installed in the controller enclosure using Velcro fasteners, and three different color grease pencils (red, black and blue) shall be provided in the enclosure for maintenance notations on the chart.
 - 5. Controller charts shall be completed prior to the final acceptance inspection.
- B. Operation and Maintenance Manuals: Within a minimum of 14 calendar days prior to acceptance of construction, prepare and deliver to the Public Work Landscape Inspector all required descriptive materials, properly prepared in two individually bound copies of the operation and maintenance manual. The manual shall describe the material installed and shall be in sufficient detail to permit operating personnel to identify, operate, and maintain all

equipment. Spare parts lists and related manufacturer's information shall be included for each equipment item installed. Each complete, bound manual shall include the following information:

1. Index sheet stating Contractor's address and telephone number, including names and addresses and telephone numbers of local manufacturer's representatives.
2. Complete operating and maintenance instructions on all major equipment.

C. Materials to be furnished: The following items shall be supplied as part of this Contract and shall be turned over to the Public Works Landscape Inspector at the conclusion of the Project at the Final Acceptance Inspection:

* Some of the Calsense items may be optional as required.

1. One Myers Enclosure #MEUG22X-ENC-RIVSS for Calsense controller.
2. *One Radio Remote Transmitter (Calsense RRe-TRAN Remote or City approved equal) compatible with controller that will turn irrigation stations on and off, complete with batteries.
3. *Calsense products such as LR YAGI Antenna, LR-Dome-RR Antenna, LR-Dome-RRe Antenna, LMR-400-DB Antenna cable 30' minimum and Transient protection board TP-1.
4. One Calsense Data Logger (Panasonic Tough Book data logger with Windows 7 or 8 or City approved equal).
5. Two (2) special tools/wrenches for disassembly and adjustment of each type of irrigation equipment/heads installed that require such special tools/wrenches.
6. Two keys for each type of automatic controller.
7. One valve box cover key.
8. "Record" prints, CD's and Mylar "As-Built" Plans at Final Acceptance.
9. Documentation of Water Department's inspection and acceptance of backflow device.

1.07 GUARANTEE:

A. General: The entire irrigation system, including all Work done under this Contract, shall be guaranteed against all defects and fault of material and workmanship for a period of one (1) year following Final Acceptance of the Work as documented by the Notice of Completion filed with the Riverside County Recorder's Office. All materials used shall carry a manufacturer's guarantee of one (1) year. Should any problem with the irrigation system be discovered within the guarantee period, it shall be corrected by Contractor at no additional expense to City within fourteen (14) calendar days of receipt of written notice from City.

B. Form of Guarantee: Guarantee shall be submitted on Contractors own letterhead as follows:

GUARANTEE FOR IRRIGATION SYSTEM

PROJECT: _____

LOCATION: _____

We hereby guarantee the irrigation system we have furnished and installed against defects in materials and workmanship, ordinary wear and tear and unusual abuse, or neglect accepted, and that the Work has

been completed in accordance with the Plans and Specifications. We agree to repair or replace any or all of the Work, together with any other adjacent Work which may be displaced by so doing, that may prove to be defective in its workmanship or materials within a period of one (1) year after the date the Notice of Completion for the above named Project is filed with the County Recorder by the City of Riverside, California, at no additional cost to City. We shall make such repairs or replacements within 14 calendar days following written notification by City. When the immediate repair or replacement of the Work is necessary to ensure the public safety and welfare, which would be endangered by continued usage of the facility, such circumstance will be deemed an operational emergency. In the event of such an emergency, after City contacts our firm and after authorizing 24 hours to initiate repairs, if we fail to initiate and diligently complete such repairs in a timely manner, the Director may direct City forces to perform such functions as the Director may deem necessary to correct the Work and immediately place the facility back in operational condition. If such procedure is implemented, we shall bear all expenses incurred by City. In all cases, the judgment of the Director shall be final in determining whether an operational emergency exists. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from City (other than an operational emergency), we authorize City to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PRINTED NAME & TITLE: _____

SIGNATURE: _____

ADDRESS: _____

PHONE: () _____
(Area Code) Number

- C. Operational Instruction: After the system has been completed, Contractor shall instruct the Public Works Landscape Inspector in the operation and maintenance of the system and shall furnish a complete set of operating instructions.
- D. Trench Settlement: Any settling of trenches which may occur during the one-year period following acceptance shall be repaired to City's satisfaction by Contractor without any additional expense to City. Repairs shall include the complete restoration of all planting, paving or other improvements of any kind, which are damaged as a result of the Work.

PART 2 - MATERIALS

2.01 GENERAL: All materials shall conform with Section 212 - 2 IRRIGATION SYSTEM MATERIALS of the Standard Specification except as modified herein.

2.02 PIPE AND FITTINGS:

- A. General:

1. Pressure supply lines 2 inches in diameter and up to 8 inches in diameter shall be Class 315 solvent weld PVC. Solvent weld and ring type pipe shall not be used together on the same pressure supply line.
 2. Pressure supply lines 1-1/2 inches in diameter and smaller shall be minimum schedule 40 PVC.
 3. Non-pressure lines shall be minimum schedule 40 PVC.
- B. Steel Pipe: Amend Standard Specifications Section **212-2.1.2 Steel Pipe** to read:
 "All steel pipe shall be hot-dipped galvanized", and add: "All fittings for steel pipe shall be 250 pound rated galvanized malleable iron, banded pattern. Pipe sizes indicated on the Plans are nominal inside diameter, unless otherwise noted."
- C. Plastic Pipe:
1. Add the following to Standard Specifications Section **212-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings**:
 "All plastic pipe shall bear the following markings: manufacturer's name, nominal pipe size, schedule or class, type of material, pressure rating in PSI, NSF seal of approval, and date of extrusion."
 2. Amend Standard Specifications Section **212-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings** to read:
 All plastic pipe fittings shall be standard weight schedule 40 and shall be injection molded of an improved PVC fitting compound. All threaded plastic fittings shall have injection molded threads. No cut threads will be accepted on PVC pipe and fittings. All tees and ells shall be manufactured in injection molds that are side gated. All threaded nipples shall be standard weight schedule 80 with molded threads.
 3. Amend first sentence of Standard Specifications Section **212-2.1.4 Plastic Pipe for Use with Rubber Ring Gaskets** to read:
 "All rubber gasket PVC pipe, couplings, and fittings shall conform to ASTM D 2241 Type 1, Grade 1, 2000-PSI design stress"; and add the following to the Section:
 "Couplings, rubber gaskets, and fittings shall be as approved by the pipe manufacturer. Ring-type rubber gasket couplings shall permit a five (5) degree deflection of the pipe at each coupling (2-1/2 degrees each side) without ex-filtration or infiltration, cracking or breaking."
- D. Asbestos Cement Pipe (ACP): Is not approved for use on City projects.

2.03 VALVES AND VALVE BOXES:

- A. Valves:
1. Ball Valves: All ball valves shall be bronze bodied, capable of withstanding a minimum working pressure of not less than 150 psi.
 2. Manual Control Valves: Add the following to Standard Specifications Section **212-2.2.3 Manual Control Valves**: Anti-siphon-type valves shall be all bronze with swivel-type replaceable seating members and an approved vacuum breaker as an integral part of assembly.

3. Quick-Coupling Valves: Add the following to Standard Specifications Section **212-2.2.6 Quick Coupling Valves and Assemblies**: Quick coupling valves shall have locking vinyl cover and shall be 1" in size.
4. Remote Control Valves: Add the following to Standard Specifications Section **212-2.2.4 Remote Control Valves**:
 - a) Valves shall be spring-loaded, self-cleaning, packless diaphragm activated, of a normally closed type.
 - b) Valve solenoid shall be corrosion-proof and constructed of stainless steel molded in epoxy to form one integral unit, and shall be 24 volt A.C., 2.0 watt maximum (2" and smaller valves).
 - c) Valve shall close against flow without chatter and with minimum closing surge pressure (minimum 5 seconds closing time per valve).
 - d) Valve shall be completely serviceable in the field without removing valve body from line.

B. Boxes:

1. Concrete Valve Boxes: Add the following to Standard Specifications Section **212-2.2.7 Valve Boxes**: Remote control valve boxes shall be rectangular concrete boxes with hinged locking cast-iron covers. Valve station numbers shall be welded in two-inch-high (2") numerals on lids. Gate valve boxes shall be round concrete boxes with cast iron covers marked "G. V." with letters cast or tooled in the cover.
2. Plastic Valve Boxes: (For use on Drip Irrigation Systems and Reclaimed water systems only)
 - a) General: Valve boxes and covers shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical reactions. The covers shall be secured with a hidden latch mechanism or bolts. The cover and box shall be capable of sustaining a load of 1,500 pounds. Valve box extensions shall be by the same manufacturer as the valve box. The box covers shall be factory embossed for the designated use and valve station numbers in 2" high letters. Boxes and covers shall be City approved.
 - b) Rectangular Plastic Boxes and Covers: Shall be a minimum of 12" wide x 18 long", with depths as necessary to protect the valve and provide the clear dimensions as detailed and/or specified. The covers shall be embossed with words or initials to identify the use for the box (e.g. "Flush Valve" or the letters "F.V.", and Air Relief Valve or the letters "A.R.V.") as noted on the Plan.
 - c) Round Plastic Boxes and Covers: Shall be minimum 12" diameter, round boxes with covers embossed with words to identify the use for the box (e.g. "Quick Coupler Valve" or the letters "Q.C.V.") and shall be marked as noted on the Plans

2.04 BACKFLOW PREVENTION DEVICE: Add the following to Standard Specifications Section **212-2.3 Backflow Preventer Assembly**: The backflow prevention unit shall be a reduced pressure type vacuum breaker of the size, manufacture, and model number as indicated on the Plans. If not indicated, the device shall be the same size as the water service and the manufacturer and model number shall be as approved by the Public Works Landscape Inspector.

2.05 IRRIGATION HEADS: All irrigation heads shall be as shown on the Plans and shall conform with Section **212-2.4 Sprinkler Equipment** of the Standard Specifications. All heads used on the same control valve shall be matched precipitation rate heads. All heads used on turf shall be minimum 6"

pop-up types; all heads used in shrub areas shall be minimum 12" pop-up types the heads shall be configured so as to elevate any runoff onto streets and shall be a minimum of 2' from any hardscape.

2.06 ELECTRICAL MATERIALS:

- A. Conduit: Amend Standard Specifications Section **212-3.2.1 Conduit** to read: All conduit below grade shall be schedule 40 PVC of sufficient size to carry all proposed wiring. Conduit above grade shall be galvanized steel per the Standard Specifications. Low Voltage (24 volt) wiring shall be provided with a separate conduit/sleeve from both high voltage wiring (110/120 volt and higher) and the irrigation mainline sleeve.
- B. Electrical Service: Materials for electrical service shall comply with the standard specifications, governing utility agency standards, and requirements of all applicable codes. All controllers serving landscape areas that will **not be turned over to the City** for maintenance shall be powered through a **metered** electrical service. Controllers serving landscape areas to be maintained by the City shall be powered through a non-metered electrical service.
- C. Wire: Add the following to Standard Specifications Section **212-3.2.2 Conductors:** "All low voltage conductors shall be 14 gauge for control and 12 gauge for common wires. All low voltage common wire shall be white with a colored stripe. Stripe color shall be different for each controller installed. All low voltage control wire shall be of one color other than white or green. A different color control wire shall be used for each controller installed."

2.07 CONTROLLER UNIT: Add the following to Standard Specifications Section **212-3.3 Controller Unit:**

- A. Controller: Shall be wall mounted type, as indicated on the Plans, with a heavy duty watertight case and locking hinged cover, installed within a lockable stainless steel enclosure.
- B. Controller Enclosure: Shall be Stainless Steel, sized to fit the controller and the other electrical components as required per Standard Detail 4060, irrigation controller electrical pedestal shall be Myers Power Products, Inc. – Catalog # MEUG22X-ENC-RIV Stainless Steel Enclosure, or City approved equal. The equipment shall conform to the requirements of the City of Riverside. Complete pedestal shall be UL Listed under Standard 508, Enclosed Industrial Control Equipment.

Enclosure shall be Rainproof NEMA Type 3R, fabricated from 12 gauge corrosion resistant stainless steel, minimum grade 304. Enclosure shall include vandal resistant hinged door with 3-point latch assembly and folding "T" handle behind lockable cover. Enclosure shall be equipped with stainless steel mounting pans, adjustable from front to back. All interior sheet metal shall be stainless steel. Mounting pans shall have painted exterior grade ¾" plywood panels. Enclosure shall have interior mounting flanges for attachment to padmount base (Myers part number 519100) encased in 4" minimum concrete.

Pedestal shall be equipped with insulated neutral and ground lug. Pedestal shall be wired for 120V 1Ph 2W with a 15 ampere circuit breaker, 10,000 A/C rated, installed. All factory wiring shall be 600 volt rated copper.

PART 3 - EXECUTION

3.01 **GENERAL:** All Work shall conform with Section **308 LANDSCAPE AND IRRIGATION INSTALLATION** of the Standard Specifications except as modified herein. No Work of this Section other than sleeving under pavement shall commence prior to the completion and acceptance of all Grading Work.

Add the following to Standard Specifications Section **308-5.1 General:**

A. **Irrigation System Design & Water Supply:**

1. The irrigation system design is based upon an available water pressure of ____ p.s.i. at a flow rate of _____ g.p.m. Individual stations are designed to this minimum p.s.i. The system is also designed to withstand a maximum pressure of ____ p.s.i. Contractor shall verify the size of the existing water supply/meter and the existing operating water pressure at the water supply location shown on the Plans prior to starting construction. Contractor shall notify the Public Works Landscape Inspector in writing of any discrepancies noted. Failure to provide such written notification may cause Contractor to provide for modifications to the irrigation system as necessary to provide for a fully operational system providing 100% coverage at the operating pressure available, all at no additional cost to City.
2. Connection to, or the installation of, the water supply shall be at the location shown on the Plans. Minor changes caused by actual site conditions shall be made at no additional cost to City.

B. **Electrical Service:** Contractor shall provide either a **metered** (for areas to be maintained by **other than the City**, such as an HOA) or **non-metered** electrical service (for areas to be **maintained by the City**) as required, and shall make the final 120 V connection to the irrigation controller.

C. **Code Requirements:** Prior to all Work of this Section, Contractor shall carefully inspect the installed Work of all other trades and verify that all such Work is complete to the point where this installation may properly commence. Verify that the irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.

In the event any equipment or methods indicated on the Plans or in the Specifications is in conflict with local codes, immediately notify the Public Works Landscape Inspector prior to installing the Work. If this notification is not provided, Contractor shall assume full responsibility for the cost of all revisions necessary to comply with all codes.

D. **Grades:** Contractor is to keep within the specified material depths with respect to finish grade. Failure to obtain specified material depths may subject Contractor to adjusting the grades or depth of lines until acceptable depths of cover are achieved, all as directed by the Public Works Landscape Inspector and at no additional cost to City.

E. **Coordination with Work of Other Trades:** Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Contractor shall coordinate

the installation of all irrigation materials with all other Work. Special attention shall be given to coordination of piping locations versus tree and shrub locations and sleeve locations versus pavement installation to avoid conflicts.

- F. Maintain Record Prints: Contractor shall maintain "record" prints on site at all times. Upon completion of the Work, transfer all "record" information on changes and dimensions to reproducible sepia Mylar or photo Mylar prints and CD's. The changes and dimensions shall be recorded in a legible and workmanlike manner, to the satisfaction of the Public Works Landscape Inspector.

3.02 TRENCHING AND BACKFILLING:

A. Trenching:

1. Add the following to Standard Specifications Section **308-2.2 Trench Excavation and Backfill**: Dig trenches and support pipe continuously on bottom of ditch. Where lines occur under paved areas, depth dimensions shall be considered below subgrade.
2. Amend Standard Specifications Section **308-2.2, Subparagraph 2 Waterlines continuously pressurized**) to read: Water lines continuously pressurized - minimum 18 inches, maximum 24 inches. (These measurements are to be from subgrade elevation for piping under pavement.)
3. Amend Standard Specifications Section **308-2.2, Subparagraph 3 Lateral sprinkler lines**) to read: Lateral irrigation lines - minimum 12 inches and maximum 16 inches. All main lines and lateral lines running parallel to other such lines shall have a minimum horizontal separation of 12".
4. Add the following to Standard Specifications Section **308-2.2 Trench Excavation and Backfill**: Where it is necessary to excavate adjacent to existing trees, Contractor shall avoid injury to trees and tree roots. Excavation in areas where 2-inch and larger roots occur shall be done by hand. All roots 2 inches and larger in diameter shall be tunneled under and shall be heavily wrapped with wet burlap to prevent scarring or drying. Where trenching machine is run close to trees having roots smaller than 2 inches in diameter, the wall of the trench adjacent to the tree shall be hand trimmed, making a clean cut through the roots. Roots 1 inch and larger in diameter shall be painted with two coats of tree seal or approved equal. Trenches adjacent to trees shall be closed within 24 hours.
5. Permanent Resurfacing: Add the following to Standard Specifications Section **308-5.1 General**: All surface improvements damaged or removed as a result of Contractor's operations shall be reconstructed by Contractor to the same dimensions, except for pavement thickness, and with the same type materials used in the original Work. Trench resurfacing shall be 1 inch greater in thickness than existing pavement. Concrete pavement shall be removed and replaced in "full panels" with no horizontal dimension less than five (5) feet. Contractor shall review the planned limits and lines of concrete removal and replacement with the Public Works Landscape Inspector prior to sawcutting for Removal Work.

B. Backfill:

1. Amend Standard Specifications Section **308-2.2 Trench Excavation and Backfill** to read: "Backfill shall be uniformly tamped in 4-inch layers under and around the pipe for the full width of the trench and the full length of the pipe. Materials shall be sufficiently

damp to permit thorough compaction, free of voids. Backfill shall be compacted to dry density equal to adjacent undisturbed soil and shall conform to adjacent grades."

2. Add the following to Standard Specifications Section **308-2.2 Trench Excavation and Backfill**:
 - a) Flooding in lieu of tamping is not allowed without specific prior written approval of the Public Works Landscape Inspector.
 - b) Under no circumstances shall the wheels of any vehicle not designed for the purpose of soils compaction be used to compact backfill.

3.03 PIPE INSTALLATION:

A. General: Add the following to Standard Specifications Section **308-5.2.1 Irrigation Pipeline Installation, General**:

1. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. However, no hydraulic driving is permitted under asphaltic concrete pavement.
2. Cutting or breaking of existing pavement is not permitted except as approved in writing by Public Works Landscape Inspector. When approved, all necessary repairs and replacements will be made at no additional cost to City.
3. Carefully inspect all pipe and fittings before installation, removing all dirt, scale and burrs and reaming; install pipe with all markings up for visual inspection and verification.
4. Contractor shall install concrete thrust blocking per the manufacturer's recommendations at all changes of direction and terminal points of pressure pipe.
5. Parallel lines shall not be installed directly over one another. Provide a minimum of 12" horizontal separation for all parallel lines.
6. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope on all threaded plastic-to-metal connections, except where noted otherwise.
7. Constant pressure piping under pavement shall be sleeved using class 315 solvent weld PVC and non-pressure lines in schedule 40 PVC sleeves. All wiring shall be sleeved under pavement using gray schedule 40 PVC. Each line shall be separately sleeved.
8. Do not install multiple assemblies ("manifold") on plastic lines. Provide each equipment assembly (e.g. RCV, quick coupler, gate valve, head, backflow device) with its own connection to its service line.

B. Plastic Pipe: Add the following to Standard Specifications Section **308-5.2.3 Plastic Pipeline**:

1. Exercise care in handling, loading, unloading and storing plastic pipe and fittings, store plastic pipe and fittings under cover until ready to install; transport plastic pipe on a vehicle with a bed long enough to allow pipe to lay flat, avoid undue bending and any concentrated external load.
2. 360E applicators shall be used to apply primer and solvent on pipe sizes 2-1/2 inches and larger.

3.04 BACKFLOW INSTALLATION: Add the following to Standard Specifications Section **308-5.3 Installation of Valves, Valve Boxes, and Special Equipment**: Install backflow assemblies at locations approved in the field by the Public Works Landscape Inspector and at heights required by local codes. In cases where the Backflow is to be placed at toe of a slope with minimum grade of 2 to 1 a crib wall be required

3.05 VALVE AND VALVE BOX INSTALLATION:

A. Valves:

1. Amend Standard Specifications Section **308-5.3 Installation of Valves, Valve Boxes, and Special Equipment** to read: Valves shall be the same size as the pipeline in which valves are installed unless otherwise specified on the Plans. Valves shall be installed a minimum of three feet in horizontal distance apart, each with its own connection to the pressure main line.
2. Amend Standard Specifications Section **308-5.3 Installation of Valves, Valve Boxes, and Special Equipment** to read: Install quick couplers within valve boxes per the Public Works Department's standards at maximum 75' o.c., and maximum 50' from ends of all planting areas.
3. Add the following to Standard Specifications Section **308-5.3 Installation of Valves, Valve Boxes, and Special Equipment:** Valves shall be installed in shrub areas whenever possible. No valves or valve boxes other than quick coupler valves shall be installed within a designated turf area.

B. Valve Boxes:

1. General: Valve boxes shall be installed with a minimum of 2" vertical clearance between the box and all pipelines and valve components and/or special equipment within the box. Valve boxes found resting on either the valve, special equipment or pipelines shall be cause for rejection of the installation.
2. Uses:
 - a) Concrete Valve Boxes:
 - i) Rectangular: Unless noted otherwise on the Plans, each remote control valve, all wire splices, flow meters and each master control valve shall be installed within a rectangular concrete valve box.
 - ii) Round: Unless noted otherwise on the Plans, each quick coupler valve and each gate valve shall be installed within a round concrete valve box.
 - c) Plastic Valve Boxes: (for drip irrigation systems only)
 - i) Rectangular: Unless noted otherwise on the Plans, each drip irrigation flush valve, and each air relief valve shall be installed within a rectangular plastic valve box.
 - ii) Round: Unless noted otherwise on the Plans, ball valves and/or gate valves shall be installed within a round plastic valve box.

3.06 IRRIGATION HEAD INSTALLATION: Amend Standard Specifications Section **308-5.4.1 Sprinkler Head Installation and Adjustment, General** to read: Irrigation heads shall be installed as designated on the Plans and per the Public Works Department's standard details. Upon coverage testing of the system if 100% coverage is not afforded by the system as designed, additional heads shall be added as necessary to achieve 100% coverage and have no runoff onto streets.

3.07 CONTROLLER INSTALLATION: Add the following to Standard Specifications Section **308-5.5 Automatic Control System Installation:**

- A. Controller Installation: The controller location, as shown on the Plans, is diagrammatic. The final location of the controller(s) shall be as approved by the Public Works Landscape Inspector before installation. Typical controller location shall be mid-block 3' behind the

sidewalk. If replacement of existing controller(s) is a part of the project, Contractor shall remove the existing controller(s) and replace with the replacement unit as specified. Contractor shall install all conduit runs, 120V wire and cable, and 24V control wire, as necessary for a complete and operational system.

B. Controller Enclosure:

(1) Conventional Type: The controller shall be wall mounted within a Myers Power Products, Inc. Catalog # MEUG22X-ENC-RIV, stainless steel vandal resistant enclosure, unless noted otherwise on the Plans. Controller enclosure shall be located in shrub areas and/or adjacent to other hardscape items. Enclosure shall have the service address applied to the upper half of the enclosure in a location visible from the roadway in 3" black vinyl numerals. A 4" thick concrete slab for maintenance access shall be provided, size approximately 15 sq. ft., line, grade and dimensions as directed by the Public Works Landscape Inspector. In cases where the controller enclosure is to be placed at toe of a slope with minimum grade of 2 to 1 a crib wall be required

B. Coordination of Controller Location with Various Service Connections: Contractor shall coordinate the electrical service with the approved controller location. Contractor shall verify the locations of 120V power prior to installing controller(s) and shall coordinate final assembly mounting locations with the needed utilities. Contractor shall furnish and install grounding rods and ground wires for each controller. Ground rod shall be installed inside base of pedestal.

C. Controller Connections: Contractor shall inspect, test, and certify all low voltage control wire splices and ground rod installations as applicable. Any repairs as necessary to provide properly operating wiring are to be made by Contractor at no additional cost to City. After repairs are satisfactorily completed, Contractor shall connect the ground wires to the ground rods and the controller(s).

D. Controller Programming: Following establishment of the turf, the irrigation system shall be programmed to operate during the periods of minimal use of the Project area (i.e., 11:00 p.m. through 6:00 a.m.).

3.08 WIRING:

A. Wiring: Add the following to Standard Specifications Section **308-5.5 Automatic Control System Installation:**

1. All splice connections shall occur in a valve box. All wire runs between the valve and the controller shall be a continuous run with no splices unless noted otherwise on the Plans.
2. All low voltage-wiring splices shall be made-up with Spears DS-100 or DS-400 Dri-Splice wire Connectors filled with DS-300 Sealant or Christy's Electra Seal #RHES-5 Sealant or City approved equal.

3.09 FINISHING AND TESTING: Amend Standard Specifications Section **308-5.6.2 Pipeline Pressure Test** to read: Pressure test the mains - minimum 2 hours at 150 PSI. Add the following to Standard Specifications Section **308-5.6.2 Pipeline Pressure Test:** Center-load all plastic pipe

prior to pressure testing. The entire system shall be operating properly before any planting operations commence.

3.10 **COMPLETION CLEANING:** Add the following to Standard Specifications Section 308 **LANDSCAPE AND IRRIGATION INSTALLATION:** Upon completion of the Work, Contractor shall smooth all ground surfaces, remove excess materials, rubbish, debris, etc., sweep adjacent streets, curbs, gutters, walkways and trails, and remove construction equipment from the premises.

SECTION 02483 - PUBLIC LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 DEFINITIONS:

- A. Contractor: Where used throughout this specification, the term "Contractor" shall mean the licensed Contractor hired by the Builder/Developer to install the landscape improvements and any and all subcontractors to Contractor.
- B. Builder/Developer: The Legal entity/individual responsible for development of the project that has entered into the agreement and posted a surety to guarantee the installation of the public landscape improvements.

1.02 RELATED DOCUMENTS:

- A. Standard Specifications: All Public Landscape Planting Work shall conform to the "Standard Specifications for Public Works Construction" Current Edition, prepared by the Southern California Chapter of the American Public Works Association and Southern California District of the Associated General Contractors of California, published by Building News, Inc., Los Angeles, California, and all amendments thereto, as adopted by the City of Riverside, and as provided herein.
- B. Reference Standards: American Association of Nurserymen Standards.

1.03 SCOPE: The Work of this Section shall consist of furnishing all labor, materials, equipment, appliances and services necessary for the execution and completion of all **Public Landscape Planting Work** as shown on the Plans and as described in the Specifications including, but not necessarily limited to, the following:

- Soil preparation;
- Finish grading;
- Planting trees;
- Guying and staking trees;
- Planting shrubs, vines and groundcover;
- Hydroseeding turf;
- Soil erosion control;
- Maintenance;
- Plant establishment;
- Coordination with Work of other Sections;
- Testing;
- Clean-up;
- Replacements, Repairs, Guarantees and Warranty Work.

1.04 RELATED WORK: *(Comment: Line out inapplicable sections)*

Submittals	01300
Clear and Grub and Selective Demolition	02110
Site Grading	02210

Irrigation
Electrical

02441
16530

- 1.05 **SOILS TEST:** Contractor shall notify the Public Works Landscape Inspector upon completion of rough grading and prior to commencement of soil preparation work. The Contractor shall take soils samples in the presence of the Public Works Landscape Inspector and shall obtain agronomic soils tests for all planting areas after completion of rough grading and prior to start of soil preparation work. Tests shall be performed by an approved agronomic soils testing laboratory and shall include a fertility and suitability analysis with written recommendations for soil preparation, planting backfill mix, auger hole requirements, and post plant fertilization program. The soils report recommendations will take precedence over the minimum amendment and fertilizer application rates specified herein only if the soils report recommendations exceed the specified minimums. Contractor shall allow a minimum two week period for the soils testing work commencing upon the Public Works Landscape Inspector's acceptance of grade.
- 1.06 **GUARANTEE:** All trees installed by the Contractor shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship for a period of one (1) year following the date of completion. During the guarantee period, any trees found to be dead, missing, or in poor condition shall be replaced by Contractor within ten (10) days of written notification. Public Works Landscape Inspector shall be the sole judge as to the condition of the trees. Replacement shall be made in accordance with City standards. Material and labor involved in replacing trees shall be provided by Contractor at no additional cost to City and/or the Developer.
- 1.07 **INSPECTIONS:** Inspections are required. Contractor shall contact the Public Works Landscape Inspector and the Developer's Landscape Architect at least 48 hours (2 working days) in advance of an anticipated inspection. An inspection will be required at each of the steps listed below:
- A. **Rough Grade Prior to Commencement of Soil Preparation:** Upon completion of rough grading and prior to commencement of soil preparation, for acceptance of rough grading work and taking of soils samples.
 - B. **Finish Grade:** Inspection of completed finish grading work following soil preparation work.
 - C. **Plant Material:** Inspection of plant materials upon delivery to the job site, but prior to planting.
 - D. **Plant Locations:** When container plants and/or bare rootstock are spotted for planting, but before planting holes are excavated.
 - E. **Completed Planting:** When planting and all other indicated or specified work has been completed.
 - F. **Chemical Applications:** During application of pre-emergent chemical.
 - G. **Start of Plant Establishment:** At the start of the Plant Establishment Period.
 - H. **End of the Plant Establishment:** Prior to Final Acceptance of the Project for ongoing maintenance, the project will be inspected for end of the Plant Establishment Period.

Acceptance for maintenance shall be confirmed in writing. Contractor shall remain responsible for maintenance until receipt of written confirmation of acceptance of the Project for maintenance by the applicable party (Home Owner's Association, City, or Master Property Owner's Association as applicable).

1.08 SUBMITTALS: The following written certifications are required to be submitted to the Public Works Landscape Inspector upon delivery of the respective materials to the job site:

- Total Quantity of commercial fertilizers, by type
- Total Quantity of soil amendments and conditioners, by type
- Total Quantity of seed, by type
- Total Quantity of fiber-mulch
- Total Quantity of iron sulphate

1.09 PLANT ESTABLISHMENT PERIOD: The Plant Establishment Period shall be for a minimum period of **one (1) year**; see also Subsections **3.12 Maintenance and Plant Establishment** and **3.13 Start of Plant Establishment Period** regarding length of plant establishment and criteria to start.

PART 2 - MATERIALS

2.01 GENERAL: All materials shall conform with Section **212 - Landscape and Irrigation Materials** of the Standard Specifications except as modified herein.

2.02 FERTILIZER, SOIL AMENDMENTS AND CONDITIONERS: Add the following to Standard Specifications Section **212-1.2.3 Commercial Fertilizer**:

A. Planting Tablets: Tightly compressed long-lasting, slow-release fertilizer tablets weighing 21 grams, with a potential acidity of not more than 5 percent by weight and having an analysis of 20-10-5 derived from the sources listed in the following guaranteed analysis:

GUARANTEED ANALYSIS

Total Nitrogen (N)	20%
Derived from urea formaldehyde	
7.0% water soluble nitrogen	
13.0% water insoluble nitrogen	
Available Phosphoric Acid (P ₂ O ₅).	10%
Derived from calcium phosphate	
Soluble Potash (K ₂ O).	5%
Combined Calcium (Ca).	2.6%
Derived from calcium phosphates	
Combined Sulfur (S).	1.6%
Derived from ferrous and potassium sulfates	
Iron (expressed as elemental Fe)	35%
Derived from ferrous sulfate	

- B. Commercial fertilizer: Shall bear the manufacturer's guaranteed statement of analysis and shall meet the following minimum requirements: 16% nitrogen, 6% phosphoric acid, and 8% potash.
- C. Organic Soil Amendment: Shall be type 1 organic soil amendment, wood based product, nitrogen stabilized, and free of foreign matter.
- D. Soil Conditioners: Add to Standard Specifications, new Section as follows:

212-1.2.6 Inorganic Conditioners. Inorganic conditioners shall be agricultural grade gypsum, soil sulfur and iron sulfate. Iron sulphate shall be ferric sulphate or ferrous sulphate in pelleted or granular form containing not less than 18.5% iron, expressed as metallic iron, and shall be registered as an agricultural mineral with the State Department of Food and Agriculture in compliance with Chapter 5 "Fertilizing Materials", of Division 7 of the Food and Agriculture Code of California, commencing at Section 14501.

2.03 HEADERS, STAKES AND TIES: Add the following to Standard Specifications Section **212-1.5 Headers, Stakes and Ties:**

- A. Headers: Standard Specifications Section **212-1.5.2 Headers and Stakes** replace with the following to read:

"Headers shall be Concrete Headers/Mow Curbing - Concrete shall be 5 sack mix with a maximum slump test of four inches (4"). Provide sufficient concrete forming and stakes (maximum 3' o.c.) to provide continuous line without waving."

- B. Tree Stakes: Shall be straight-grained lodge pole pine, or City approved equal. Stakes shall be free from knots, checks, split, or disfigurements.
- C. Tree Ties: Tree ties shall be manufactured of virgin flexible vinyl meeting ASTM-D-412 standards (Cinch-Tie) for tensile and elongation strength. Material shall be black for ultraviolet resistance. Tree ties shall be manufactured with a double back locking configuration and secured with one galvanized nail to prevent slippage. Tree ties shall elongate with the tree growth preventing damage to the tree. Installed in a double stake, four tie, figure eight configuration. **Metal "Twist Braces" are NOT ALLOWED.**

2.04 HYDROSEEDING MATERIALS:

- A. Binding Agent: Shall be a dry powder organic concentrate, Ecology Controls "M-Binder" as available from Robinson Fertilizer Company, Anaheim, CA 714/632-9715 or City approved equal.
- B. Fertilizers:
 - 1. Controlled Release Fertilizer (CRF):
 - a) Total Quantity Exceeding 1 Ton: CRF shall be "Sierra 17-6-12 Plus Minors" Controlled Release Fertilizer (Stock# 90209), 4-5 month time release formulation,

using resin coated pills, as manufactured by The Scotts Co., Marysville, OH 1-800-270-3714, or City approved equal.

- b) Total Quantity Less than 1 Ton: CRF shall be "Osmocote" Controlled Release Fertilizer with a formulation of 17-7-12 (Stock #90010) as manufactured by the Scotts Company, Marysville, OH 1-800-270-3714, or City approved equal.
2. Triple Super Phosphate: Shall be a premium quality granulated high phosphorus "Best" fertilizer product having an analysis of 0-45-0, or City approved equal.
- C. Fiber-Mulch: Shall be produced from cellulose such as wood pulp or similar organic material and shall be of such character that it will disperse into a uniform slurry when mixed with water. The fiber shall be of such character that when used in the applied mixture, an absorptive or porous mat, but not a membrane, will result on the surface of the ground. Materials which inhibit germination or growth shall not be present in the mixture.
 - D. Seed: Turf seed mix as specified.
 - E. Water: All water used for hydro seeding shall be potable domestic water. Contact the City Public Utilities Department, Water Division at 951/826-5648 regarding availability of water and temporary construction meter and charges for water drawn from City fire hydrants.
- 2.05 JUTE NETTING: Jute netting shall be new and shall be of uniform, plain-weave, flame-retardant mesh. The mesh shall be dyed green and shall be made from unbleached single jute yarn. The yarn shall be of loosely twisted construction and shall not vary in thickness by more than one-half its normal diameter. Jute netting shall be furnished in rolled strips and shall meet the following requirements:
- Width - 48 inches, with a tolerance of one inch wider or narrower.
 - Minimum 78 warp ends per width of roll.
 - Minimum 41 weft ends per yard of length.
 - Weight shall average 1.22 pounds per linear yard, with a tolerance of 5 percent heavier or lighter.
- 2.06 PLANTS: Add the following to Standard Specifications Section **212-1.4 Plants**:
- A. General: Add the following to sub-section **212-1.4.1 General**: All plants shall be true to name, with at least one of each bundle or lot tagged with the name and size in accordance with the American Association of Nurserymen Standards. In all cases, botanical names shall take precedence over common names. All plants and planting materials shall meet or exceed the specifications of Federal, State, and County Laws requiring inspection for plant disease and insect control.
 - B. Quality and Size:
 1. Quality: All plant material shall comply with the definition for number one nursery stock per the current edition of "Horticultural Standards" as adopted by the American Association of Nurserymen.
 2. Size: Add the following to Standard Specifications Sections **212-1.4.2 Trees** and **212.1.4.3 Shrubs**:

- a) All container plants supplied by Contractor shall be of the standard height and diameter set by the American Standard for Nursery Stock as specified for the container size within which the plants are delivered to the site. 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 six (6) inches above the crown roots.
 - b) All palm trees shall be the size(s) as noted on the approved plans, but in no case less than a minimum overall height of 10 to 14 feet as measured from the crown of the root ball to the tips of the fronds, or ten feet of brown trunk whichever is greater.
 - c) All container grown trees shall be the size(s) as noted on the approved plans, but in no case less than a minimum 15 gallon container size, with minimum caliper and height in accordance with the American Association of Nurseryman standards for container plants.
- C. **Bare Root Stock**: Substitution of bare root stock for plant material specified by container size shall be subject to the review and approval of the Public Works Landscape Inspector. All bare root stock shall conform to the American Nurseryman's Association standards. Minimum caliper shall be two (2) inch diameter and minimum height shall be twelve (12) feet.
- D. **Cuttings**: Modify Standard Specifications Section 212-1.4.6 **Cuttings** to read: All cuttings used on the project shall be fully rooted cuttings unless otherwise approved in writing by the Public Works Landscape Inspector.

2.07 **MULCH**:

- A. **Nitrolized Shavings**: Shall conform with Standard Specifications Section 212-1.2.5 (a) **Type I Mulch**.
- B. **Tree Mulch**: Shall be a ground wood product as produced through a wood chipper, and shall consist of twigs and branches with pieces of a maximum size of 2" diameter by 4" long, free of seeds, trash and debris and other inert non-organic materials.

2.08 **TURF PLANTINGS**:

- A. **SEED**: Add the following to Standard Specifications Section 212-1.3 **Seed**:
Seeded Turf: For turf areas being planted solely from seed, use the following seed mix:

<u>Turf Seed Mix</u>	<u>by weight</u>	<u>Proportion</u>	
		<u>Purity</u>	<u>Germination</u>
Medallion Turf Type Tall Fescue	50%	98%	90%
Triple Crown Tall Fescue Blend	50%	98%	90%

Seeding rate: Shall be as noted on the approved plans, but in no case less than a minimum of 400 pounds per acre (10 LBS/1,000 SF)

- B. **SOD**: Turf sod shall be of the type noted on the Plans. All sod shall be new, fresh, viable sod delivered in full pallets ready for installation.

PART 3 - EXECUTION

3.01 **GENERAL:** All Work shall conform with Section **308 LANDSCAPE AND IRRIGATION INSTALLATION** of the Standard Specification, except as modified herein.

At Contractor's option, subject to the Public Works Landscape Inspector and Landscape Architect's acceptance of the material available and the appropriateness of the planting season, bare root stock may be substituted for the required 15 gallon and 24" box tree species if commercially available as bare root plantings and provided the corresponding minimum caliper and height requirements specified above in Part 2 Materials are met.

3.02 **WEED CONTROL MEASURES:** Upon completion of all rough grading work, and prior to soil preparation, perform weed control measures as follows:

1. Irrigate all areas designated to be planted for a minimum of 10 minutes per setting, two settings per day for seven days to germinate all weed seed possible.
2. Apply a systemic weed killer and allow sufficient time to obtain complete kill of all weeds germinated.
3. Repeat step one above.
4. Repeat step two above.

3.03 **SOIL PREPARATION:** Add the following to Standard Specifications Section **308-2.3 Topsoil Preparation and Conditioning:**

- A. **Work Sequence:** All rough grading, mounding and weed control measures shall be completed prior to soil preparation. Soil Preparation Work shall not commence until the agronomic soils test has been completed. Should 30 calendar days elapse between completion of soil preparation and commencement of planting, all areas shall be prepared again.
- B. **Excluded Areas:** Planting areas with slopes 3:1 and steeper shall not be soil prepared. In lieu of soil preparation, such slopes will require fertilizer tablets for all plantings as specified below.
- C. **Soil Preparation:** In all planting areas with gradients less than 3:1, areas to be soil prepared shall first be cross ripped to a minimum depth of 6" with tractor tines spaced at maximum 18" on center. Following cross-rip operations, a layer of soil amendments shall be spread and rototilled into the soil to a minimum depth as noted on the Plans, but not less than 4 inches, or as recommended by the soils report if greater, so that the soil shall be loose, friable, and free from rocks, sticks, and other objects undesirable to planting.
- D. **Amendment Application Rates:** The following soil amendments shall be added per 1,000 square feet to all planting areas with gradients less than 3:1 (agronomic soil test recommendations shall take precedence where these minimum amounts are exceeded):
 1. 6 cubic yards Type I organic soil amendment.
 2. 15 pounds commercial fertilizer.
 3. 100 pounds gypsum.
 4. Soil sulfur per soils report.

3.04 **FINISH GRADING:** Contractor shall finish grade all planting areas, filling as needed or removing surplus dirt, raking to remove all rocks and debris over 1 inch in diameter, and floating to a smooth uniform grade. All areas shall slope to drain. Flow lines shall be established to roads, curbs, drainage swales and inlets, and/or sidewalks as shown on the Plans and as directed. All fill material placed within the top 12" from finish grade elevations in all planting areas shall be topsoil.

All landscape areas shall be finish graded to "dress out", maintain, and/or re-establish finish grades and flow lines as approved prior to amending the soil. Contractor shall call for inspection upon completion of finish grading work. Contractor shall not proceed with planting work until finish grades have been inspected and accepted by the Public Works Landscape Inspector.

3.05 **EROSION CONTROL:** Add new Section to the Standard Specifications:

"**308-4.9.6 Jute Netting.** All slopes areas exceeding 3:1 shall receive jute netting. Netting shall also be provided during the Plant Establishment Period, when and as directed by the Public Works Landscape Inspector, along flow lines and other locations where erosion is evident. Jute netting shall be installed loosely, up and down the slope. The installed netting shall fit the soil surface contour and shall be held in place by 9-inch long, 11-gage (minimum) steel wire staples driven vertically into the soil at approximately 24-inch spacing. Jute netting strips shall overlap along the sides at least 6 inches. Ends of strips shall be buried into the soil at least 6 inches. Lap all ends of rolls a minimum of 24"."

3.06 **INSPECTION OF CONTAINER PLANTS:** The root condition of plants furnished in containers and proposed for use in the Work will be checked by the Public Works Landscape Inspector 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 from a single source. When container-grown plants are from several different sources, the roots of not less than two plants of each species or variety from each source may be checked by the Public Works Landscape Inspector at the Inspector's option. The selection of plants to be checked will be made by the Public Works Landscape Inspector. Care shall be exercised to avoid rendering plants unsuitable for planting by virtue of this inspection. However, all plants rendered unsuitable for planting shall be considered as samples, and replacements shall be provided at no additional cost to City. In case the sample plants are found to be defective, the entire lot or lots of plants represented by the defective samples will be rejected.

3.07 **PLANTING BACKFILL:**

A. **Mixing:** All backfill materials shall be bulk mixed, not individually mixed at each plant pit.

B. **Proportions:** Backfill for planting pits shall be enriched using the following blend per cubic yard (agronomic soil test recommendations shall be reviewed prior to soil mixing):

1. **Container Plants:**

60% top soil	3 lbs. gypsum
40% Type I Organic Amendment	2 lbs. iron sulphate
2 lbs. commercial fertilizer	

2. **Bare Root Stock:**

10% wood shavings	90% topsoil
fertilizer and soil conditioners as specified for container plants.	

3.08 PLANTING:

A. Tree and Shrub Planting: Add the following to the Standard Specification Section **308-4.5 Tree and Shrub Planting:**

1. Soil surrounding planting pit shall be in a friable condition and moist to a depth of 8".
2. Backfill using specified soil mix to within 8" of finish grade. At this depth, place the plant fertilizer tablets Agriform 20-10-5, 21 grams each, or City approved equal. A minimum of 1 tablet for 1 gallon, 3 tablets for 5 gallons, 5 tablets for 15 gallons, and 8 tablets for a 24" box. Complete backfilling to finish grade.
3. Trees (other than relocated palms) shall be planted at such a depth that the crown roots bear the same relative position to finish grade as the crown roots did in the soils where the trees were grown. Backfill after planting shall be compacted carefully into place without injuring the roots of the tree or breaking up the ball of earth surrounding the roots.

B. Groundcover and Vine Planting: Add the following to Standard Specifications Section **308-4.7 Groundcover and Vine Planting:**

1. On slopes exceeding 3:1 ratio, apply 5 gram Agriform tablets, one per plant in lieu of soil preparation work.
2. Prepare the soil in all planting areas (except where slopes exceed 3:1) by applying 1.5 cubic yards of Nitrolized Shavings and 5 lbs. of the specified commercial fertilizer per 1,000 square feet. Repeat fertilization at 30 day intervals throughout the duration of the Work up to 4 applications. After the fourth application decrease frequency to once every 90 days.
3. All planting areas, areas to receive Tree-Mulch and bare dirt areas shall be treated with a pre-emergent chemical (subject to approval by the Public Works Landscape Inspector prior to application). Chemicals shall be applied by a licensed Pest Control Agent. This treatment shall be applied at the following times during the Contract: a) before planting, b) at beginning of Plant Establishment Period, and c) at end of Plant Establishment Period. The Public Works Landscape Inspector, (951) 826-5311, shall be given a minimum of 48 hours (2 working days) notice prior to each application. No chemicals shall be applied other than in the presence of the Inspector.
4. All areas designated to receive Tree-Mulch shall have mulch applied and spread to provide a uniform thickness of not less than 3" of mulch, and shall be neat and clean, free of trash.

3.09 TREE STAKING: Stake trees in accordance with the Public Works Department's Standard Detail #1001.

3.10 TURF PLANTING: Add the following to Standard Specifications Section **308-4.8.2, (b) Method AB:** Turf Planting shall be performed by either hydroseeding or sodding as indicated on the Plans, or, if not noted, as suitable for the species of turf specified and as acceptable to the City:

- A. Pre-moistening: All areas to be planted shall be moistened to a depth of six inches just prior to application.
- B. Hydroseeding:
1. Mixing of hydroseed slurry:

- a. Mixing shall be performed in a tank, with a built-in continuous agitation and recirculation system of sufficient operating capacity to produce a homogeneous slurry of fiber, M-Binder, seed, fertilizer and water in the following designated unit proportions:

Fiber-Mulch:	1,500 lbs. /acre
Fertilizers:	
CRF	870 lbs. /acre (20#/1000 SF)
Triple superphosphate	200 lb. /acre (4 □#/1000 SF)
Seed:	as specified above.
Binding Agent:	100 lbs. /acre (use on all slopes 5:1 and steeper)
Water:	3,000 gal. /acre (maximum)
Agricultural Grade Gypsum:	500 lb. /acre
- b. With agitation system operating at part speed, water shall be added to the tank, good recirculation shall be established. Materials shall be added in such a manner that they are uniformly blended into the mixture in the following sequence (assumes a nominal 1500 gallon tank):
- c. When tank is 1/3 filled with water:
 - Add binding agent – lbs. /acre requirement.
 - Add 5 - 50 pound bales of fiber-mulch.
 - Add seed – lbs. /acre requirement.
 - Add fertilizer – lbs. /acre requirement.
- d. Agitate mixture at full speed when the tank is half-filled with water.
- e. Add remainder fiber-mulch requirement, 10 bales, before tank is 3/4 full. Add remainder fertilizers, seed and gypsum. Slurry distribution should begin immediately.

2. Application: Hydroseed slurry shall be applied under high pressure evenly and result in a uniform coat on all areas to be treated. Care shall be exercised to assure that plants in place are not subjected to the direct force of the application. Slurry shall be immediately removed from walks, structures, plants, etc., that are inadvertently sprayed.

3. Clean-up: The slurry shall not be sprayed on non-designated areas. Any slurry spilled or sprayed into areas other than those designated to receive spray shall be cleaned up at Contractor's expense to the satisfaction of the Public Works Landscape Inspector.

B. Sodding: All areas to receive sod shall be Finish Graded prior to commencement of sodding. Immediately prior to laying sod, all areas shall be irrigated to moisten the soil as specified above. Rooting Agent shall be applied per the written recommendations of the Sod Grower. Contractor shall provide a copy of such recommendations to the Public Works Landscape Inspector prior to installation of the sod. Lay sod in parallel rows with a running bond pattern using uniformly sized strips of sod. Use whole pieces wherever possible. Lay sod smooth, with tight joints, no gaps greater than 1/8" in size. All irrigation heads shall be marked with flags for ease of location. Cut sod neatly trimming it away from around each irrigation head a maximum of 1/8" all around to allow for proper spray pattern and smooth pop-up and retract operation. Immediately following completion of sodding operations, irrigate as necessary.

- C. Replanting: At the point that the turf is generally showing signs of establishment, all bare spots shall be replanted within 10 days by Contractor, either with seed or sod as designated by the Public Works Landscape Inspector. Contractor shall be responsible for all replanted turf areas for as long after replanting as is necessary until acceptable germination/rooting and establishment is realized and approved by the Public Works Landscape Inspector.

3.11 WATERING: Add the following to Standard Specifications Section **308-4.9.5 Watering**:

- A. Responsibility: It shall be Contractor's responsibility to maintain a balanced watering program to ensure proper growth until Final Acceptance of the Work and to assure no runoff onto streets.
- B. Initial Watering: Immediately after planting, apply water to each plant. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.
- C. Ongoing Watering: Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas moist at all times, well below the root system of plants.
- D. Irrigation:
 - 1. Contractor shall properly and completely maintain the irrigation system. A balanced water program shall be maintained to ensure proper germination and growth until Final Acceptance of the Work. Plants which cannot be watered sufficiently with the irrigation system shall be watered by means of a hose.
 - 2. All controllers are to have each station individually adjusted on a weekly basis. System shall be set considering the application rate each area is capable of receiving. The system shall operate on short intervals, with the cycle repeating at a later time to reduce runoff.

3.12 MAINTENANCE AND PLANT ESTABLISHMENT: Amend the first sentence of Standard Specifications Section **308-6 MAINTENANCE AND PLANT ESTABLISHMENT** to read: "Contractor shall maintain **all areas within the Work Limits of this Project** on a continuous basis...until Final Acceptance".

3.13 START OF PLANT ESTABLISHMENT: Add the following to Standard Specifications Section **308-6 MAINTENANCE AND PLANT ESTABLISHMENT**:

- A. Criteria for Start of Plant Establishment Period:
 - 1. The Plant Establishment Period shall not start until all elements of the Project that impact the landscape are completed in accordance with the Contract Documents. Projects will not be segmented into phases.
 - 2. Permanent power to remote controllers shall be established.
 - 3. The Plant Establishment Period for the Project shall not begin until after the first mowing of the newly planted turf areas. For Plant Establishment purposes "First Mowing" is defined as the first mowing after the point in time that a minimum of 85% of the turf area has attained a minimum height of 2". Until the above specified percentage of turf area is established and mown, Contractor

shall mow as necessary to maintain those portions of turf exceeding 2" at the mowing height of 1 1/2 inches. At no time shall any turf exceed 3" in height.

4. Written acceptance of the Public Works Landscape Inspector must be obtained to start the Plant Establishment Period.
5. If the project maintenance fails to continuously meet standards required, the Plant Establishment Period "day count" will be suspended and will not recommence until Contractor has corrected all deficiencies.

3.14 **MAINTENANCE TASKS:** Add the following to Standard Specifications Section 308-6
MAINTENANCE AND PLANT ESTABLISHMENT:

- A. **General:** During the contract period provide all watering, weeding, mowing, fertilizing and cultivation and spraying necessary to keep the plants and turf in a healthy growing condition and to keep the planted areas neat, edged, and attractive. All shrubs planted by Contractor shall be pinched and pruned as necessary to encourage new growth and to eliminate rank sucker growth. Old wilted flowers and dead foliage shall be immediately pinched or cut off. Do not prune trees without written approval of the Public Works Landscape Inspector.
- B. **Iron Chlorosis:** After planting and during the Plant Establishment Period, in the event that any plantings exhibit iron chlorosis symptoms, apply FE 138 Geigy or equivalent at manufacturer's recommended rates.
- C. **Replacement Plantings:** During the Plant Establishment Period, should the appearance of any planting installed by Contractor indicate weakness, that plant shall be replaced immediately with a new, healthy plant. At the end of the Plant Establishment Period, all plant materials shall be in a healthy, growing condition and spaced as indicated on the Plans.
- D. **Fertilization:** Contractor shall apply commercial fertilizer to all turf areas at a rate of 10 pounds per 1,000 square feet, and all groundcover areas at a rate of 5 pounds per 1,000 square feet, at 30-day intervals, for 3 applications as a minimum, above and beyond the original soil preparation application.
- E. **Planting Establishment:** All planting areas that do not show a prompt establishment of plant material, and areas where plant material is missing, shall be replanted at 10-day intervals until the plant material is established. For turf sod plantings, sod shall exhibit sufficient root growth knitting into the subgrade such that the sod can no longer be removed by hand. If a good rate of growth has not been demonstrated within 30 days of first planting/hydroseeding, Contractor shall be responsible to determine the appropriate horticultural practices necessary to obtain good growth. Contractor shall obtain agronomic soils testing of all areas not showing good growth and shall provide copies of the test results to the Public Works Landscape Inspector to verify the appropriateness of all maintenance work performed.
- F. **Grading and Drainage:** During the 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. Jute netting shall be installed at flow lines and other locations where erosion is evident, when directed by the Public Works Landscape Inspector.
 1. Damage to planting areas shall be repaired immediately and throughout the Plant Establishment Period. Depressions caused by vehicles, bicycles, or foot traffic shall be filled and leveled. Replant damaged areas.

2. All paved areas shall be washed and maintained in a neat and clean condition at all times.
3. All subsurface drains and inlets shall be periodically cleared of debris, leaves and trash and flushed with clear water to avoid build up of silt and debris.
4. Debris and trash shall be removed from the site daily.

G. Disease and Pest Control: Throughout the Plant Establishment Period, all plants shall be maintained in a disease and pest free condition. A licensed pest control operator shall be retained by Contractor to recommend and apply all pesticides, herbicides, and fungicides. Exterminate gophers, moles, and all other rodents, and repair damage.

3.15 END OF PLANT ESTABLISHMENT PERIOD: Add the following to Standard Specification Section 308-6 MAINTENANCE AND PLANT ESTABLISHMENT:

- A. Request for Inspection: When Contractor believes the Plant Establishment Period is complete and the Project is ready for Final Acceptance, Contractor shall request inspection of the Project. The Public Works Landscape Inspector will inspect the Project for Final Acceptance. Deficiencies noted during inspection shall extend the Plant Establishment Period until all are corrected.
- B. Established Plantings: All planting areas shall show a good rate of growth and shall be well established "filled in" plantings free of voids. Bare areas will be unacceptable. Contractor shall provide sod or plantings from flats as necessary to fill in all bare areas. Such sod or plantings shall be planted a minimum of 10 days prior to the end of the Plant Establishment Period and shall have roots "knit-in" to the native soil.
- C. Written Acceptance: Final Acceptance and assumption of maintenance responsibilities by City shall occur only upon the Public Works Department Representative's written acceptance of the Project for maintenance by City.

3.16 CLEAN UP: Upon completion of the Work, Contractor shall smooth all ground surfaces; remove excess materials, rubbish, debris, etc.; sweep adjacent streets, curbs, gutters; wash down all walkways, and trails; and remove construction equipment from the premises.

SECTION 02482 - TREE RELOCATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Standard Specifications: All Work shall conform to the "Standard Specifications for Public Works Construction" Current Edition, prepared by the Southern California Chapter of the American Public Works Association and Southern California District of the Associated General Contractors of California, published by Building News, Inc., Los Angeles, California, and all amendments thereto adopted by the City of Riverside, and as provided herein.
- B. Reference Standards: American Association of Nurserymen Standards.

1.02 SCOPE: The Work of this Section shall consist of furnishing all labor, materials, equipment, appliances and services necessary for the execution and completion of all **Tree Relocation Work** as shown on the Plans and as described in the Specifications including, but not necessarily limited to, the following:

- Obtaining all required street tree and street opening permits;
- Transplanting trees;
- Guying and staking trees;
- Maintenance;
- Plant Establishment;
- Replacements, Repairs, Guarantees and Warranty Work;
- Coordination with Work of other Sections;
- Clean-up.

1.03 GUARANTEE: All relocated trees shall be guaranteed against any and all poor, inadequate or inferior workmanship for a period of one year following relocation. At the end of the guarantee period any material found dead or not in a satisfactory growth condition shall be removed from the site. Such trees shall be replaced at no expense to the City with the same variety and size as originally designated and the maintenance period extended for a period as deemed appropriate by the Public Works Department but not to exceed one additional year.

1.04 INSPECTIONS & PERMITS:

- A. Inspections: Inspections will be required. Contractor shall contact the Call-Center at (951) 826-5311 a minimum of two working days in advance to schedule required inspections. An inspection will be required at each of the steps listed below:
1. On-site inspection of all equipment to be used in Tree Relocation Work.
 2. Inspection and approval of new tree locations prior to digging.
 3. Inspection of defroning and tying prior to moving of palm trees.
 4. Inspection of replanting operations and trees in place following relocation for start of Plant Establishment Period.
 5. Inspection for Final Acceptance and release from Plant Establishment Period.
- B. Permits: Public Works Department Street Tree Permit(s) for Tree Relocation and/or Removal and a Public Works Department Street Opening Permit are required prior to commencement of

Tree Relocation and/or Removal Work. Contractor shall obtain permits by contacting the Urban Forester at (951)826-5311. Street Tree permits will be issued as "no fee" permits based upon submittal of a set of the improvement plans to either of these gentlemen. Backfill operations for all holes from which palm trees are removed are to be inspected by Public Works for proper compaction under the Street Opening Permit process.

- 1.04 **PLANT ESTABLISHMENT PERIOD:** Contractor shall be responsible for maintenance of all relocated trees for a minimum one (1) calendar year Plant Establishment Period. Trees shall be maintained in a good growth condition throughout the Plant Establishment Period. Maintenance work shall include periodic watering and weeding of the tree basins. Trees shall be maintained in a plumb position until accepted. Contractor shall provide a source of water and/or watering truck. All water used shall be paid for by Contractor. At the time of Final Acceptance and release of the Project Bonds, all watering basins shall be weed free and shall be filled in with clean top soil and all guy wires removed as directed by the Public Works Inspector.

The Plant Establishment Period will end and Contractor will be released from further maintenance responsibility, only upon receipt of written notification from the City that the Public Works Department is releasing the project. This release will be issued in writing by the Public Works Department.

- 1.05 **PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS:** Contractor's attention is directed to Section 7-9 **PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS** of the Standard Specifications which shall govern this Work. Contractor shall proceed at Contractor's own risk.

PART 2 - MATERIALS

- 2.01 **TOPSOIL:** All soil used for planting shall conform to the requirements of Class "C" topsoil as defined in subsection 212-1.1.4 **Class C Topsoil** of the Standard Specifications.
- 2.02 **ROOT GROWTH STIMULATE:** Stimulant shall be Vitamin B-1 as manufactured by Cal-liquid, Cooke, Chican, Ortho, or City of Riverside approved equal.
- 2.03 **PLANT TABLETS:** Planting fertilizer tablets shall be slow-release type, 21 grams. Tablets shall be in compressed form with the following minimum available percentages: N-20 percent, P-10 percent, and K-5 percent.

PART 3 - EXECUTION

- 3.01 **GENERAL:** All Relocation Work is to be done in a workmanlike manner by personnel experienced in this type of Work to the satisfaction of the Public Works Inspector.
- 3.02 **PRUNING:** No Pruning Work shall be performed other than in the presence of the Public Works Department representative. In preparing trees for relocation, all dead or damaged limbs shall be removed. Healthy limbs shall be pruned to remove an amount of foliage in proportion to root loss, and in such a manner as to encourage the natural form of the tree. Care shall be taken to prevent injury to trunks of trees.

3.03 **PLANT PITS:** New planting pits shall be dug prior to removal of trees from their existing location. All pits shall be dug in accordance with Standard Specifications Section 308-4.5 **Tree and Shrub Planting.**

3.04 **DIGGING THE ROOTBALL:** When digging out the root ball, no excavation shall be done closer than 24" to the trunk at ground level and the excavation shall extend below the major root system to a minimum depth of six (6) feet. The bottom of the root ball shall be cut off square and perpendicular to the trunk below the major root system. Under no conditions shall Contractor cut down the size of the root ball in width or depth.

Contractor shall not free-fall, drag, roll or abuse the tree or put a strain on the crown at any time. A protective device shall be used around the trunk of the tree while lifting and relocating so as not to scar or skin the trunk in any way. This device shall consist of either a rubber or leather sling or a sling made out of timbers sufficiently sized to withstand the cable/choker pressure. At no time will trees be balled out and laid on the ground with root ball left exposed to direct sunlight and air. The root ball shall be kept moist and shaded at all times.

3.05 **ROOT GROWTH STIMULANT:** Root growth stimulant shall be applied when the backfilling is between half to two thirds up the root ball. Application rate shall be one (1) quart for trees less than thirty (30) feet in height, two (2) quarts for trees thirty (30) feet and larger in height. Stimulant shall be poured full strength equally distributed around the root ball, and water-jetted into the backfill.

3.06 **PLANT TABLETS:** Twenty-one gram tablets shall be placed in the upper one-third of the planting pit, 12-inches from root ball at a rate of one tablet per inch of trunk diameter.

3.07 **PLANTING:** When the trees are replanted in the new location, trees shall be placed at the same depth in the ground as the trees originally stood in relation to finish grade. The trees shall be placed with their vertical axis in a plumb position. When the trees are in position for backfilling, a minimum of 36" of water shall be placed in the hole before any backfill is added. Backfilling shall continue with clean topsoil and water. Trees shall be "mudded-in" for the full height of the root ball and up to the ground surface. When directed by the Public Works Inspector, relocated trees shall be guyed and/or braced until accepted.

A watering basin shall be provided at each tree. Basins shall extend a minimum of 3 feet out from the trunk all around and shall be a minimum of one foot deep.

3.08 **CLEAN UP:** Following Planting Work, all remaining excavations shall be backfilled and compacted to a minimum relative compaction of 85%. Burying of debris in holes will not be permitted. All excess soil and debris from the Relocation Work shall be disposed of off the site by Contractor. The site shall be left neat and clean to the satisfaction of the Public Works Department Representative.

C. GENERAL NOTES

1) Irrigation System Design Criteria for Capital Projects

- Water Service:** Contractor shall contact the City of Riverside, Public Utilities, Water Department or Western Municipal Water District and obtain and pay for new water meter(s) as necessary to adequately serve the irrigation system as designed. Meter and backflow devices shall be located in the parkway (within public right-of-way) a minimum of 100' from any intersection or major driveway (curb return type driveway opening). Contractor shall be responsible for all water costs throughout the maintenance and Plant Establishment period if applicable.
- Electric Service:** Contractor shall contact the City of Riverside, Public Utilities, Electric Division to obtain and pay for a new "non-metered" electric service as necessary to serve each new irrigation controller(s). Service shall be underground type. Coordinate location and obtain approval from the City's Inspector.
- Irrigation Controller:** The irrigation controller(s) (One required at each Point of Connection, i.e. POC), each shall be sized to accommodate the number of valves required to serve the entire project and to provide a minimum of two spare stations. The controller and enclosure shall be the type and manufacturer as indicated on the Plans and/or Irrigation Legend. Controller shall be weatherproof, wall-mount type, installed within a locking stainless steel metal enclosure to support controller manufacturer requirements, as well as City requirements, and shall be located minimum of 100' from any intersection or major driveway (curb return type driveway opening). A concrete pad the same width and thickness, as the controller pad shall be installed between the controller and the back of sidewalk.
- Sleeves:** Sleeves shall be installed in straight lines (no turns or bends, either vertical or horizontal).
- All lines beneath street areas (i.e. not within the landscape planting areas) shall be constant pressure lines installed in sleeves with Tracer Tape (type of sleeve indicated on tape) installed six inches above each sleeve.
 - Main line sleeves under street areas shall be Class 315 PVC or Sch.40.
 - Controller wires installed within streets shall be sleeved in gray PVC Sch. 40 conduit, with 12" minimum separation from the mainline water sleeve.
 - Main line, lateral lines and control wires installed beneath hardscape within the landscape area extending for five feet or more must be sleeved. The sleeve shall extend twelve inches beyond edge of hardscape.

- o Main line and lateral lines shall be sleeved in Sch 40 PVC.
- o Controller wires shall be installed in gray Sch 40 PVC conduit.

- Control Wire:** All control wire located under pavement of any type shall be separately sleeved from main line and laterals. Provide a minimum of two spare control wires at each terminating end of the mainline, stubbed out in a valve box with the lid marked "SW". Station control wire shall be 14 gauge, common wire 12 gauge and spare wires 14 gauge. Spare wire shall be a different color from station and common wires.
- Main Line:** Size all mainlines as necessary to keep water velocity below 5 feet per second. Pressure supply lines 2 inches in diameter and up to 8 inches in diameter shall be either Class 315 solvent weld PVC or gasket type PVC. Solvent weld and ring type pipe shall not be used together on the same pressure supply line. Pressure supply lines 1-1/2 inches in diameter and smaller shall be Schedule 40 PVC. Provide a line size gate valve within a valve box immediately upstream of line entering a sleeve passing under the street area. Thrust blocks shall be installed per pipe manufacturer requirements or as Directed by City Inspector.
- Lateral Lines:** Size all lateral lines as necessary to keep water velocity below 5 feet per second. Design lateral line placements at edges of planting spaces to avoid conflict with plantings, the pipe shall be Sch. 40 PVC. All main line and lateral lines running parallel to other lines shall have a minimum horizontal separation of 12 inches.
- Control Valves:** All irrigation control valves shall be brass, pressure regulating (Master Valve Non-Pressure Regulating), sized to provide the water volume required with pressure loss through the valve kept at below a maximum of 10% of the available static pressure. Install valves in "inline" configuration. All stations shall be sized to avoid 100 GPM demand or 50 heads per station whichever is greater.
- Valve boxes:** All valve boxes shall be plastic body with locking lids. Purple colored valve boxes are to be used for reclaimed water systems and green valve boxes to be used for potable water systems. Lids shall be marked by manufacturer of lids (welded into top of lid) with numbers for Station Identification, "GV" for Gate Valve, "QC" for Quick Coupler, "MV" for Master Valve, "FM" for Flow Meter, "SW" for Spare Wire, "SB" for Wire Splice Box and "FI" for Fertilizer Injector.
- Quick Couplers:** Provide quick coupler valves at a maximum of 50' from the end of the landscaped area in each island/parkways, and spaced at a maximum of 100' o.c. in shrub and turf areas.
- Bubblers:** All bubblers shall be of the type and manufacturer indicated on the plans and shall be installed with triple swing joints inside in a 3" PVC perforated drain pipe, with a 3" PVC cap filled with crushed one inch rock

as detailed. Two bubblers shall be installed at each tree, with 48" minimum spacing between each bubbler. Trees shall be planted 50' minimum from each nose, then spaced 45' minimum between each tree.

- Miscellaneous:
1. The Rain Bucket and the ET Gauge shall be installed per Manufacturer requirements.
 2. A fertilizer Injector shall be installed after the master valve adequately sized per manufacturer recommendations. Equal to EZ-Flo Fertilizing Systems, (866) 393-5601.

Curb Marking: Stencil Valve box markings to curb top along right-of-way with a commercial quality Alkyd marking paint (equal to Sherwin-Williams Setfast Premium Alkyd Zone Marking Paint, A303 Yellow, A305 Black - (800) 524-5979). Paint black 3" markings atop a yellow background, which extends a minimum 1" beyond stenciled markings.

Record Prints: Initially shall be marked up blue line prints, all dimensions noted on a Compact Disk (CD) with all Global Positioning System (GPS) coordinates for each required item, and all information is to be transferred to either Sepia Mylar or Photo Mylar prints prior to turn-over to the City at Final Acceptance of the project.

2) Irrigation Design Criteria for Developer Street Improvement Projects

Water Service: Contractor/Developer shall contact the City of Riverside, Public Utilities, Water Department or Western Municipal Water District and obtain and pay for new water meter(s) as necessary to adequately serve the irrigation system as designed. Meter and backflow devices shall be located in the parkway (within public right-of-way) a minimum of 100' from any intersection or major driveway (curb return type driveway opening). Contractor/Developer shall be responsible for all water costs throughout the maintenance and Plant Establishment period if applicable.

Electric Service: Contractor/Developer shall contact the City of Riverside, Public Utilities, Electric Division to obtain and pay for a new "non-metered" electric service as necessary to serve each new irrigation controller(s). Service shall be underground type. Coordinate location and obtain approval from the City's Inspector.

Irrigation Controller: The irrigation controller(s) (One required at each Point of Connection, i.e. POC), each shall be sized to accommodate the number of valves required to serve the entire project and to provide a minimum of two spare stations. The controller and enclosure shall be the type and manufacturer as indicated on the Plans and/or Irrigation Legend. Controller shall be weatherproof, wall-mount type, installed within a locking stainless steel metal enclosure to support controller manufacturer requirements, as well as City requirements, and shall be located minimum of 100' from any

intersection or major driveway (curb return type driveway opening). A concrete pad the same width and thickness, as the controller pad shall be installed between the controller and the back of sidewalk.

- Sleeves:** Sleeves shall be installed in straight lines (no turns or bends, either vertical or horizontal).
- All lines beneath street areas (i.e. not within the landscape planting areas) shall be constant pressure lines installed in sleeves with Tracer Tape (type of sleeve indicated on tape) installed six inches above each sleeve.
 - Main line sleeves under street areas shall be Class 315 PVC or Sch. 40.
 - Controller wires installed within streets shall be sleeved in gray PVC Sch. 40 conduit, with 12" minimum separation from the mainline water sleeve.
 - Main line, lateral lines and control wires installed beneath hardscape within the landscape area extending for five feet or more must be sleeved. The sleeve shall extend twelve inches beyond edge of hardscape.
 - Main line and lateral lines shall be sleeved in Sch 40 PVC.
 - Controller wires shall be installed in gray Sch 40 PVC conduit.
- Control Wire:** All control wire located under pavement of any type shall be separately sleeved from main line and laterals. Provide a minimum of two spare control wires at each terminating end of the mainline, stubbed out in a valve box with the lid marked "SW". Station control wire shall be 14 gauge, common wire 12 gauge and spare wires 14 gauge. Spare wire shall be a different color from station and common wires.
- Main Line:** Size all mainlines as necessary to keep water velocity below 5 feet per second. Pressure supply lines 2 inches in diameter and up to 8 inches in diameter shall be either Class 315 solvent weld PVC or gasket type PVC. Solvent weld and ring type pipe shall not be used together on the same pressure supply line. Pressure supply lines 1-1/2 inches in diameter and smaller shall be Schedule 40 PVC. Provide a line size gate valve within a valve box immediately upstream of line entering a sleeve passing under the street area. Thrust blocks shall be installed per pipe manufacturer requirements or as Directed by City Inspector.
- Lateral Lines:** Size all lateral lines as necessary to keep water velocity below 5 feet per second. Design lateral line placements at edges of planting spaces to avoid conflict with plantings, the pipe shall be Sch. 40 PVC. All main line and lateral lines running parallel to other lines shall have a minimum horizontal separation of 12 inches.
- Control Valves:** All irrigation control valves shall be brass, pressure regulating (Master Valve Non-Pressure Regulating), sized to provide the water volume

required with pressure loss through the valve kept at below a maximum of 10% of the available static pressure. Install valves in "inline" configuration. All stations shall be sized to avoid 100 GPM demand or 50 heads per station whichever is greater.

- Valve boxes: All valve boxes shall be plastic body locking lids. Purple colored valve boxes are to be used for reclaimed water systems and green valve boxes to be used for potable water systems. Lids shall be marked by manufacturer (welded into lid) with numbers for Station Identification, "GV" for Gate Valve, "QC" for Quick Coupler, "MV" for Master Valve, "FM" for Flow Meter, "SW" for Spare Wire, "SB" for Wire Splice Box and "FI" for Fertilizer Injector.
- Quick Couplers: Provide quick coupler valves at a maximum of 50' from the end of the landscaped area in each island/parkways, and spaced at a maximum of 100' o.c. in shrub and turf areas.
- Bubblers: All bubblers shall be of the type and manufacturer indicated on the plans and shall be installed with triple swing joints inside in a 3" PVC perforated drain pipe, with a 3" PVC cap filled with crushed one inch rock as detailed. Two bubblers shall be installed at each tree, with 48" minimum spacing between each bubbler. Trees shall be planted 50' minimum from each nose, then spaced 45' minimum between each tree.
- Miscellaneous:
1. The Rain Bucket and the ET Gauge shall be installed per Manufacturer requirements.
 2. A fertilizer Injector shall be installed after the master valve adequately sized per manufacturer recommendations. Equal to EZ-Flo Fertilizing Systems, (866) 393-5601.
- Curb Marking: Stencil Valve box markings to curb top along right-of-way with a commercial quality Alkyd marking paint (equal to Sherwin-Williams Setfast Premium Alkyd Zone Marking Paint, A303 Yellow, A305 Black - (800) 524-5979). Paint black 3" markings atop a yellow background, which extends a minimum 1" beyond stenciled markings.
- Record Prints: Initially shall be marked up blue line prints, all dimensions noted on a Compact Disk (CD) with all Global Positioning System (GPS) coordinates for each required item, and all information is to be transferred to either Sepia Mylar or Photo Mylar prints prior to turn-over to the City at Final Acceptance of the project.

3) Irrigation Design Criteria for HOA Maintained Development Projects

- Water Service: Contractor/Developer shall contact the City of Riverside, Public Utilities, Water Department or Western Municipal Water District and obtain and pay for new water meter(s) as necessary to adequately serve the irrigation

system as designed. Meter and backflow devices shall be located in the parkway (within public right-of-way) a minimum of 100' from any intersection or major driveway (curb return type driveway opening). Contractor/Developer shall be responsible for all water costs.

Electric Service: Contractor/Developer shall contact the City of Riverside, Public Utilities, Electric Division to obtain and pay for a new "metered" electric service as necessary to serve each new irrigation controller(s). Service shall be underground type.

Irrigation Controller: The irrigation controller shall be water wise type (s) (One required at each Point of Connection, i.e. POC), each shall be sized to accommodate the number of valves required to serve the entire project and to provide a minimum of two spare stations. The controller and enclosure shall be the type and manufacturer as indicated on the Plans and/or Irrigation Legend. Controller shall be weatherproof, wall-mount type, installed within a locking stainless steel metal enclosure to support controller manufacturer requirements, as well as City requirements, and shall be located minimum of 100' from any intersection or major driveway (curb return type driveway opening). A concrete pad the same width and thickness, as the controller pad shall be installed between the controller and the back of sidewalk.

Sleeves: Sleeves shall be installed in straight lines (no turns or bends, either vertical or horizontal).

- All lines beneath street areas (i.e. not within the landscape planting areas) shall be constant pressure lines installed in sleeves with Tracer Tape (type of sleeve indicated on tape) installed six inches above each sleeve.
 - Main line sleeves under street areas shall be Class 315 PVC or Sch. 40.
 - Controller wires installed within streets shall be sleeved in gray PVC Sch. 40 conduit, with 12" minimum separation from the mainline water sleeve.
- Main line, lateral lines and control wires installed beneath hardscape within the landscape area extending for five feet or more must be sleeved. The sleeve shall extend twelve inches beyond edge of hardscape.
 - Main line and lateral lines shall be sleeved in Sch 40 PVC.
 - Controller wires shall be sleeved in gray Sch 40 PVC conduit.

Control Wire: All control wires located under pavement of any type shall be separately sleeved from main line or laterals. Provide a minimum of two spare control wires at each terminating end of the mainline, stubbed out in a valve box with the lid marked "SW". Station control wire shall be 14 gauge, common wire 12 gauge and spare wires 14 gauge. Spare wire shall be a different color from station and common wires.

- Main Line:** Size all mainlines as necessary to keep water velocity below 5 feet per second. Pressure supply lines 2 inches in diameter and up to 8 inches in diameter shall be either Class 315 solvent weld PVC or gasket type PVC. Solvent weld and ring type pipe shall not be used together on the same pressure supply line. Pressure supply lines 1-1/2 inches in diameter and smaller shall be Schedule 40 PVC. Provide a line size gate valve within a valve box immediately upstream of line entering a sleeve passing under the street area. Thrust blocks shall be installed per pipe manufacturer requirements or as Directed by City Inspector.
- Lateral Lines:** Size all lateral lines as necessary to keep water velocity below 5 feet per second. Design lateral line placements at edges of planting spaces to avoid conflict with plantings, the pipe shall be Sch. 40 PVC. All main line and lateral lines running parallel to other lines shall have a minimum horizontal separation of 12 inches.
- Control Valves:** All irrigation control valves shall be brass, pressure regulating (Master Valve Non-Pressure Regulating), sized to provide the water volume required with pressure loss through the valve kept at below a maximum of 10% of the available static pressure. Install valves in "inline" configuration. All stations shall be sized to avoid 100 GPM demand or 50 heads per station whichever is greater.
- Valve boxes:** All valve boxes shall be plastic body locking lids. Purple colored valve boxes are to be used for reclaimed water systems and green valve boxes to be used for potable water systems. Lids shall be marked by manufacturer (welded into lid) with letter and/or numbers (ex. "A10") for Station Identification, "GV" for Gate Valve, "QC" for Quick Coupler, "MV" for Master Valve, "FM" for Flow Meter, "SW" for Spare Wire, "SB" for Wire Splice Box.
- Quick Couplers:** Provide quick coupler valves at a maximum of 50' from the end of the landscaped area in each island/parkways, and spaced at a maximum of 100' o.c. in shrub and turf areas.
- Bubblers:** All bubblers shall be of the type and manufacturer indicated on the plans and shall be installed with triple swing joints inside in a 3" PVC perforated drain pipe, with a 3" PVC cap filled with crushed one inch rock as detailed. Two bubblers shall be installed at each tree, with 48" minimum spacing between each bubbler. Trees shall be planted 50' minimum from each nose, then spaced 45' minimum between each tree.
- Miscellaneous:** Controller weather stations shall be installed per Manufacturer requirements.

Record Prints: Initially shall be marked up blue line prints, all dimensions noted on a Compact Disk (CD) with all Global Positioning System (GPS) coordinates for each required item, and all information is to be transferred to either Sepia Mylar or Photo Mylar prints prior to Final Acceptance of the project.

4) Public Landscaping

- a. All related work shall conform to the City of Riverside Public Works Department Standards and Specifications for Planting and Irrigation work. (Sections 02441 and 02483).
- b. A "Public Landscape" permit, as issued by the Public Works Department is required. Contact the Public Works Landscape Inspector at (951) 826-5311 to schedule a pre-construction meeting and to obtain the permit.
- c. When calling for inspections contact the Public Works Landscape Inspector a minimum of 48 hours in advance at to schedule an inspection. A written approval will be provided on the Public Landscape Permit card for each stage of inspection. A verbal approval will not be acceptable. Inspections are required per the standard specifications, and include but are not necessarily limited to the following:
 - After completion of final grading and when all utility services have been marked, but prior to initiating any landscape work within in the public right of way;
 - At time of installation of irrigation sleeves and constant pressure mainlines, but prior to backfill of trenches for same (Note: mainlines must be pressure tested in the presence of the Public Works Landscape Inspector);
 - At time of installation of irrigation valves, laterals and heads;
 - For spotting of all trees prior to digging planting pits;
 - While digging plant pits and planting/relocating trees;
 - After planting and all other indicated or specified work has been completed, for start of maintenance;
 - At substantial completion of the project for City's acceptance to start the required maintenance period;
 - At the end of the Maintenance Period, the Contractor/Developer shall call the Public Works Landscape Inspector at the number listed above for a final acceptance inspection in order to be released from maintenance. Contractor's bond will not be released until after City's issuance of written notification that the project has passed final inspection and the Public Works Department is assuming maintenance responsibilities.
- d. The Developer shall be responsible to acceptably maintain all plantings for a minimum period as specified in the bid documents.

5) HOA Maintained Public Landscapes

- a. All related work shall conform to the City of Riverside Public Works Department Standards and Specifications for Planting and Irrigation work. (Specification Sections 02441 and 02483).
- b. A "Public Landscape" permit, as issued by the Public Works Department is required. Contact the assigned Public Works Landscape Inspector at (951) 826-5311 to schedule a pre-construction meeting and to obtain the permit.
- c. When calling for inspections contact the Public Works /Landscape Inspector a minimum of

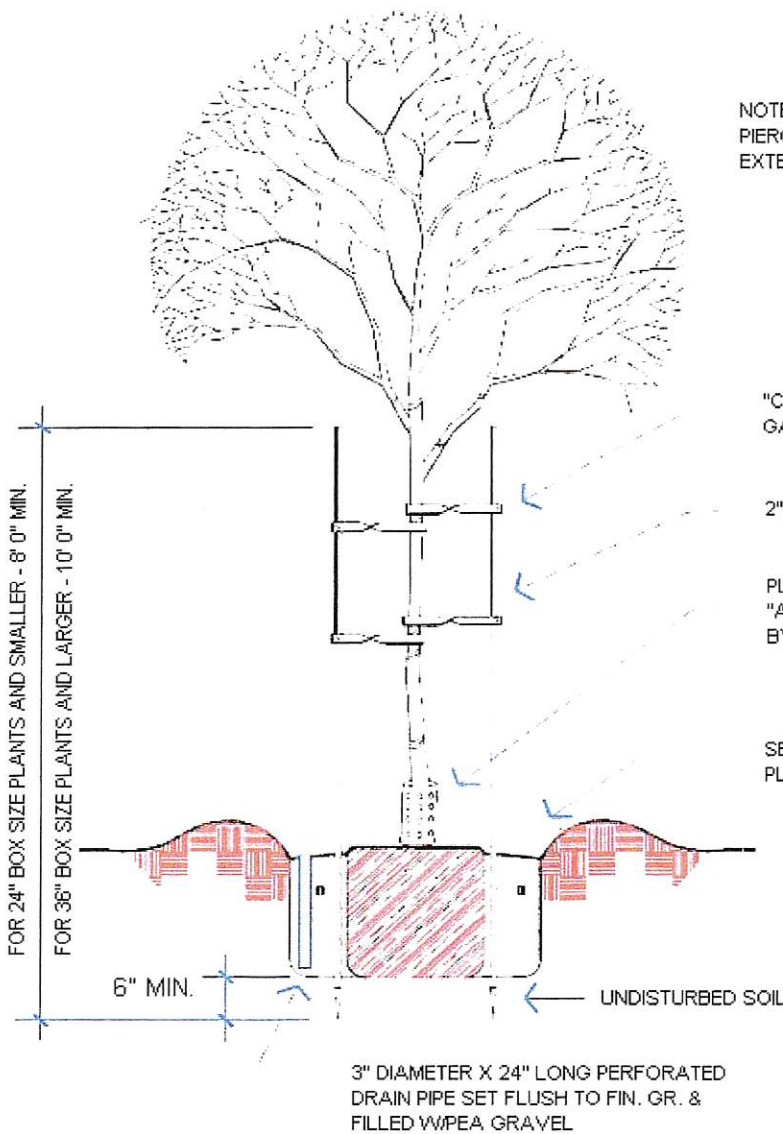
48 hours in advance to schedule an inspection. A written approval will be provided on the Public Landscape Permit card for each stage of inspection. A verbal approval will not be acceptable. Inspections are required per the standard specifications, and include but are not necessarily limited to the following:

- After completion of final grading and when all utility services have been marked, but prior to initiating any landscape work within in the public right of way;
 - At time of installation of irrigation sleeves and constant pressure mainlines, but prior to backfill of trenches for same (Note: mainlines must be pressure tested in the presence of the Public Works Landscape Inspector);
 - At time of installation of irrigation valves, laterals and heads;
 - For spotting of all trees prior to digging planting pits;
 - While digging plant pits and planting/relocating trees;
 - After planting and all other indicated or specified work has been completed, for start of maintenance;
 - At substantial completion of the project for City's acceptance to start the required maintenance period;
 - At the end of the Maintenance Period, the Contractor/Developer shall contact the Public Works /Landscape Inspector at the number listed above for a final acceptance inspection in order to be released from maintenance. Developers bonds will not be released until after City's receipt of written notification from the HOA's authorized representative that the HOA is assuming maintenance responsibilities, and the City's issuance of written notification to the Developer that the project has passed final inspection.
- d. The Developer shall be responsible to acceptably maintain all plantings for a minimum period of one (1) year.

***NOTE:** In the interest of public safety and maintenance the Public Works Landscape Inspector shall have the authority to revise the tree quantities and locations shown on approved plans based upon field conditions found at the time of installation of the trees.

6) Sample Pressure Loss Calculations

PRESSURE LOSS CALCULATIONS		
(HIGHEST FLOW - 50 GPM)		
<u>EQUIPMENT</u>	<u>SIZE</u>	<u>LOSS</u>
WATER METER	2"	1.9
BACKFLOW	2"	11.5
FLOW SENSOR	2"	1.0
MASTER VALVE	2"	0.82
MAINLINE	3"	2.5
CONTROL VALVE	1.5"	2.65
LATERAL LINES	<5 FPS	2
SUBTOTAL PRESSURE LOSSES		22.37
MISC. LOSSES THRU SYSTEM (10%)		2.28
ELEVATION GAIN (FT)	10	4.33
TOTAL PRESSURE LOSSES		28.89
PRESSURE REQUIRED AT HEAD		40
TOTAL PRESSURE REQUIRED		69.48
STATIC PRESSURE AVAILABLE		80
RESIDUAL PRESSURE		10.51



NOTE: STAKES SHALL NOT PIERCE ROOTBALL, AND SHALL EXTEND INTO UNDISTURBED SOIL.

"CINCH-TIE" OR TIRE STRIP TIE, GARDEN HOSE & WIRE NOT APPROVED

2" DIAMETER LODGEPOLE PINE STAKE

PLASTIC TRUNK GUARD "ARBOR-GARD" AS MFG'D BY DEEP ROOT CORP.

SEE STD. DETAIL 1001 FOR PLANTING INFORMATION

LODGEPOLE PINE STAKE
 TREE TRUNK
 GALV. NAIL

SECTION

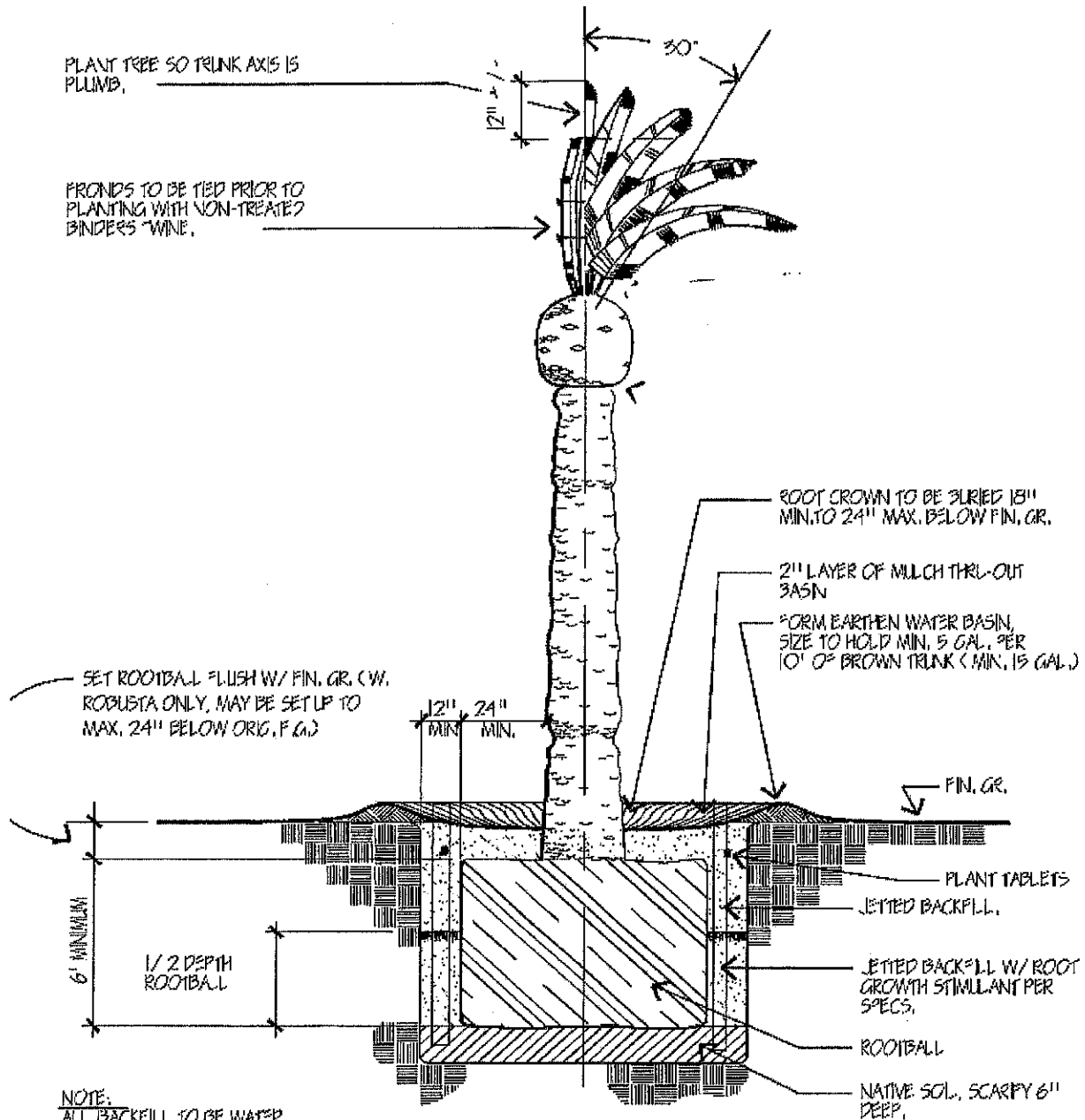
NOT TO SCALE

NOTE: ROOT BARRIERS MAY BE REQUIRED AT THE INSPECTORS DISCRETION, SIZE TO BE DETERMINED BY SPECIES AND PROXIMITY TO HARDSCAPE. TREES ARE TO BE SET 2" ABOVE GRADE.

Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
 CITY OF RIVERSIDE
TREE PLANTING DETAIL

Detail No.
1001



NOT TO SCALE

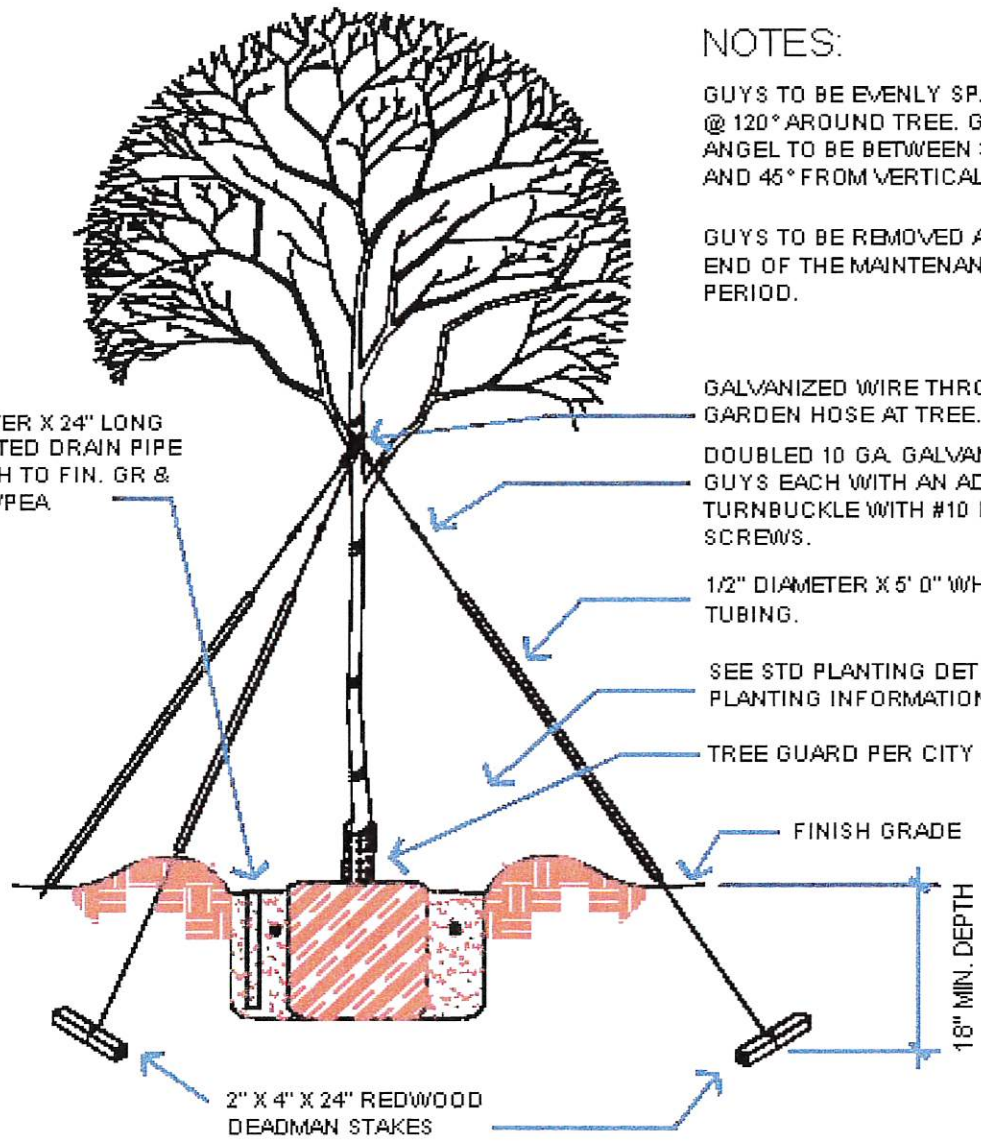
Construction Notes

- 1) Provide minimum two deep water wells 4" x Min. 36" perforated PVC Pipe, filled with 3/4" crushed rock, wrapped with soil cloth.
- 2) Sand backfill may be required depending on species and location.

Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department Forestry and Landscape Division CITY OF RIVERSIDE
PALM TREE PLANTING

Detail No.
1002



NOTES:

GUYS TO BE EVENLY SPACED @ 120° AROUND TREE. GUY ANGLE TO BE BETWEEN 30° AND 45° FROM VERTICAL.

GUYS TO BE REMOVED AT THE END OF THE MAINTENANCE PERIOD.

3" DIAMETER X 24" LONG PERFORATED DRAIN PIPE SET FLUSH TO FIN. GR & FILLED W/P&E GRAVEL.

GALVANIZED WIRE THROUGH GARDEN HOSE AT TREE.

DOUBLED 10 GA. GALVANIZED WIRE GUYS EACH WITH AN ADJUSTABLE TURNBUCKLE WITH #10 EYEBOLT SCREWS.

1/2" DIAMETER X 5' 0" WHITE PVC TUBING.

SEE STD PLANTING DET 1004 FOR PLANTING INFORMATION.

TREE GUARD PER CITY STANDARDS.

FINISH GRADE

18" MIN. DEPTH

2" X 4" X 24" REDWOOD DEADMAN STAKES

NOT TO SCALE

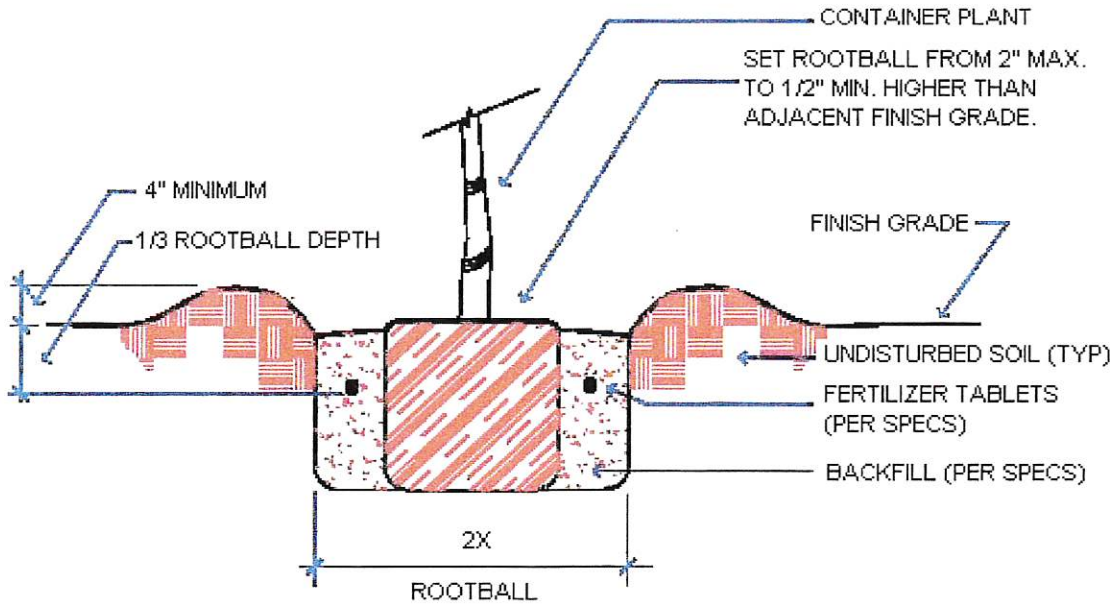
Approved	Date
P.V.	5/12/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
TREE GUYING DETAIL

Detail No.
1003

GENERAL PLANTING NOTES

1. CONTACT THE LANDSCAPE MAINTENANCE INSPECTOR AT (951) 351-6313 TWO DAYS (48 HOURS) PRIOR TO INSTALLATION.
2. FOR SPECIFICATION INFORMATION REFER TO CITY OF RIVERSIDE PUBLIC WORKS DEPARTMENT STANDARD SPECIFICATIONS, SECTION 02483 PLANTING.
3. PROVIDE FERTILIZER TABLETS.



NOT TO SCALE

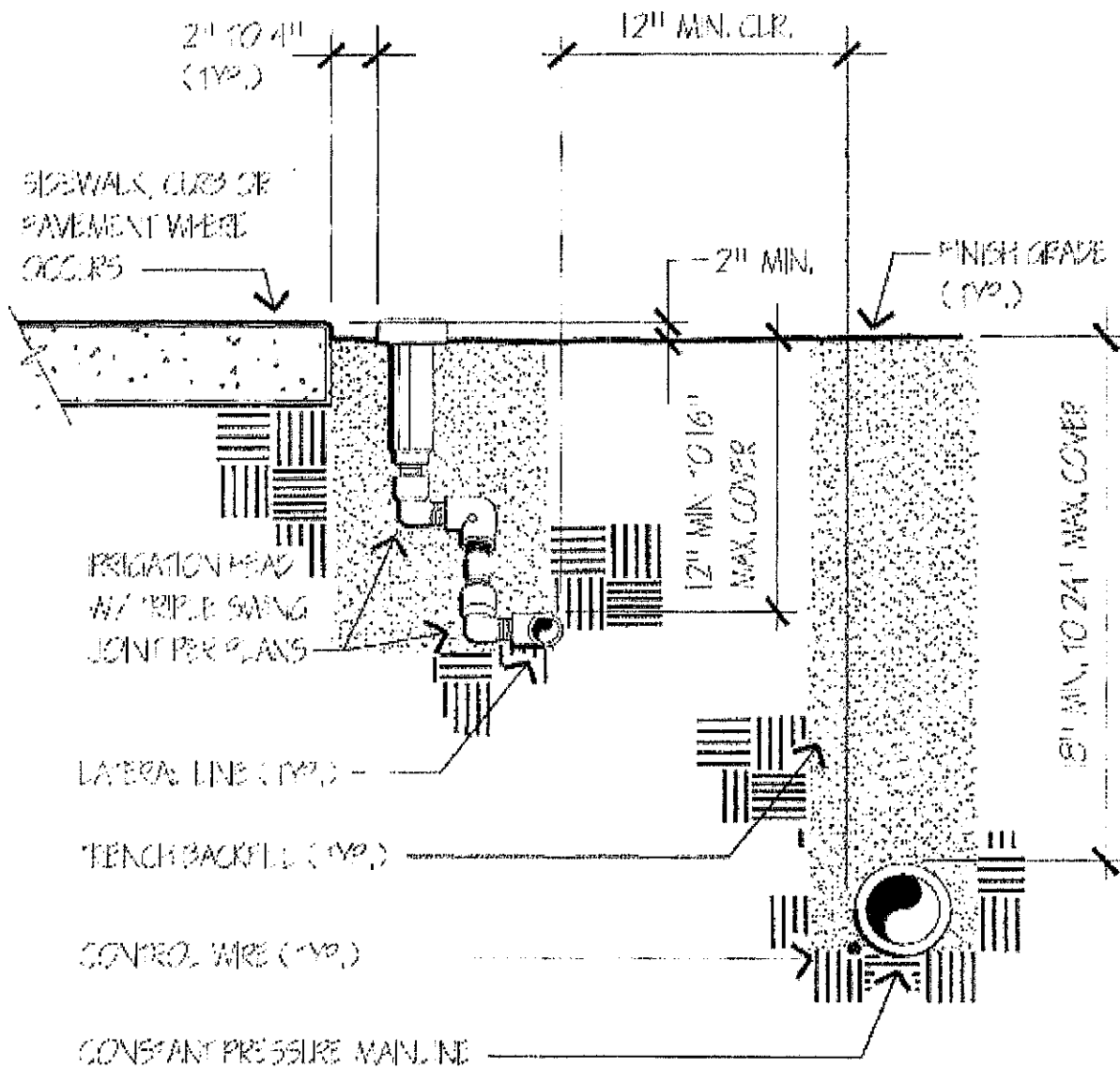
Approved	Date
P.V.	5/12/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

PLANTING DETAIL

Detail No.

1004



Construction Notes

Not to Scale

- 1) Controller wire shall be taped every 100'.
- 2) Main Line pipe and Lateral Line pipe shall not be placed within the same trench.
- 3) Rotor type sprinklers shall have a minimum 4" clearance between the hardscape and edge of rotor.

Approved	Date
P.V.	5/13/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

TRENCH AND LINE PLACEMENT

Detail No.
2001

LOCKABLE STEEL
ENCLOSURE SBBC-30-CR
PER CITY STDS.

BACKFLOW DEVICE AS
APPROVED BY PUBLIC
UTILITIES - WATER.

DEVICE MUST BE
CONSISTENT WITH
METER SIZE, OR MAY
INCREASE IN SIZE.
NEVER REDUCED.

LINE SIZE WYE
STRAINER

4" THICK CONC. PAD
PER CITY STDS.

12" MIN.

FIN. GR.

BRONZE ELBOWS AND
RISERS PER CITY STDS.

NOT TO SCALE

PVC MAINLINE WITH
MALE ADAPTER

Notes:

Construction Notes

- 1) Install backflow device square with hardscape elements as approved by the Public Works Inspector in the field.
- 2) Coordinate with Public Utilities-Water for location of backflow and water meter. Wherever possible, locate service and backflow in the parkway at mid-block a minimum of 150' from the Back of Curb Return at the nearest intersection per City standards.
- 3) The backflow enclosure must be locking Stainless Steel powder coated green per City specifications. SBBC-30-CR or Applicable size.
- 4) Backflow device shall be a Febco 825 YA installed using 250 psi rated brass/bronze pipe and fittings, between P.O.C. and device including the ninety degree elbows at the point of connection to the mainline. Contact Public Utilities-Water Backflow Program Staff (951) 351-6320 or (951) 351-6282 for inspection before back filling.

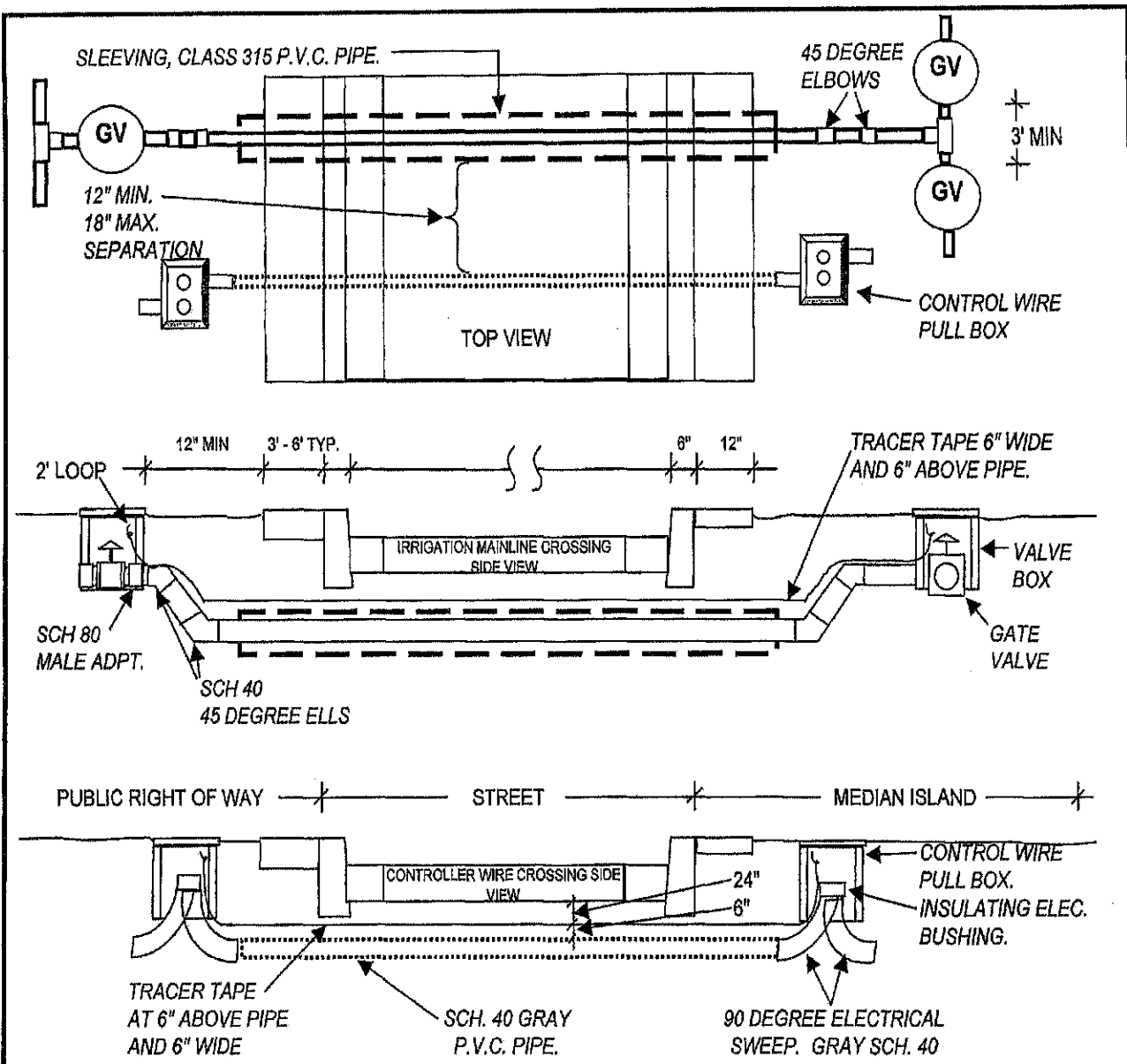
Approved	Date
P.V.	4/23/08
Revised	Date
P.V.	7/9/08

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

REDUCED PRESSURE BACKFLOW W/ENCLOSURE

Detail No.

2002



Construction Notes

Not to Scale

- 1) The Contractor shall mark the proposed crossing with blue paint, and receive written approval from the inspector prior to trenching and or boring. They shall also have Dig Alert markings prior to inspection.
- 2) The irrigation tracer tape shall be 6" wide, Blue in color, and read "CAUTION Irrigation Line Buried Below".
- 3) The irrigation wire tracer tape shall be 6" wide, Red in color, and read "CAUTION Electrical Line Buried Below".

Approved	Date
P.V.	5/13/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

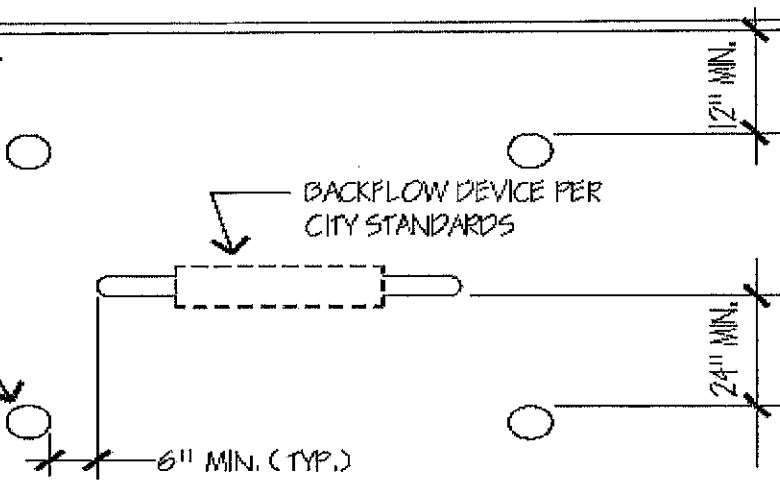
TYPICAL STREET CROSSING

Detail No.
2003

SIDEWALK, CURB &
GLITTER, ETC.

6" DIA. SCH 80 STEEL
PIPE, FILLED SOLID
W/1 CONC. (TYP.)

BACKFLOW DEVICE PER
CITY STANDARDS

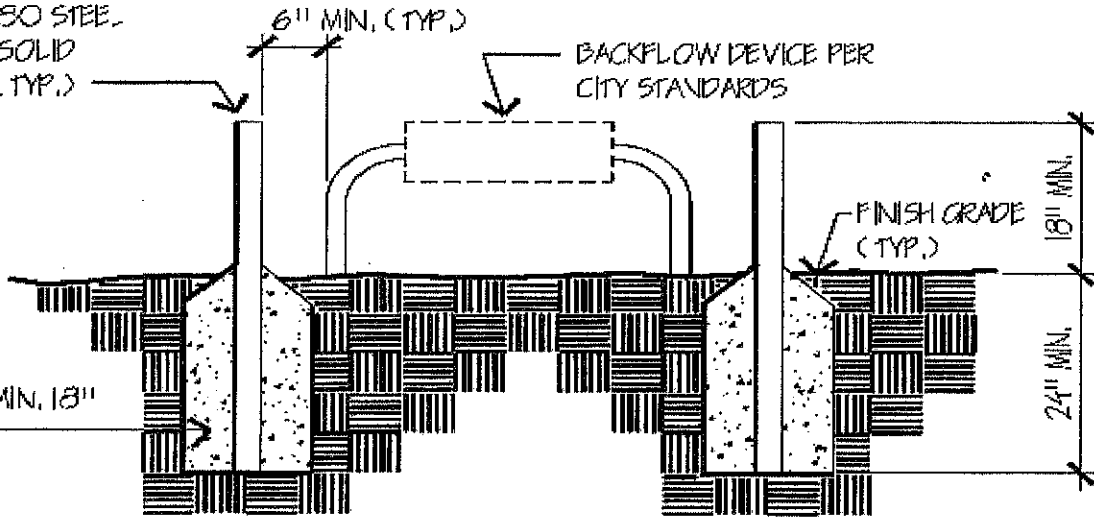


PLAN VIEW NOT TO SCALE

6" DIA. SCH 80 STEEL
PIPE, FILLED SOLID
WITH CONC. (TYP.)

BACKFLOW DEVICE PER
CITY STANDARDS

CONC. FTG. MIN. 18"
DIA. (TYP.)



ELEVATION NOT TO SCALE

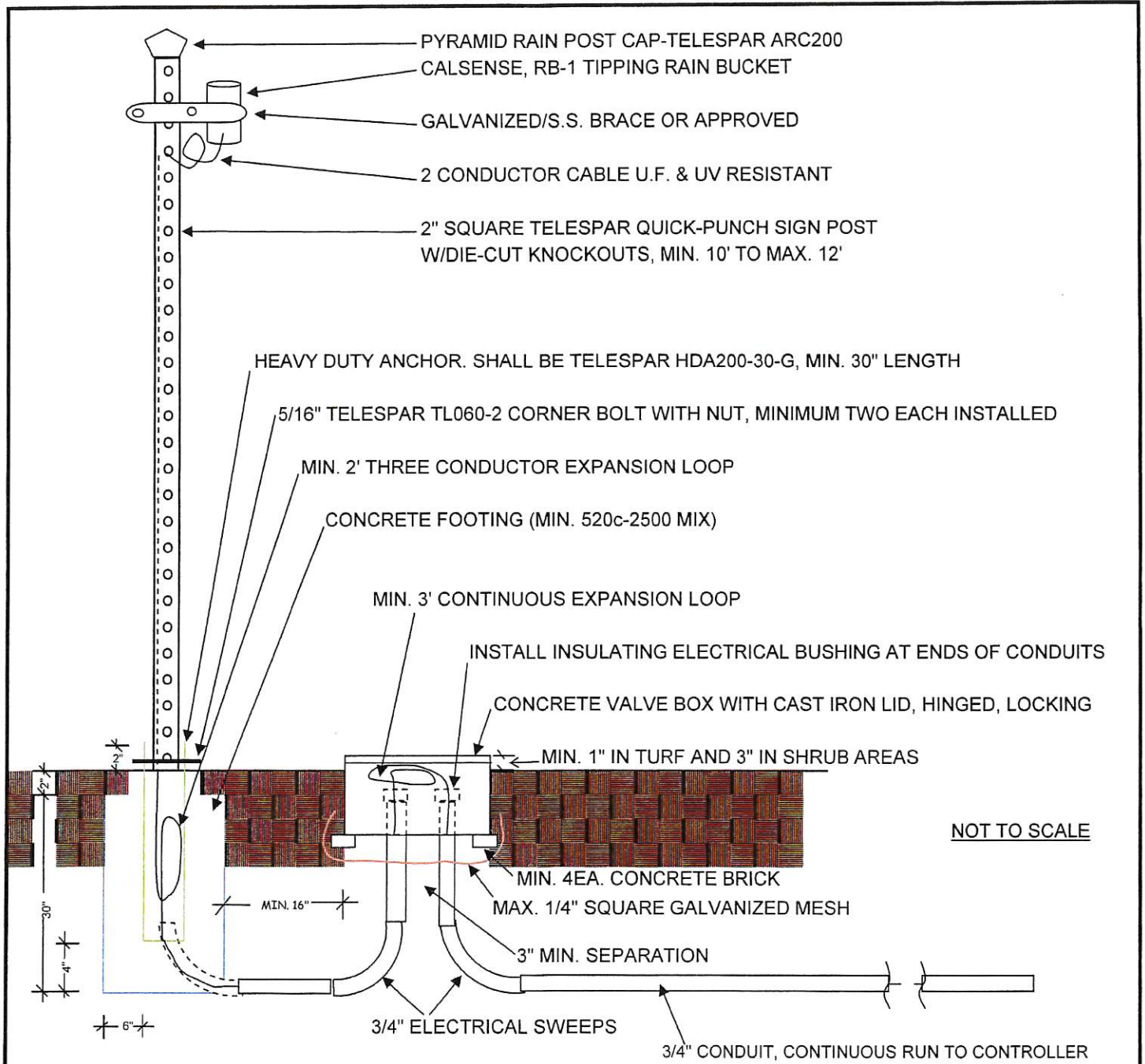
Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

BACKFLOW PREVENTER WITH POSTS

Detail No.

2004



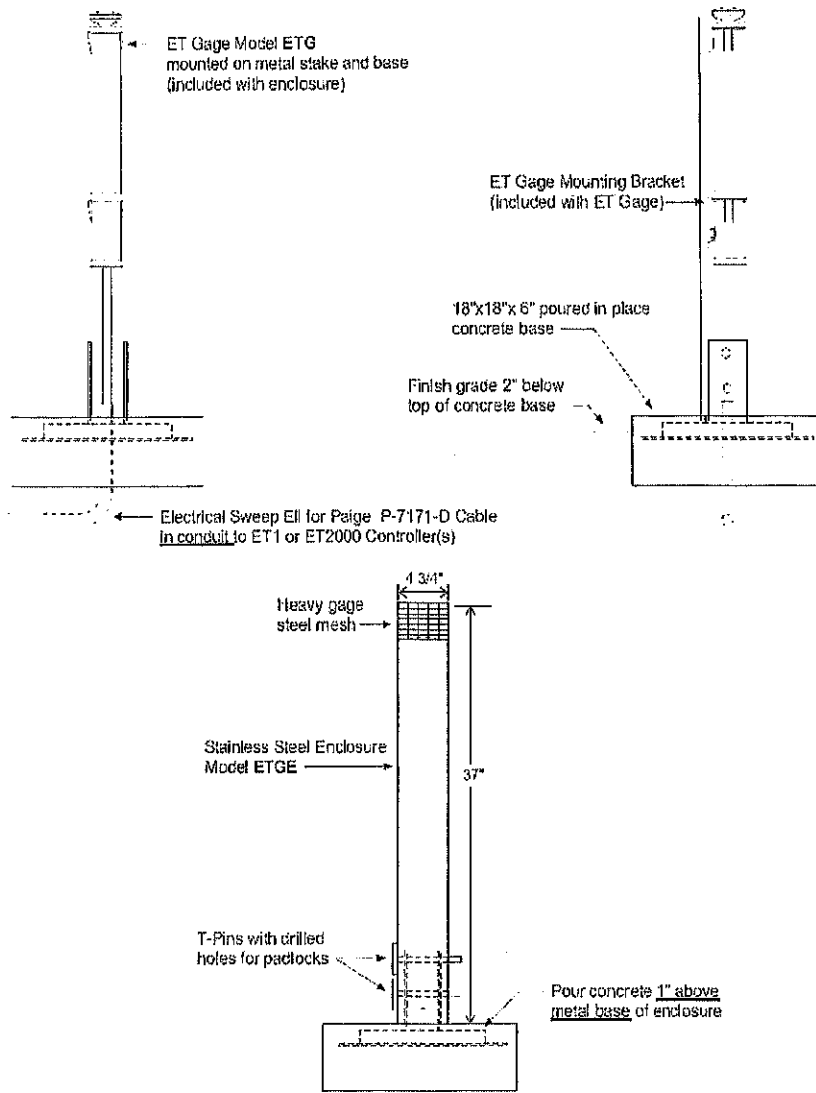
Construction Notes

- 1) The rain bucket shall not be installed within a 25' radius of any tree.
- 2) The installation shall be certified in writing by Calsense.
- 3) The maximum length of cable which can be used is 200'.
- 4) The location shall be approved by the Landscape Maintenance Inspector.
- 5) The pole and rain bucket shall be level.
- 6) RB-1 Tipping Rain Bucket supplied with 60' of plastic covered wire.

Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
TYPICAL CALSENSE RAIN BUCKET INSTALLATION

Detail No.
2005



NOT TO SCALE

- Note: 1) Installation of ET Gage shall be certified by Manufacturer.
 2) The proposed location shall be spotted by the Contractor, with the final location Approved by the Landscape Maintenance Inspector
 3) The ET Gauge shall be level.
 4) The cable (P-7171-D) shall run continuously from the ET Gage to the controller in a separate 1" PVC Gray conduit.

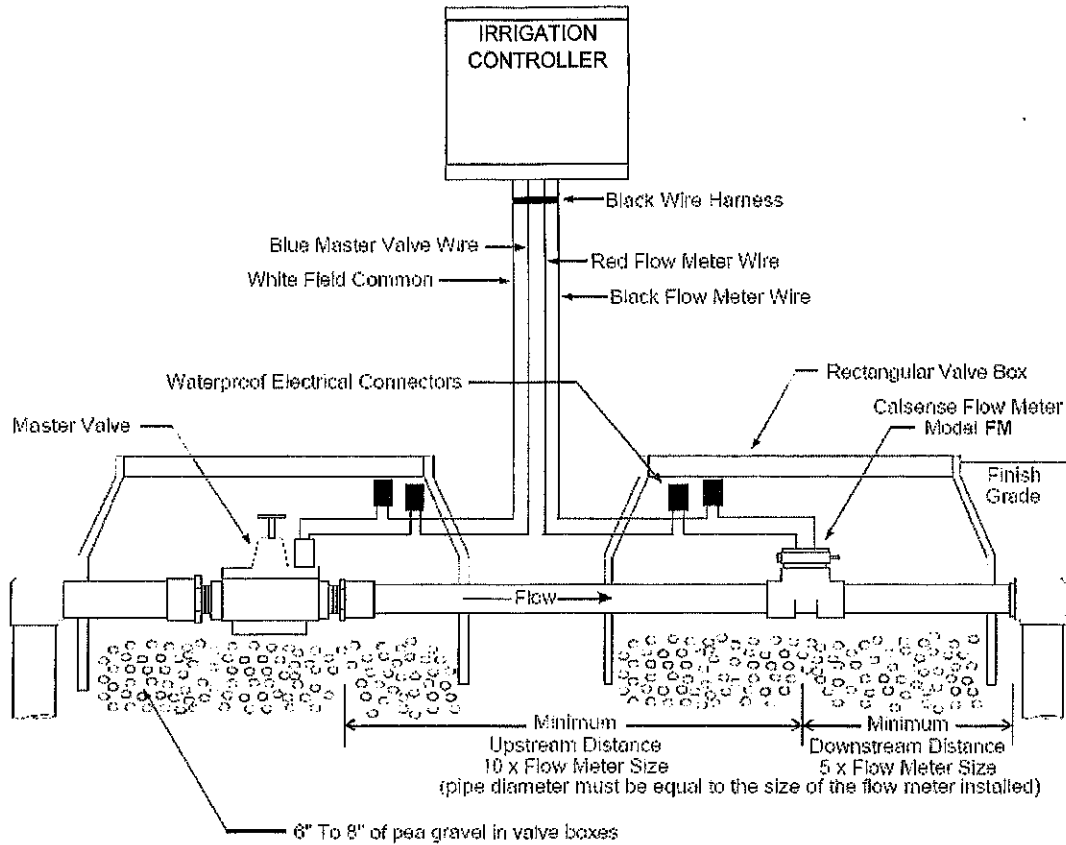
Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

CALSENSE EVAPOTRANSPIRATION (ET) GAGE

Detail No.
2006

Flow Meter Installation



Minimum Upstream and Downstream Distance for Various Flow Meter Sizes

Flow Meter Size	Minimum Upstream Pipe Length	Minimum Downstream Pipe Length	Pipe Diameter
1"	10'	5'	1"
1.25"	12-12'	6-14'	1-1 1/4"
1.5"	15'	7-12'	1-1 1/2"
2"	20'	10'	2"
3"	30'	15'	3"

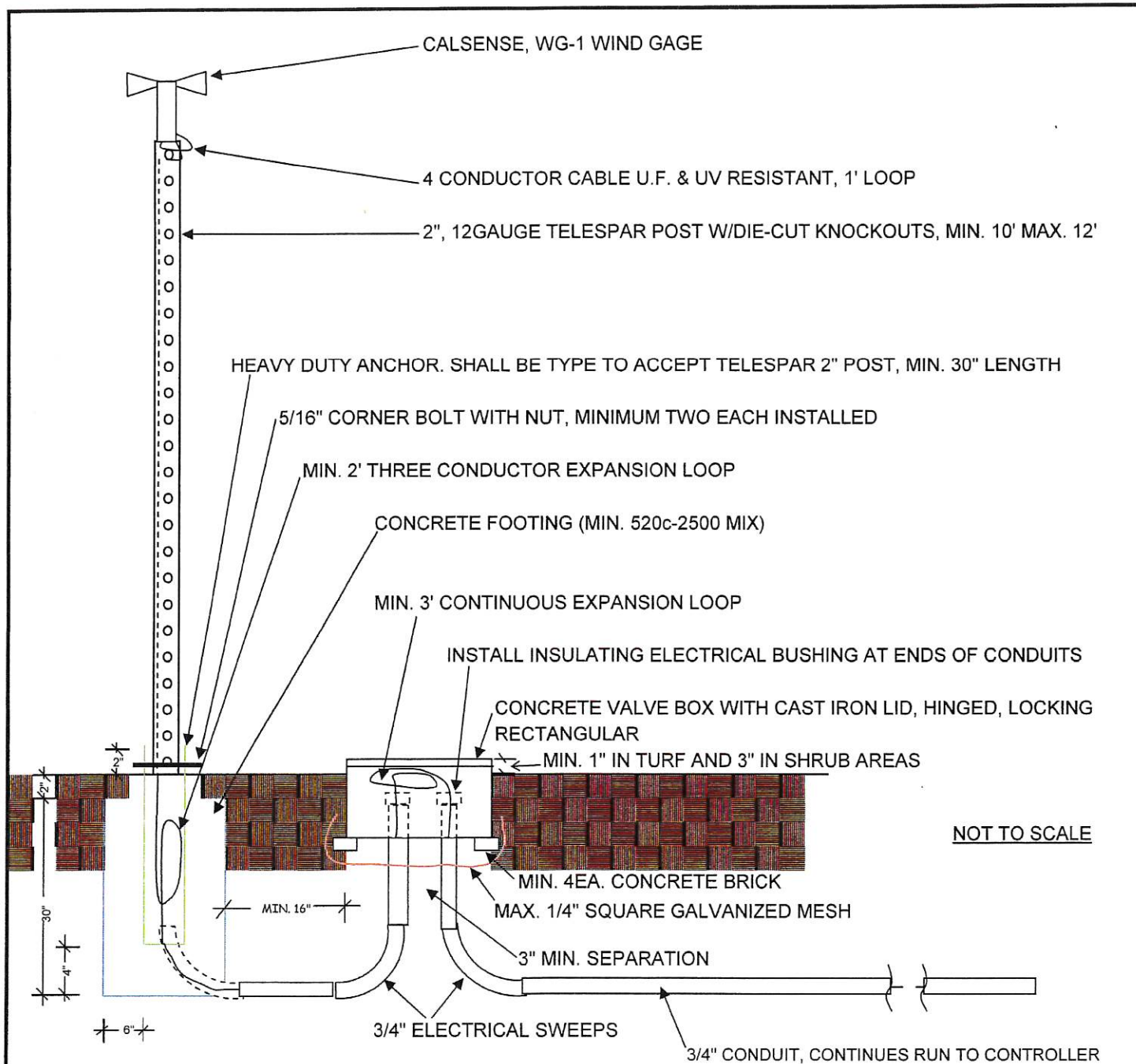
NOT TO SCALE

- Note:
- 1) Installation of the Master Valve and Flow Meter shall be certified by Manufacturer.
 - 2) The proposed location shall be spotted by the Contractor, with the final location Approved by the Landscape Maintenance Inspector
 - 3) Valve boxes shall be Concrete, with Locking cast iron hinged lids.
 - 4) A 3" Min. Clearance between the valve / flow meter and the inside of the valve box is required.

Approved Date	
P.V.	5/5/08
Revised Date	

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
CALSENSE TYPICAL FLOW METER & MASTER VALVE

Detail No.
2007



Construction Notes

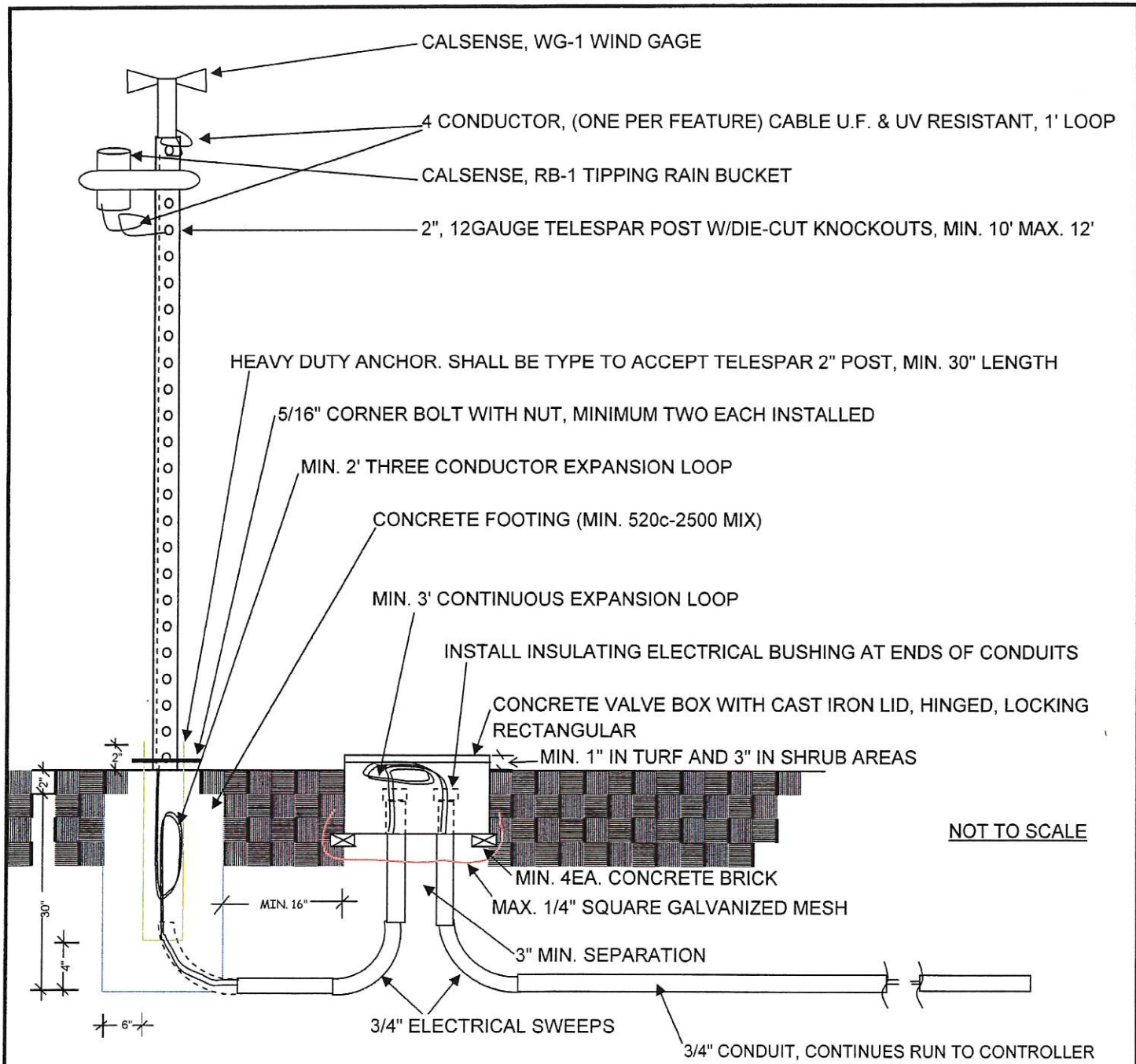
- 1) The rain bucket shall not be installed within a 25' radius of any tree.
- 2) The installation shall be certified in writing by Calsense.
- 3) The maximum length of cable which can be used is 200'.
- 4) The location shall be approved by the Landscape Maintenance Inspector.
- 5) The pole and rain gage shall be level.

Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

CALSENSE TYPICAL WIND GAGE INSTALLATION

Detail No.
2008



Construction Notes

- 1) The rain bucket and wind gage shall not be installed within a 25' radius of any tree.
- 2) The installation shall be certified in writing by Calsense.
- 3) The maximum length of cable which can be used is 200'.
- 4) The location shall be approved by the Landscape Maintenance Inspector.
- 5) The pole, wind gage and rain gage shall be level.
- 6) Both the wind gage and rain bucket shall have separate groups of wires that run from each feature, back to the irrigation controller.

Approved	Date
P.V.	5/8/08
Revised	Date

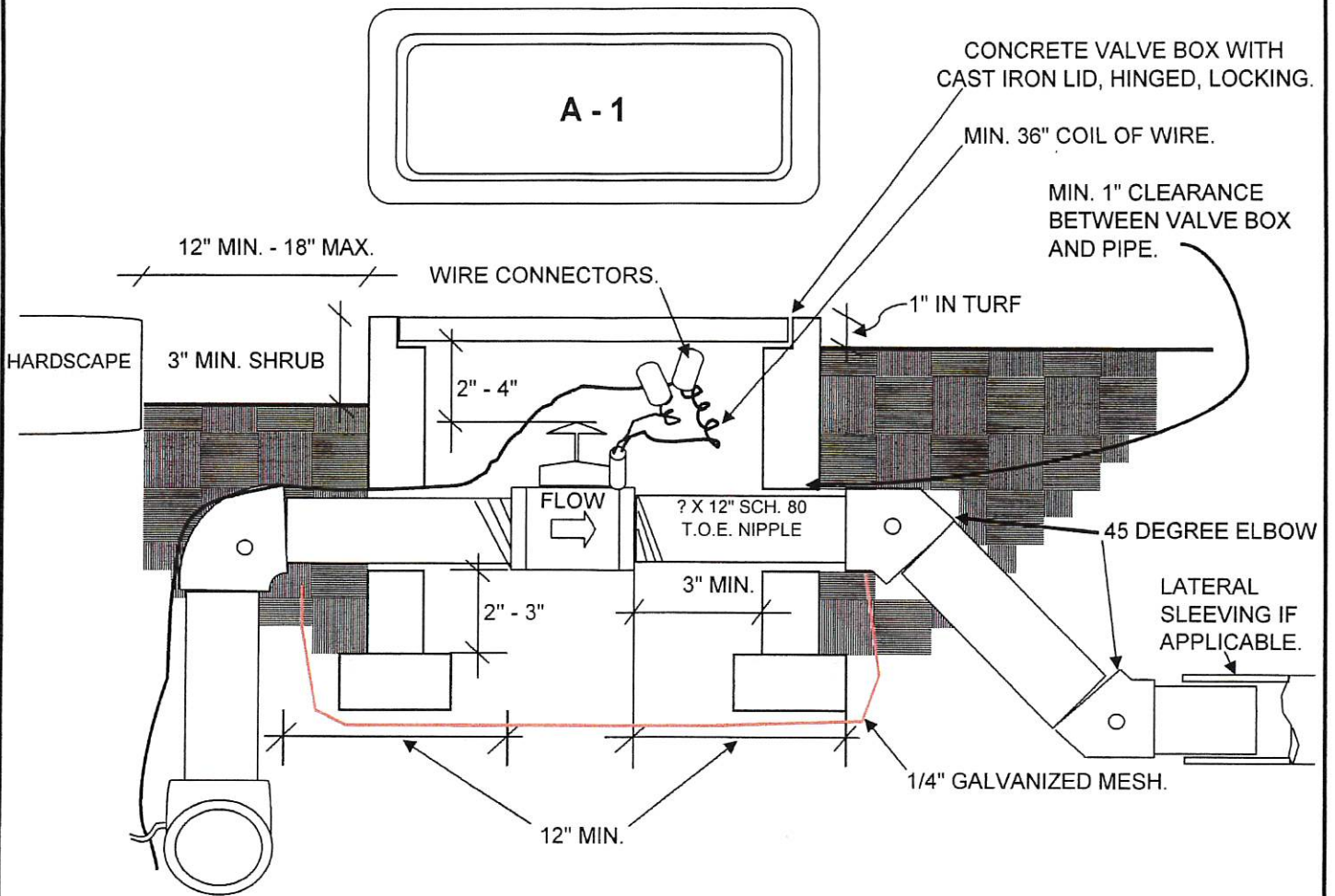
Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

CALSENSE TYPICAL RAIN BUCKET & WIND GAGE INSTALLATION

Detail No.

2009

TOP VIEW



Construction Notes

- 1) EACH VALVE SHALL HAVE ITS OWN TEE OR ELL CONNECTION TO THE MAINLINE. NO MANIFOLD CONNECTIONS.
- 2) PROVIDE MINIMUM 3' CLEAR DISTANCE BETWEEN VALVES AND WIRE BOXES.
- 3) INSTALL VALVE BOX SO THAT THE BOX DOES NOT REST ON ANY IRRIGATION LINES.
- 4) WHERE PIPE DEPTH MUST CHANGE IN LESS THAN 10' HORIZONTAL DISTANCE, USE 45 DEGREE ELBOWS.
- 5) 3/4" GRAVEL ROCK SHALL BE PLACED IN EACH BOX. MINIMUM 2 CF.

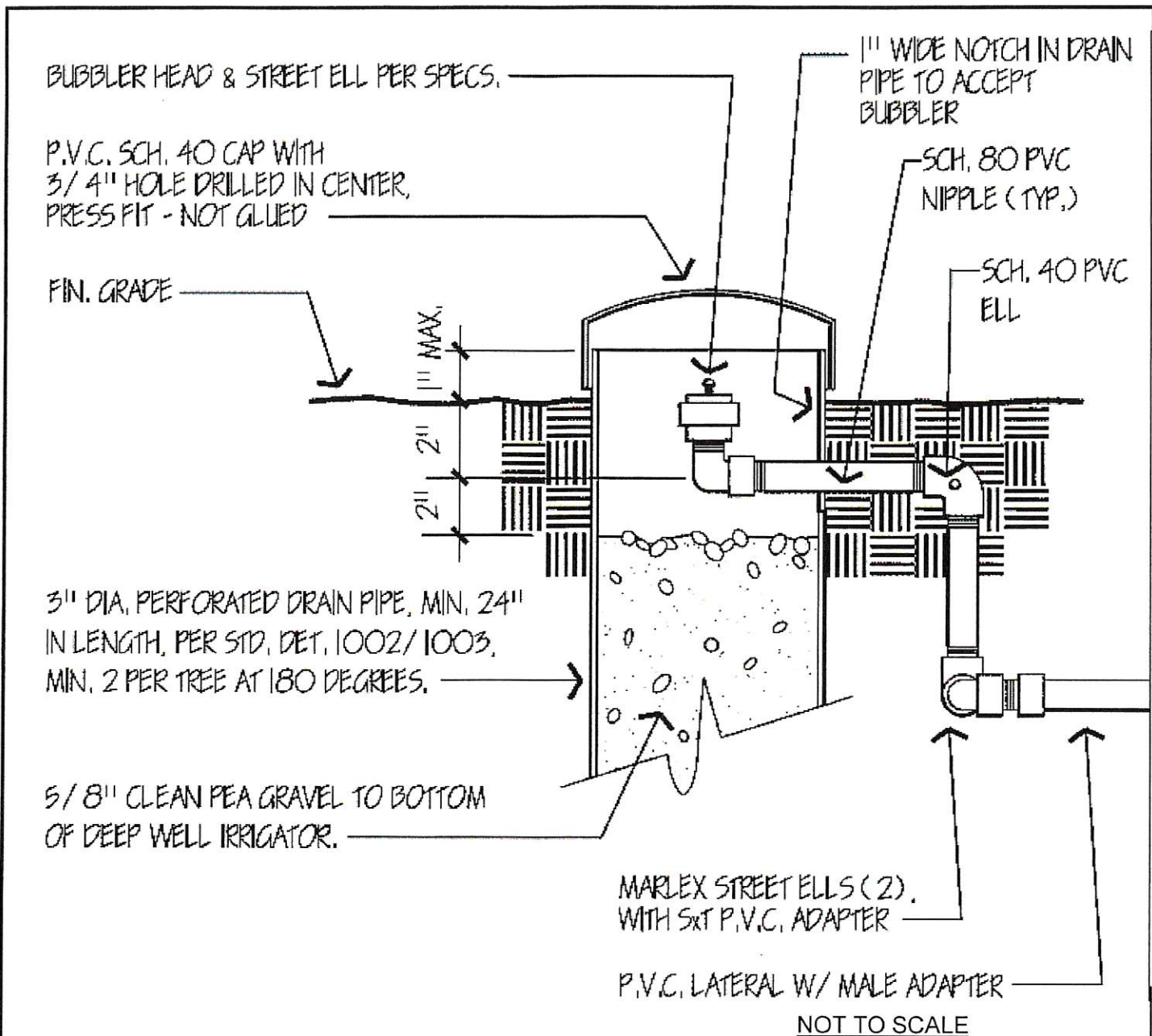
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Approved	Date
P.V.	5/7/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

REMOTE CONTROL VALVE "IN-LINE"

Detail No.
2010



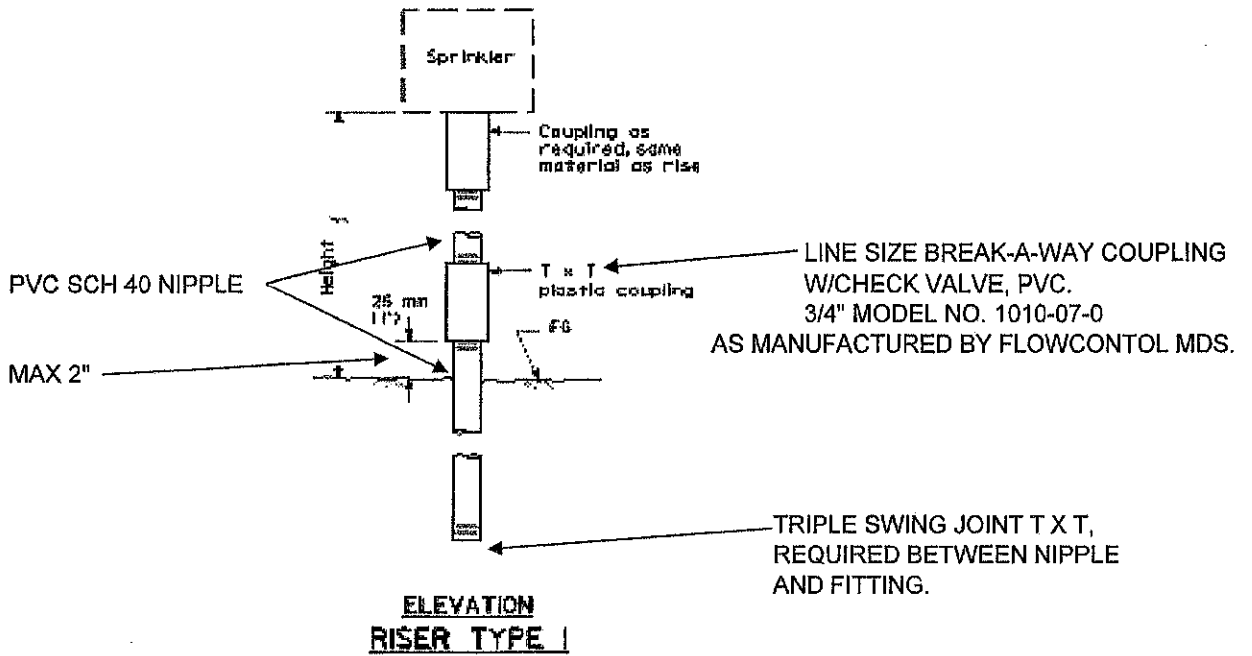
Construction Notes

- 1) Each tree shall have a minimum of two deep well irrigators.
- 2) The deep well irrigators shall be irrigated separately from shrub and turf area's.
- 3) Use pre-set bubblers only, adjustable flood bubblers will not be accepted.
- 4) The use of Rainbird RWS-BCG02 Root Watering System in place of drain pipe and rock is acceptable.

Approved	Date
P.V.	5/6/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
DEEP WELL IRRIGATOR

Detail No.
2011



Construction Notes

- 1) The risers shall be Sch. 40 PVC threaded at both ends.

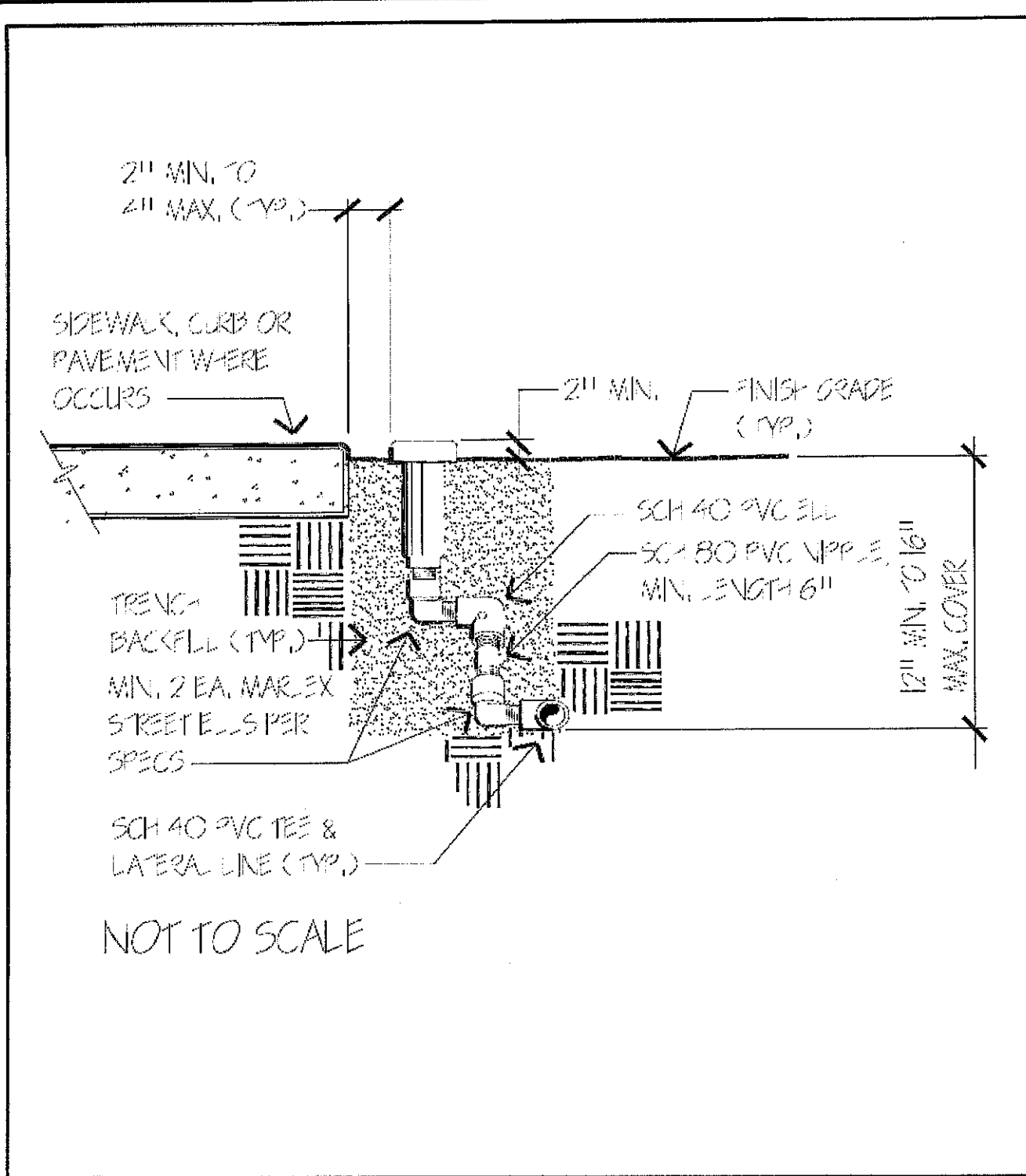
NOT TO SCALE

Approved	Date
P.V.	5/9/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

SHRUB RISER EXTENSION (TYPE 1)

Detail No.
2012



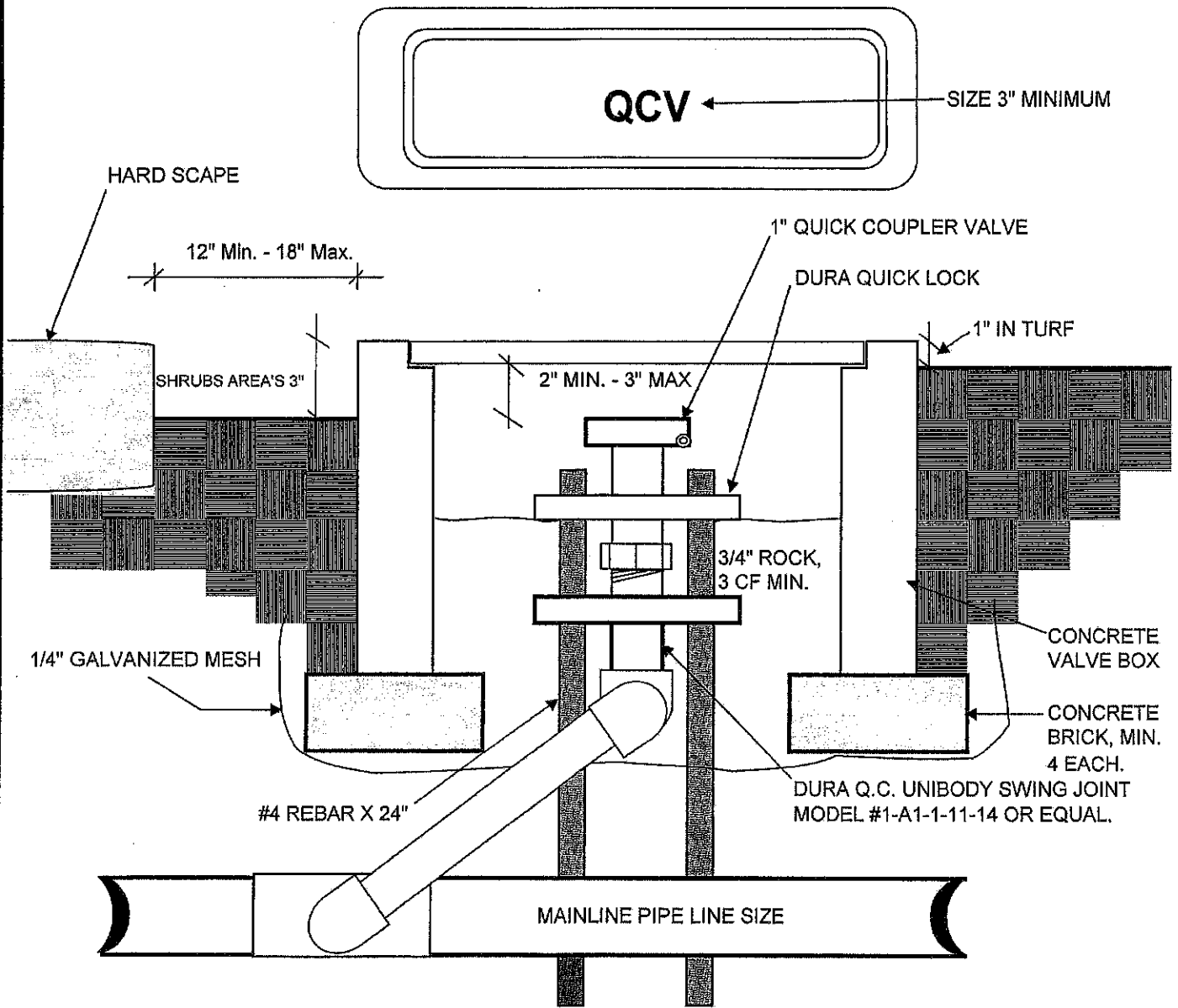
Approved	Date
P.V.	5/23/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

TYPICAL IRRIGATION SPRAY HEAD DETAIL

Detail No.
2013

TOP VIEW



Construction Notes

- 1) The contractor shall ensure that the hexagons between the quick lock and the swing joint are aligned.
- 2) All boxes shall have a minimum 3' foot space between each other.

NOT TO SCALE

Approved	Date
P.V.	5/27/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

QUICK COUPLER IN VALVE BOX

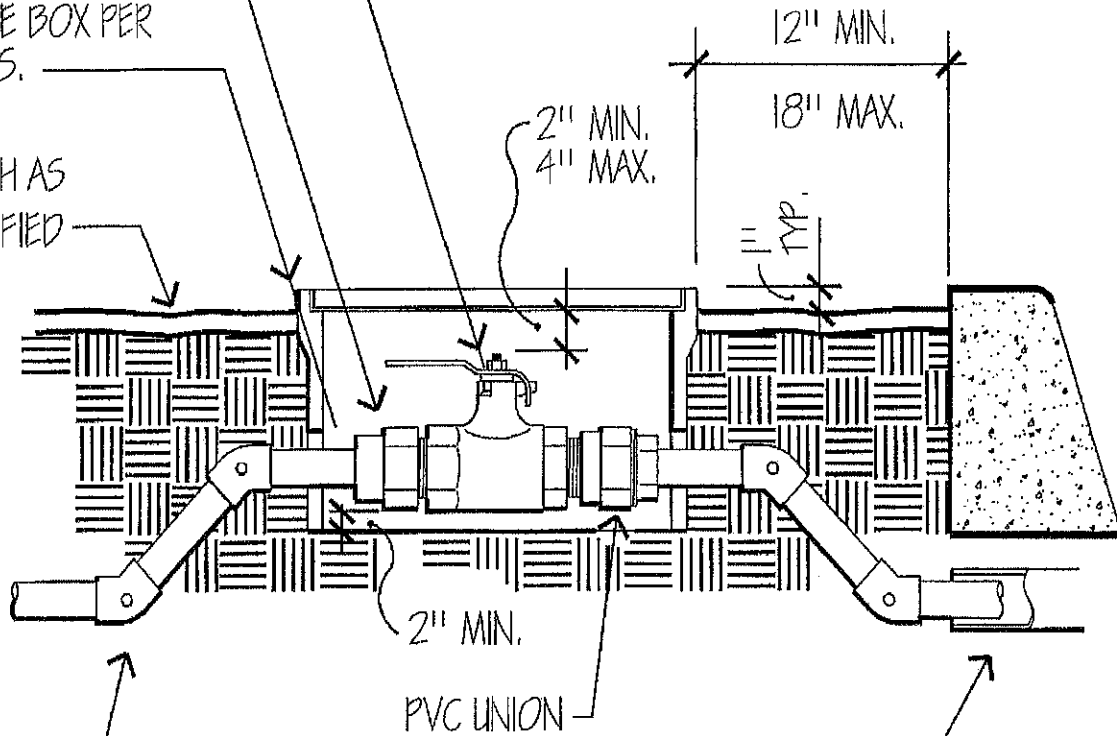
Detail No.
2014

P.V.C. MALE
ADAPTER

VALVE BOX PER
SPECS.

MULCH AS
SPECIFIED

ISOLATION VALVE
PER SPECS



WHERE PIPE GRADE MUST CHANGE
IN LESS THAN 10' HORIZONTAL
DISTANCE, USE 45 DEGREE ELL
FITTINGS

SCH 40 PVC SLEEVE WHERE
UNDER PAVEMENT

NOT TO SCALE

Construction Notes

- 1) Isolation valve must be Nibco T-113-K Gate Valve.
- 2) Where pipe depth must change, use 45 degree elbows.
- 3) A minimum of 2 CF. of 3/4" gravel rock shall be placed under valve in box.
- 4) Install valve box so that the box does not rest on any lateral or main lines.
- 5) Provide minimum 3' clear distance between valve and wire boxes.

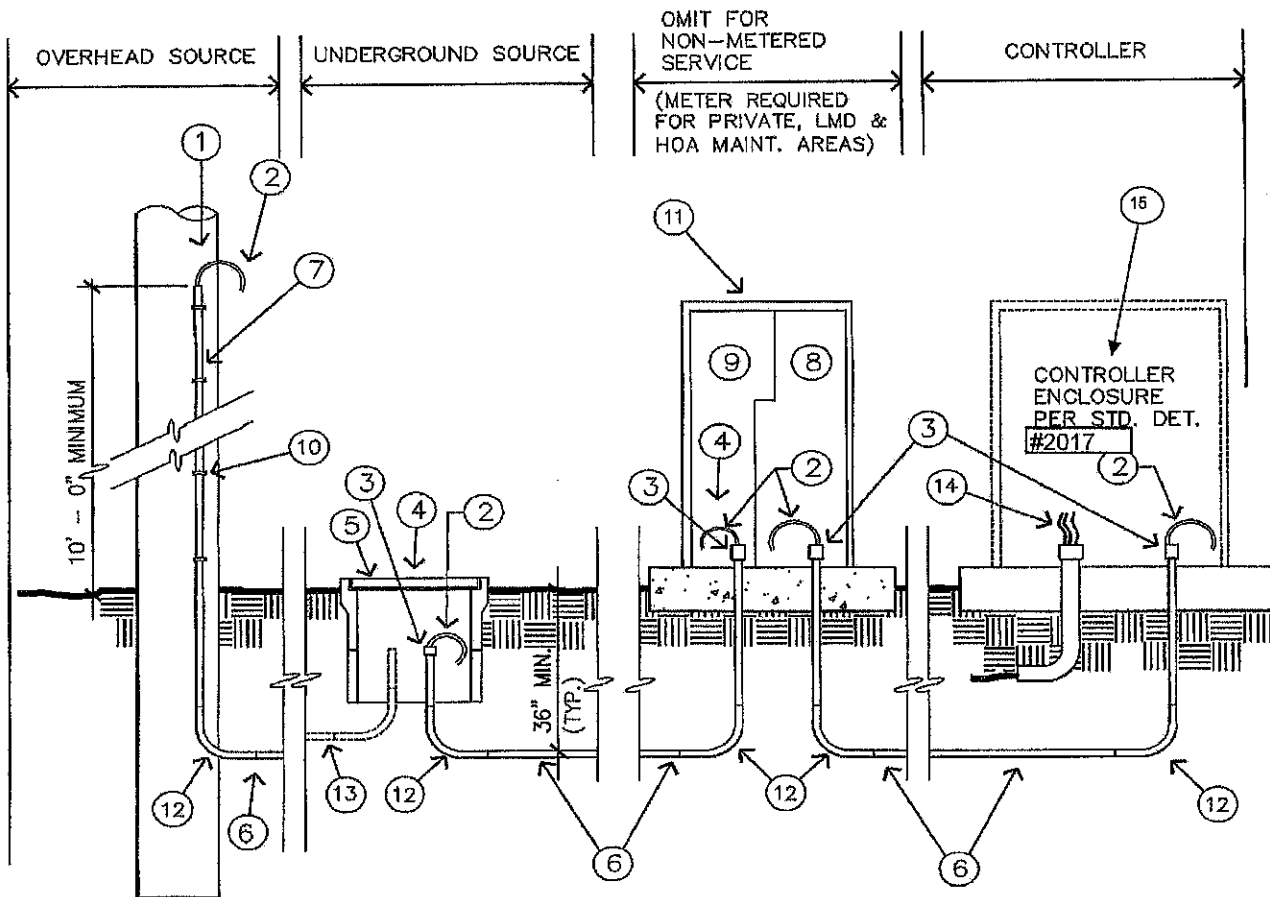
Approved	Date
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Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

ISOLATION VALVE IN BOX

Detail No.

2015



NOT TO SCALE

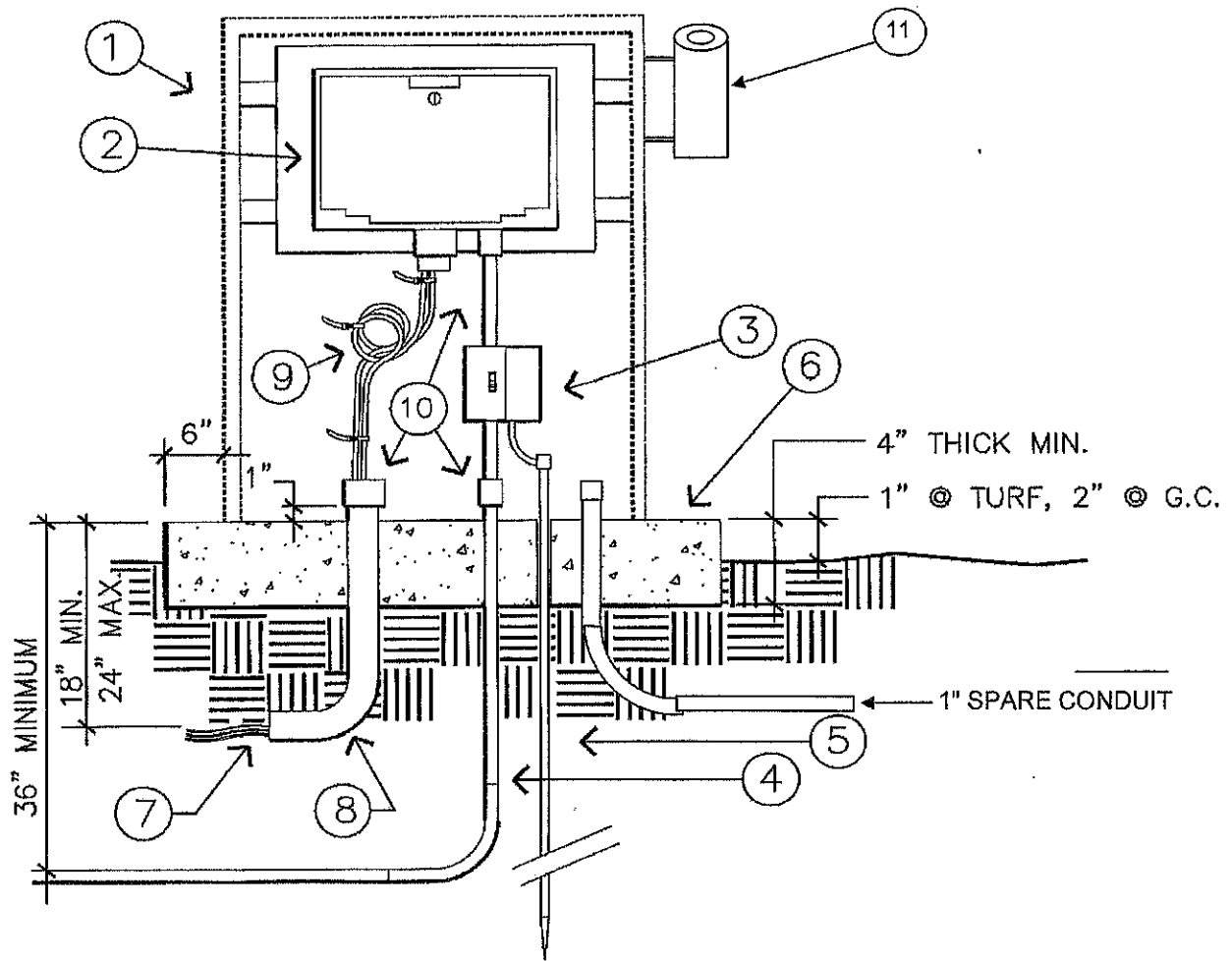
CONSTRUCTION NOTES:

- 1) COORDINATE W/UTILITIES-ELECTRIC (951) 826-5393 FOR RISER LOCATION ON POLE.
- 2) 3-#8 CU THW WIRES. CONTRACTOR TO PROVIDE SUFFICIENT WIRE LENGTH BEYOND END OF CONDUIT TO REACH OVERHEAD SECONDARY LINES FOR OVERHEAD SERVICE AND TO PROVIDE 2 FEET OF WIRE BEYOND CONDUIT END AT UGS BOX & 4 FEET OF WIRE AT METER AND CONTROLLER. IDENTIFY NEUTRAL.
- 3) PROVIDE INSULATING BUSHING, TERMINATE CONDUIT PER UTILITIES SPEC. UGS-311.
- 4) P.U. ELECTRIC WILL MAKE SERVICE CONNECTIONS IN UGS BOX FOR NON-METERED SERVICE, AND WILL MAKE CONNECTIONS AT UGS BOX
- 5) ELECTRIC SERVICE BOX, SIZE PER PUBLIC UTILITIES STANDARDS.
- 6) MIN. 2" SERVICE CONDUIT PER CITY STDS.; DB BELOW GRADE, HDG ABOVE GRADE, HDG WRAPPED SWEEPS.
- 7) LINE SIZE HDG CONDUIT WITH 3-#8 CU THW WIRES, PER UTILITIES STANDARDS. ID NEUTRAL.
- 8) LOAD SECTION.
- 9) SERVICE SECTION.
- 10) MINIMUM 3 PIPE STRAPS
- 11) METER PEDESTAL PER E.U.S.E.R.C. DRAWING #308. SUBMIT CATALOG CUTS TO P.U.-UTILITIES FOR APPROVAL PRIOR TO INSTALLATION.
- 12) LINE SIZE WRAPPED HDG SWEEP ELL, MIN. 9" RAD. (TYP.)
- 13) EXISTING SERVICE CONDUIT.
- 14) LOW VOLTAGE IRRIGATION CONTROL WIRE & CONDUIT PER PUBLIC WORKS STD. SPECS.
- 15) USE CONTROLLER ENCLOSURE DETAILS #2017 OR #2018 AS REQUIRED PER PROJECT.

Approved	Date
P.V.	5/27/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
NON-METERED / METERED ELECTRIC SERVICE

Detail No.
2016



CONSTRUCTION NOTES:

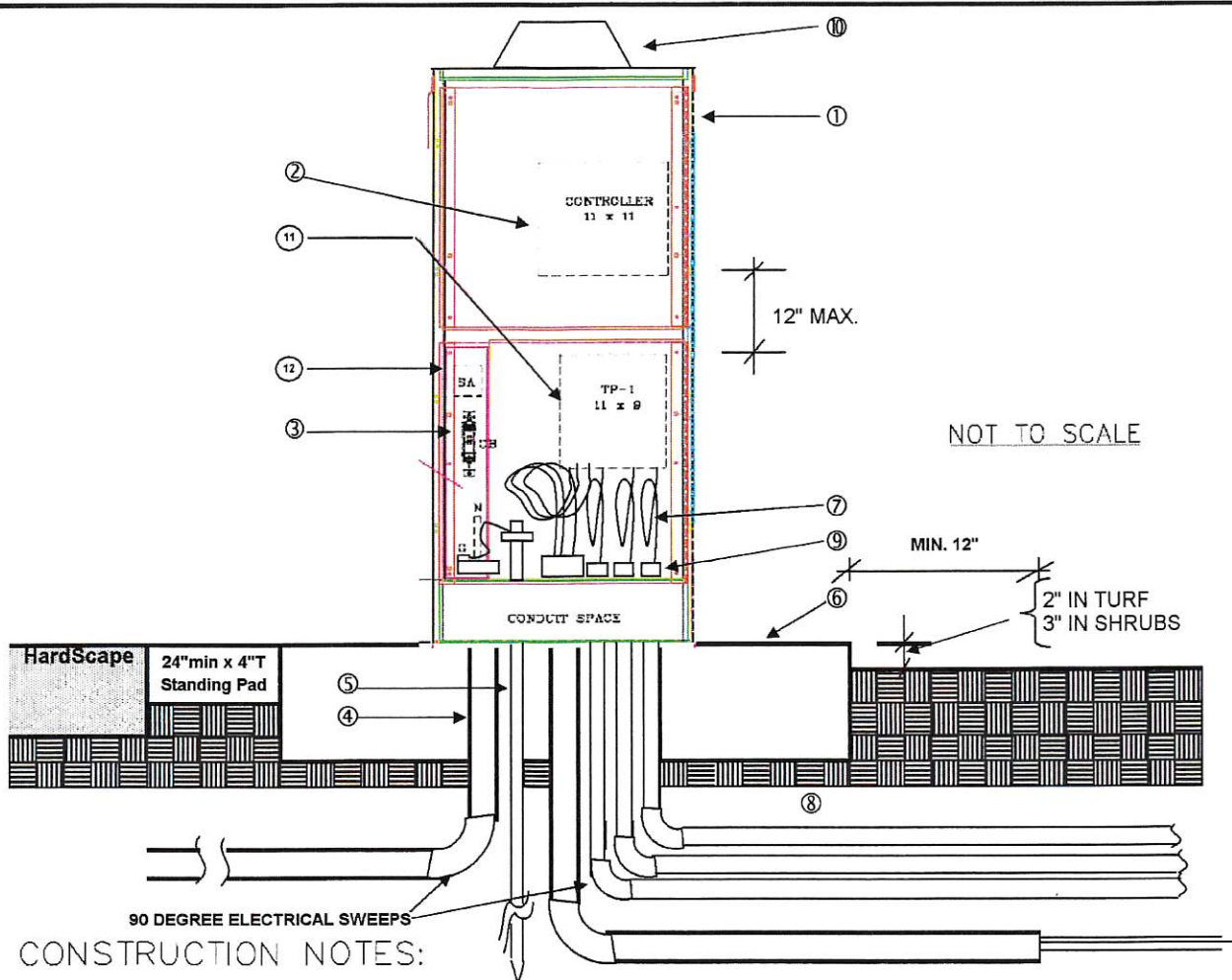
NOT TO SCALE

- ① STAINLESS STEEL ENCLOSURE PER PUBLIC WORKS STDS., MODEL SIZE TO FIT CONTROLLER, WITH SERVICE ADDRESS STENCILED ON LOCKING HINGED DOOR. SECURELY ANCHOR ENCLOSURE TO CONCRETE PAD.
- ② WEATHER PROOF AUTOMATIC IRRIGATION CONTROLLER PER PUBLIC WORKS STDS., SECURELY WALL MOUNTED TO ENCLOSURE.
- ③ SQUARE D BREAKER BOX MODEL Q02-4L70S, OR APPROVED EQUAL WITH SINGLE 15 AMP BREAKER. MAKE 120 V POWER AND GROUND CONNECTION AT BREAKER BOX. MOUNT IN ENCLOSURE.
- ④ 3 - #8 CU COPPER WIRES IN MIN. 2" SCH 40 PVC CONDUIT FROM CONTROLLER TO POWER SOURCE. BOND SERVICE TO BREAKER BOX.
- ⑤ #8 CU COPPER WIRE AND 5/8" BY 8' LONG DRIVEN COPPER GROUNDING ROD WITHIN ENCLOSURE. DRIVE ROD PRIOR TO INSTALLATION OF ENCLOSURE.
- ⑥ CONCRETE PAD, EXTEND SUFFICIENT DISTANCE IN FRONT OF ENCLOSURE TO ALLOW UNOBSTRUCTED AREA FOR DOOR SWING FREE OF PLANTINGS, 6" MIN. BEYOND ENCLOSURE ON ALL SIDES.
- ⑦ LOW VOLTAGE DIRECT BURIAL WIRES TO CONTROL VALVES.
- ⑧ 90 DEGREE WRAPPED HDG SWEEP ELL, SIZED TO FIT WIRE FOR NUMBER OF STATIONS ON THE CONTROLLER, PLUS SPARES AND COMMON.
- ⑨ THREE FOOT EXPANSION LOOP OF CONTROL WIRE, NEATLY LACED WITH ZIP-LOCKS. MAKE CONNECTIONS DIRECTLY TO IRRIGATION CONTROLLER TERMINALS FOR 12 STATION & SMALLER. USE TERMINAL STRIPS FOR CONTROLLERS LARGER THAN 12 STATIONS.
- ⑩ PROVIDE INSULATING ELECTRICAL BUSHINGS AT CONTROLLER AND END OF CONDUITS.
- ⑪ RAIN GAGE INSTALLED IN PROTECTIVE COVER ON CONTROLLER OR MOUNTED ON 12' POLE PER PLANS. PROTECT FROM SPRINKLER OVER SPRAY.

Approved	Date
P.V.	5/27/08
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
NON-CALSENSE IRRIGATION CONTROLLER

Detail No.
2017



CONSTRUCTION NOTES:

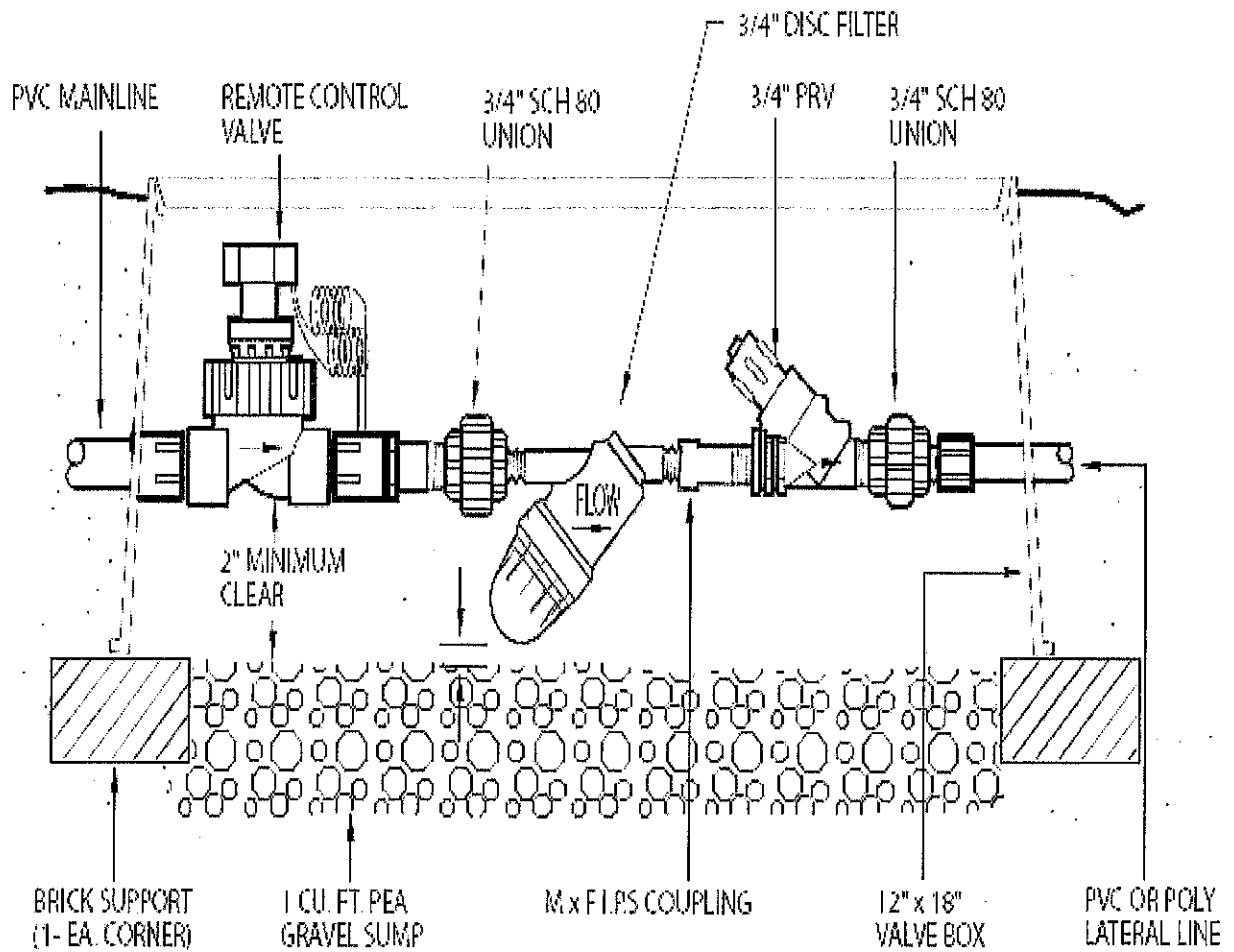
- ① MYERS POWER PRODUCTS CAT. No. MEUG22X-ENC-RIV S.S. ENCLOSURE TO SUPPORT ALL MATERIALS REQUIRED BY ALL CITY AGENCIES OR EQUAL. ENCLOSURE SHALL BE MOUNTED ON A MYERS PADMOUNT BASE (PART NUMBER 519100) ENCASED CONCRETE.
- ② CALSENSE CONTROLLER AS SPECIFIED ON THE LEGEND AND OR SPECIFICATIONS, WEATHER PROOF AUTOMATIC CONTROLLER, WALL MOUNT TYPE, SECURELY MOUNTED TO THE ENCLOSURE.
- ③ SQUARE-D 15 AMP SINGLE BREAKER BOX. MAKE 120v. POWER AND GROUND CONNECTION AT BREAKER BOX THEN TO TP-110 SURGE PROTECTION DEVICE.
- ④ 3-#8 CU THW WIRES IN MIN. 2" SCH 40 PVC CONDUIT FROM CONTROLLER TO POWER SOURCE. BOND SERVICE TO BREAKER BOX.
- ⑤ #8 CU COPPER GROUND WIRE AND MIN. (1) 5/8" BY 8' LONG DRIVEN COPPER GROUNDING ROD WITHIN ENCLOSURE. DRIVE ROD PRIOR TO INSTALLATION OF ENCLOSURE.
- ⑥ CONCRETE PAD, EXTEND EDGE MIN. 8" FROM ENCLOSURE TO ALLOW UNOBSTRUCTED AREA FOR DOOR TO SWING FREE. MIN. 6" THICK. NO PLANTING WITHIN 15" FROM THE FOOTING ON ALL SIDES.
- ⑦ LOW VOLTAGE ELECTRICAL SWEEP TO EXTEND MIN. 12" FROM EDGE OF FOOTING. THREE FOOT EXPANSION LOOP ON ALL CONTROLLER WIRES, RAIN BUCKETS, ET-GAUGE, AND FLOW-SENSORS NEATLY LACED WITH ZIP-LOCKS. MAKE CONNECTION TO TP-1 BOARD
- ⑧ THE ET-GAUGE, RAIN BUCKET, AND FLOW SENSOR CONTROL WIRES SHALL BE INSTALLED IN SCH 40 GRAY PVC CONDUIT, AS A CONTINUOUS RUN.
- ⑨ PROVIDE INSULATING ELECTRICAL BUSHINGS AT CONTROLLER END OF CONDUITS.
- ⑩ LR-DOME-RR ANTENNA
- ⑪ TP-1 BOARD. THE DISTANCE BETWEEN THE CONTROLLER AND THE TP-1 BOARD SHALL NOT EXCEED 12".
- ⑫ TP-110 LINE SURGE PROTECTOR

(INSTALLATION SHALL BE CERTIFIED BY THE CONTROLLER MANUFACTURER IN WRITING)

Approved	Date
P.V.	5/27/08
Revised	Date
P.V.	12/18/08

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
IRRIGATION CONTROLLER (NON-METERED) DETAIL (CS)

Detail No.
2018



Construction Notes

SET IN JUMBO BOX
 PRESSURE RELIEF VALVE FACING UPWARD

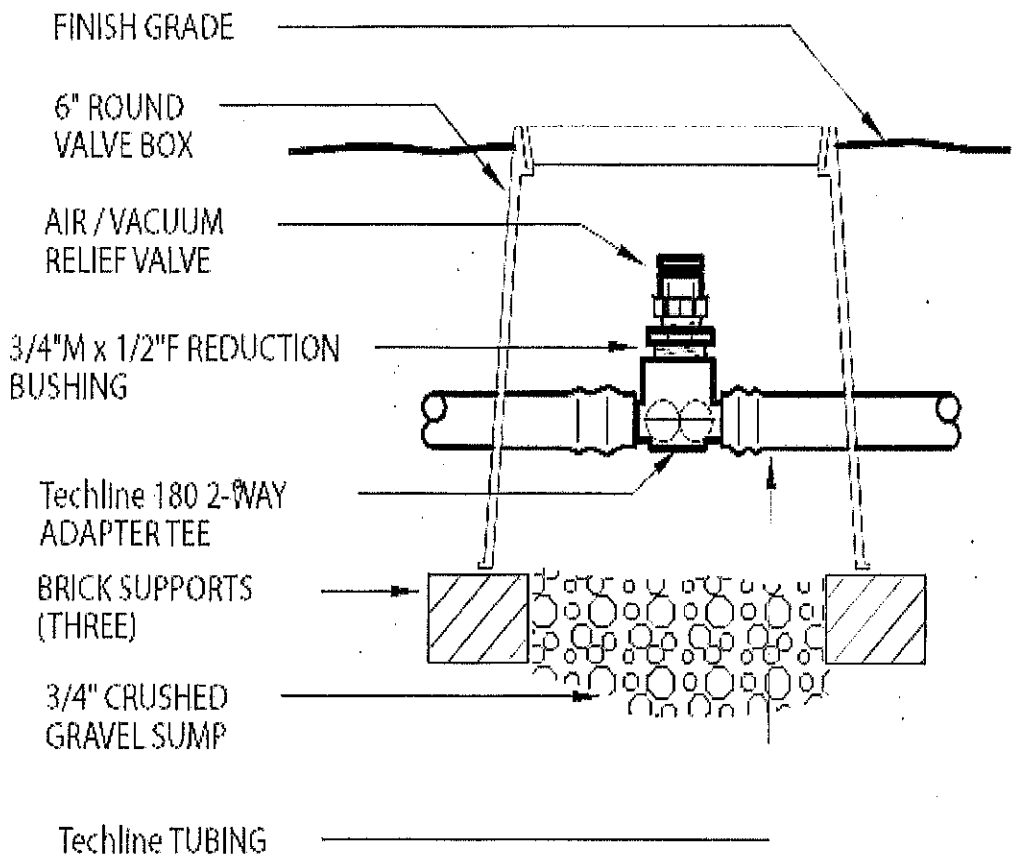
NOT TO SCALE

Approved	Date
P.V.	5/27/08
Revised	Date

Public Works Department, Forestry and Landscape Division
 CITY OF RIVERSIDE

NETAFIM TYPICAL DRIP VALVE KIT DETAIL

Detail No.
2019



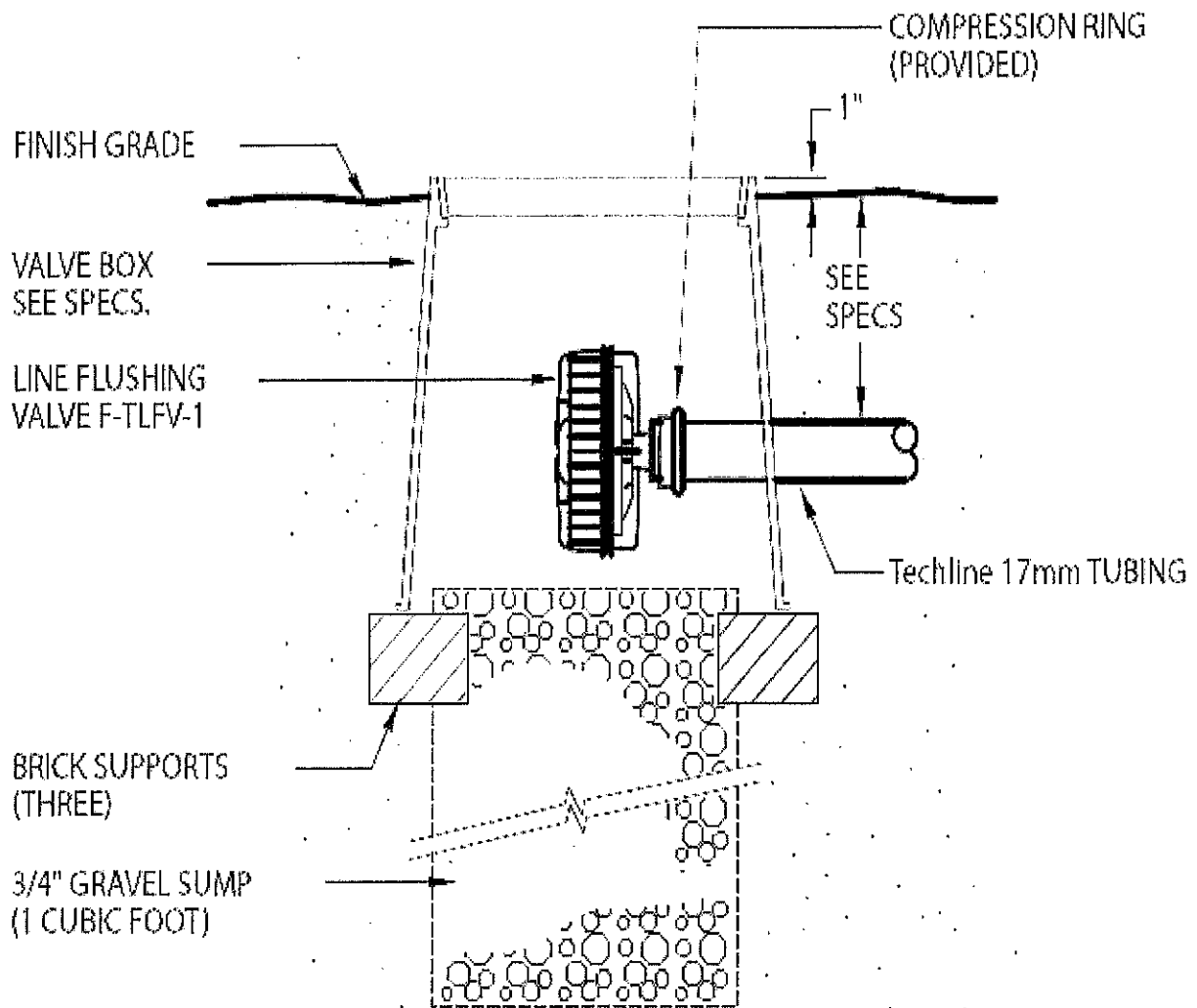
NOT TO SCALE

Approved	Date
P.V.	5/27/08
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Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE

NETAFIM TYPICAL AIR/VACUUM RELIEF VALVE

Detail No.
2020

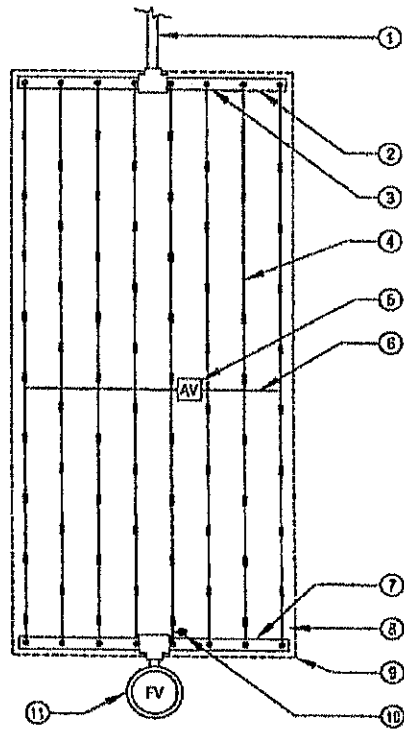


NOT TO SCALE

Approved	Date
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Revised	Date

Public Works Department, Forestry and Landscape Division
 CITY OF RIVERSIDE
NETAFIM TYPICAL LINE FLUSHING VALVE

Detail No.
2021



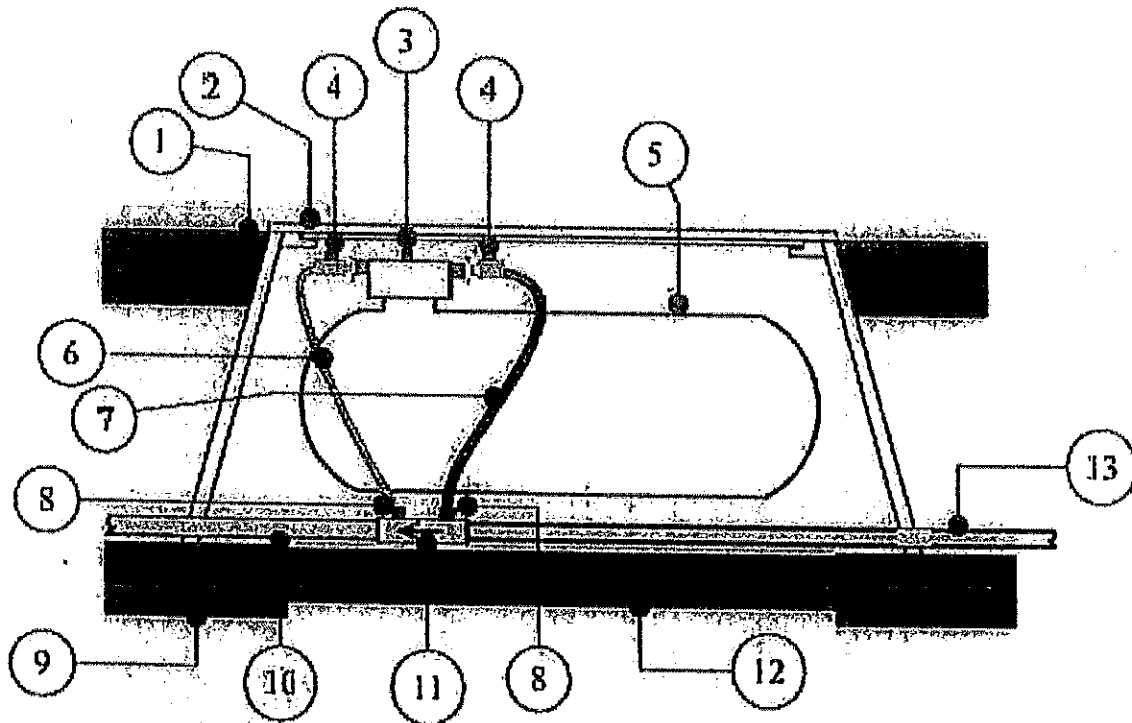
PLAN
NOT TO SCALE

- ① PVC LATERAL LINE FROM DRIP ZONE KIT.
- ② PVC SUPPLY MANIFOLD
- ③ MANIFOLD-TO-ELBOW CONNECTION
- ④ NETAFIM TECHLINE
- ⑤ NETAFIM AIR/VACCUUM RELIEF VALVE
- ⑥ AIR/VACCUUM RELIEF LATERAL
- ⑦ PVC FLUSH MANIFOLD
- ⑧ PERIMETER LATERALS 2" TO 4" FROM EDGE
- ⑨ AREA PERIMETER.
- ⑩ NETAFIM OPERATION INDICATOR (OPTIONAL)
- ⑪ NETAFIM FLUSH VALVE PLUMBED TO FLUSH MANIFOLD AT LOW POINT.

Approved	Date
R.F.	3/21/12
Revised	Date

Public Works Department, Forestry and Landscape Division
CITY OF RIVERSIDE
NETAFIM TYPICAL END-FEED LAYOUT

Detail No.
2023



NOT TO SCALE

- 1) Finish Grade to top of valve box shall be min. 1" in turf and min. 3" in shrub areas.
- 2) Concrete valve box with locking non-hinged cast iron cover, min 17"L x 12"D x 1 1/4"W inside dimensions.
- 3) Proportioning cap with feed adjustment.
- 4) Ez-Flo shut off valves
- 5) Ez-Flo fertilizer injector system as required by EZ-Flo
- 6) Fertilizer Out - Connect clear tube to green connections on proportioning cap and coupling
- 7) Water In - Connect black tube to blue connections on proportioning cap and coupling
- 8) 1/4" Tubing Clamp - Both the green and blue coupling tubing connections
- 9) Concrete Brick Min. 4ea.
- 10) PVC Sch 40 main line size, to valve manifold.
- 11) EZ Coupling Connector - Install according to water flow direction arrow
- 12) Pea Gravel (Min. 1 CU. FT.).
- 13) PVC Main line from back flow preventor.

Construction Notes

- A) Items 3 thru 8 are included with the EZ-Flo system. Item 11 is purchased separately.
- B) The installation shall be certified in writing by EZ-Flo Fertilizing Systems, Inc.
- C) A Min. 3' separation between Injector and other irrigation components is required.

Approved	Date
R.F.	3/21/12
Revised	Date

Public Works Department, Street Services Division
CITY OF RIVERSIDE

EZ-FLO TYPICAL FERTILIZER INJECTOR 1.5G

Detail No.
2024