

4 - LANDSCAPING STANDARDS

4.01 PUBLIC RIGHT-OF-WAY STREET TREE PLANTING

Trees shall be planted from a minimum 15-gallon container and be of a size not less than 5 feet in height nor less than 3/4 inch in diameter. Trees shall have a healthy root system that is established in its container. The roots shall not be circled in the container. Trees shall have a single trunk with vertical leader branches that have not been "topped". Tree shall be free from pests, dead and damaged branches or trunks. When 24-inch box container size trees are required, trees shall be a minimum of 8 feet tall and have a minimum trunk diameter of 1¾ inches.

The 15-gallon tree shall be planted in a hole that is a minimum of 24 inches square by 24 inches deep. In severely compacted or layered soil it will be necessary to break the continuity of the hardpan, clay pan or compacted layer by digging deep enough to penetrate below the pan or compacted layer. The excavation material in most cases can be returned to the hole. For 24-inch box container size trees the planting hole shall be a minimum of 36 inches square and at a minimum depth of 24 inches or deeper in order to accommodate the root ball.

Root barriers shall be installed whenever adjacent sidewalk and or curb are replaced. Root barrier shall be placed in the trench created alongside the new, or existing sidewalk and curb. The barrier shall be a continuous length and shall extend from ½" above finished soil grade downwards to a minimum depth of 12" adjacent to the sidewalk and 18" adjacent to the curb. Root Barriers shall be the Deep Root Barrier panel LB12-2 and UB18-2, or acceptable equivalent. Refer to Manufacturer's Specifications for all other applicable requirements.

Trees shall be planted in original soil material unless otherwise required by the City Engineer. Trees shall be set 2 inches higher than grown at the nursery.

Install two deep watering perforated plastic pipes as shown on City Standard Plan T-1. Fill pipes with 3/4-inch clean drain rock.

Trees shall be staked as indicated below:

- **Double stake support system** - Two 2-inch diameter by 8 foot minimum lodge pole pine stakes or approved equal and spaced with a Mission Manufacturing tree stake stabilizer or approved equal. Stakes shall be pressure treated with a wood preservative material. Trees shall be tied with a 24-inch minimum GroStrait tree ties or approved equal.

Exact location of trees shall be determined by the Parks and Recreation Services Department. Tree spacing varies depending on type. Trees shall be located a minimum 20 feet from curb returns, 15 feet from street lights, 6 feet from driveways, 8 feet from all utility boxes, and 10 feet from sewer laterals and water facilities.

When the area between the curb and the sidewalk contains a concrete or similar hard surface, a minimum 40 inches square opening around the tree shall be maintained.

Tree species designated for each street are on file at the Parks and Recreation Services Department Office. Large tree types shall not be planted when overhead utilities are present or when it is determined by the City that inadequate planting space is available.

Newly planted trees shall be watered deeply during the dry season or twice a week by the property owner or occupant. Water for approximately ten minutes with a hose adjusted to very low pressure (approximated 10 gallons). The root ball of the tree shall be thoroughly soaked. The two deep watering perforated pipes that have been installed shall be used to get water

down to the root ball. Deep watering will encourage the roots to go deep into the soil away from paved surfaces.

4.02 PUBLIC RIGHT-OF-WAY LANDSCAPE SPECIFICATIONS

4.02.01 GENERAL REQUIREMENTS

All landscape construction plans shall have been approved by the City of Napa Parks and Recreation Services Department. A pre-construction conference must be scheduled with the Parks and Recreation Services Department prior to the start of the landscape installation.

4.02.02 REQUIRED INSPECTION POINTS

During the course of construction, approval of City Engineer shall be required as follows:

APPROVAL REQUIRED ON	PRIOR TO
Electrical Installations	Covering Trenches and Connection
Irrigation Mains and Laterals	Covering Joints
Fine Grading	Planting
Plant Materials	Installation

4.02.03 SITE PREPARATION AND GRADING

Clearing and grubbing shall include the removal of the vegetation, asphalt, concrete and other debris from the site. Tree stumps, roots and other unsuitable material shall be removed to a depth of 12 inches below the finished grade.

Curb, gutter and sidewalk which is required to be removed shall be cut to minimum depth of 1½ inches with an abrasive type saw, on a score line, and the entire section shall be removed.

Removing concrete shall conform to the provisions in Section 15-1.03B of the Standard Specifications.

The Contractor shall roto-till or otherwise cultivate soil to remove the existing vegetation from the site.

All utility and valve boxes shall be adjusted to meet the finished grade of the site. All finished soil grades shall be one inch below sidewalk or curb level and shall not create run-off into adjacent properties.

4.02.04 IRRIGATION PIPING AND ELECTRICAL SYSTEMS

A. Materials

Sprinklers: Rainbird 1800 series or approved equal.

Gear Drive rotors: Hunter I-40, I-20

Bubblers: Rain Bird 1400 series or approved equal.

Subsurface Dripline: Rain Bird XFS Subsurface Dripline

Automatic Remote-Control Valve: Hunter ICV Series valve or approved equal centered in approved valve boxes. Each valve shall have a polyurethane tag with station identification number. Tag shall be Christy's ID-STD-Y1 or approved equal.

Remote Control Valve Boxes: Carson Industries Model 1419-12 with 1419-4B (bolt down) lid marked "Irrigation". Color shall be green for potable water and purple for reclaimed water applications.

Gate Valve: Three inches and smaller shall be Nibco T-113 or approved equal. Four inches and larger shall be Nibco F-619 –RW series as specified.

Master Valve/Flow Sensor Assembly: Site One Green Tech (Part No. FSAV- series) Superior Master Valve Model No. 3100/Data Industrial Flow Sensor.

Backflow Preventer: To be approved by the Parks and Recreation Services Department's Cross Connection Specialist. Wilkins 975 XL reduced pressure / 950 XL double check or equal approved by California Department of Health. Installed with Wilkins Model No. 500XL Pressure Reducer Valve on services of 80 PSI or greater. Polar Parka backflow insulation is required.

Backflow Preventer Enclosure Strong Box: Model BC-CR.

Pressure Regulator: Wilkins Model No. 600 regulator to be used whenever the system pressure exceeds manufacturer specifications for sprinkler performance.

Quick Coupler Valves: Model 44 Rainbird or equal installed in Carson 910-12B box with bolt down lid. Coupling valve must be capable of receiving RB44K keys.

Irrigation Piping: Schedule 40 PVC

Electrical Conduit: Gray schedule 40 PVC.

PVC Primer & Pipe Cement: Weld-On P-70 primer with Weld-On 711 heavy bodied medium setting PVC pipe cement.

Controller: Rain Master DX series satellite controller for central system. Hunter I-CORE series for non-central system. Hunter XC HYBRID or Hunter NODE series for battery operated applications.

B. Installation

The Contractor shall install the irrigation and electrical systems in accordance with the approved plans, each controller cabinet shall contain a GFI electrical receptacle. All work and installations shall be in accordance with the California Plumbing Code, the National Electric Code and the local regulations.

Irrigation systems shall be installed to provide full coverage of all landscaped areas. If areas are receiving insufficient coverage, the contractor shall adjust and/or reinstall the system to provide proper coverage.

Trenches shall be straight with bottoms of uniform slopes. The bottom of the trench shall be undisturbed native material or imported material compacted. Main lines shall be installed with a minimum cover of 18 inches. A minimum of 1-inch vertical clearance shall be maintained between lines which cross. No line shall be installed parallel to and directly over another line. All lines, when passing under areas that are to be paved, shall be placed in a P.V.C. conduit sleeve.

All main lines shall be placed on sand bedding, a minimum of 2 inches thick.

Irrigation control wires shall be installed in the same trench as irrigation pipe, maintaining a 2-inch clearance at pipe joints. Control wires are to be on the same level as (not on top of) irrigation pipe. Irrigation control wire shall be bundled and taped at 6-foot intervals. There shall be a minimum of 36 inches for each wire coiled inside each valve box. Irrigation pipe is to be installed with identifying marks visible for inspection.

A minimum of 5 inches of sand shall be placed over the lines. Native material may be used for remainder of the backfill.

The entire irrigation system shall be thoroughly flushed with water to remove dirt scale and foreign material of any nature prior to the pressure test.

Prior to backfilling, the main lines shall be filled with water. The irrigation system shall not leak and a pressure test of 125 psi for a period of 2 hours, shall be maintained on the entire system.

Control and common ground wire shall be type UF600V with a minimum 1/16-inch insulation or of a type approved by the governing electrical code for underground direct burial for Class 2 wiring for 24 volt, 60 cycle A.C. Direct lines shall be No. 14-1 AWG-UF, black. Common lines shall be No. 14-1 AWG-UF, white. All control and common ground wires shall be placed in minimum 1½-inch PVC conduit when passing under areas that are to be paved. All 24-volt splices shall be made using 3M Company No. DBR/Y-6 Splice Kit, or approved equal. Install spare control wires of a different color along entire main line. Loop 36-inch excess wire into each single valve box. Minimum of two spare wires per controller.

Galvanized pipe or fittings will not be permitted in the system.

The control and quick coupler valves shall be installed as shown on the approved plans. The valve boxes shall extend from the finished grade to the bottom of the valve.

The electrical system shall be installed to properly operate the irrigation system.

The Contractor shall furnish and install all required materials and equipment to connect the system to electrical service point and water meters.

The Contractors shall furnish and install all required materials and equipment to install the controller in the cabinet.

Wiring for the remote control valves shall be in accordance with the manufacturer recommendations. Each master valve shall have a dedicated control wire and dedicated common wire.

The Contractor shall furnish a reproducible "as built" plan of the irrigation and electrical system.

The Contractor shall furnish applicable operating manuals, warranty cards for controllers, valves, backflow preventer and pressure regulators.

4.02.05 CENTRAL CONTROL SYSTEM SPECIFICATIONS

A. General

All materials furnished and installed shall be new and shall conform to the City of Napa Standard Specifications and Standard Plans, current edition, as adopted by the City.

All materials except interconnect conductors shall have a five-year limited warranty. The contractor shall submit proof of warranty to the City inspector prior to the start of the

maintenance period. It shall be the contractor's responsibility to obtain the necessary warranty inspections from the equipment supplier. No installation will be accepted without proof of warranty.

All existing and new computerized irrigation control system components shown on the plans shall be fully operational at final acceptance.

All incidental parts which are not shown on the plans or specified herein and are necessary to complete or modify the existing system shall be furnished and installed as though such parts were shown on plans or specifications. All systems shall be in satisfactory operation at the time of completion.

Existing interconnect systems shall be maintained in effective operation by the contractor for the duration of the work. The contractor shall notify the City inspector 48 hours prior to performing any work on an existing system.

The contractor shall coordinate with the local telephone company for connections to the service and/or installation of conduits, telephone conductors, jacks and modems at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no cost to the City. All changes to plans shall be approved by the City Engineer.

B. Products

Conduit

All central control system interconnect conduit and fittings shall be PVC schedule 40, 1-inch in size, unless otherwise noted.

All telephone service interconnect conduit and fittings shall be as approved by the local telephone company.

Conductor

The communication cable as required from the sub master satellite assembly to the other satellite assemblies on line shall be a 4 conductor shielded cable (Part No. EV-CAB-COM). Communication cable may be used to link satellites up to 5,000 feet from each other. Cable shall be installed in a gray 1-inch schedule 40 PVC.

The flow sensor wire as required from the flow sensor into the satellite assembly enclosure shall be a 2 conductor shielded cable (Part No. EV-CAB-SEN). The sensor cable may be used to connect the flow sensor to a satellite up to 2,000 feet from each other. Cable shall be installed in a gray 1-inch schedule 40 PVC. Each flow sensor cable shall be a continuous run.

All conductors shall be the same type and size shown on the drawings as required for proper operation of the system.

Wire Splices

Conductors shall be installed with **NO UNDERGROUND** splices unless absolutely necessary and unavoidable. Any and all underground splices that are required to be made must be approved by the City Inspector and shall be placed in a suitable type, 14 inch by 19 inch valve box for easy access.

Wire splices on the communication or sensor cable shall be made with a splice kit (3M Company Part No. 72-N1).

Pull Boxes

Pull boxes shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical action of soil. Pull boxes shall be a minimum size of 20 inches in length, 15.25 inches in width and 12 inches in height. In paved areas, the pull box shall be a concrete type with a cast iron lid.

Ground Rod

A 5/8-inch by 8 foot ground rod, clamp and No. 6 wire shall be provided at every satellite location. It shall be installed between 8' – 12' from enclosure, installed in a 10" round valve box.

All central control system equipment shall be grounded to conform to requirements of the National Electric Code; current edition as adopted by the City, and the manufacturer's specifications. No solder connection will be allowed. Resistance to ground shall be no more than 25 ohms.

Satellite Assembly

The number and location of the satellites shall be as shown on the drawings and shall be as manufactured by Rain Master.

All satellites shall be pre-assembled, hereafter referred to as Satellite Assembly, by Site One Green Tech in a top entry (SA6 series) or metered (SA5 series) "Strongbox" stainless steel weatherproof, vandal resistant, lockable enclosure manufactured by V.I.T. Products.

The satellite assembly shall consist of a stainless steel enclosure, stainless steel removable backboard, interconnect terminal strips, primary power voltage surge protection, on/off switch, a ground fault interrupt circuit, ground rod, wire and clamp.

The satellite assembly (Part No. SA6-RM4-XX/PHB or SA5-RM4-XX/PHB series) shall include a phone communication circuit board for communicating with the central computer by means of the telephone system.

The satellite assembly (Part No SA6-RM4-XX/RHG or RFL or SA5-RM4-XX/RHG or RFL series) shall include a radio communication circuit board for communicating with the central computer by means of a data radio. For proper antenna selection, contact Site One Green Tech at (888) 438-7435.

The satellite assembly (Part No. SA6-RM6 or SA5 series) shall include a hard wire communication circuit board for communicating with a submaster satellite assembly (Part Nos. SA6-RM4-XX/HWB, SA5-RM4-XX/HWB) when interconnected by means of hard wire (Part No. EV-CAB-COM).

The satellite assembly (where applicable) shall include a flow sensing assembly with a normally open master valve assembly option (Part No. FSAV series) for each point of connection (maximum of two per satellite/group) or a dual flow sensing assembly with master valves option (Part No. DFSAV series) for a single point of connection with a bypass to monitor very low and high flows.

The satellite assembly (where applicable) shall include a Rain Master PRO-MAX transmitter and built-in remote receiver with a controller access code (Part No. PMR) or PRO-MAX built-in receiver only with controller access code (Part No. PMR-CAC) whichever is applicable.

The satellite shall be covered by a five-year limited warranty.

C. Execution of Work

Interconnect Conduit

The interconnect conduit shall be located within the public right-of-way whenever possible. If the conduit is installed outside of the public right-a-way, an easement shall be provided to the City prior to installation.

Conduit runs shall be installed as shown in the approved plans. Any changes shall be approved by the City Engineer prior to installation.

The ends of the conduits, whether shop or field cut, shall be reamed to remove burrs and rough edges. Cuts shall be made square and true.

The ends of the conduit shall be capped until the pulling of wiring is started.

Conduit bends, except factory bends, shall have a radii of not less than six times the inside diameter of the conduit.

Conduit shall be installed at a depth of not less than 18 inches below finished grade.

Conduit shall be free of soil and debris.

A nylon or polypropylene pull rope with a minimum tensile strength of 500 pounds shall be installed in all conduits which are to receive future interconnect cable. At least 2 feet of pull rope shall be extended beyond each end of the conduit run and secured.

Interconnect Conductors

All interconnect conductors shall be pulled by hand.

A total of 3 feet of cable shall be left at each satellite assembly and pull box. Sufficient slack shall be left to allow the wire to extend 18 inches above the top of the pull box grade.

The interconnect wire shall be continuous from satellite to satellite. All splices shall occur within the satellite enclosure unless specifically authorized by the City Engineer. Splices shall be capable of satisfactory operation under continuous submersion in water.

Pull Boxes

Pull boxes shall be installed with a 36-inch loop inside the box, at intervals not to exceed 200 feet, at all changes in direction, and where the conduit crosses a roadway, bridge or railroad track.

Pull boxes shall be installed in area to be landscaped whenever possible.

The bottom of the pull box shall be bedded in crushed rock six inches deep prior to installation of the interconnect cable.

D. Equipment Supplier Support

- Review system and plans.
- Conduct one pre-construction meeting on site, for the contractor and owners' representative.
- Hook-up communication and flow sensor cable inside the assembly.
- Test to verify proper grounding.
- Field test for proper operation of the assembly components.

- Communication cable continuity and resistance test.
- Calibration of assembly flow sensing components (if applicable).
- Verify equipment conforms to and is installed in accordance with Site One Green Tech and Manufacturers specifications and recommendations.
- Perform functional test of system from a computer.
- Provide written certification letter.

4.02.06 LANDSCAPING MATERIALS

All trees/shrubs (all plant material) shall possess a County of Napa Agricultural Commission inspection stamp.

A. Soil Mix

Import soil mix shall consist of 50 percent loam and 50 percent nitrogen fortified redwood sawdust or approved equal.

B. Fertilizers and Soil Conditioners

Controlled release fertilizer for groundcover: 20-6-8 (N-P-K) or approved equal with a minimum of one percent iron.

Soil Amendment: Redwood sawdust – nitrogen stabilized or approved equal.

Controlled release fertilizer for trees and shrubs: 20-10-10 (N-P-K) or approved equal with calcium, sulfur and iron.

All fertilizers and soil conditioners shall be first quality, standard brand, and agricultural products.

C. Pre-emergent Herbicides

All herbicides must be approved by the Parks and Recreation Services Department and be registered for plant materials used. Applications must be performed in accordance with CDPR standards.

D. Compost

Available from Napa Garbage Company

All plant material shall be approved prior to installation by the Parks and Recreation Services Department, must be well suited to Napa's climate and require minimal water once live.

E. Trees

Fifteen-gallon trees with a root system established in its container a minimum of 6 months. Trees shall be not less than 5 feet in height, nor less than 3/4-inch caliper and shall not have evidence of stem damage, disease, fungus, root restriction or deformity. Additionally, no co-dominant stem growth shall be present; that is the tree shall possess one dominant stem with an internal branch structure.

F. Shrubs

Shrubs with a root system established in its container shall not have evidence of root restriction or deformity.

G. Ground Cover Plants

Ground cover plants shall be rooted plants grown in flats, unless otherwise approved in advance by the Parks and Recreation Services Department. Plants shall be full and compact.

4.02.07 SOIL PREPARATION

A. Weed and Debris Removal

All ground areas to be planted shall be cleaned of all weeds and debris prior to any soil preparation or grading work. Noxious weeds and grasses shall be removed by the roots wherever they are found at any stage of the work. Weeds and debris shall be disposed of off-site.

B. Moisture Content

Soil shall not be worked when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in the air or that clods will not break readily. Water shall be applied, if necessary.

C. Soil Loosening

Soil in all planting areas shall be cultivated to a depth of 8 inches below finish grade. Water shall be added and cultivating shall be continued until the entire 8-inch depth is loose and friable. All debris, concrete and rocks shall be removed to the 8-inch depth and shall be disposed off-site. No rocks or debris over 2 inches will be allowed to remain.

4.02.08 SOIL CONDITIONING

A. General

After soil preparation has been completed and the soil and water settled, high and low spots re-graded and the rough grade established, add soil amendments as indicated below and rototill, making repeated passes with the cultivator to the depth specified until the amendments have been thoroughly mixed.

B. Ground Cover Areas

Rototill 6 cubic yards nitrogen stabilized Redwood Sawdust or approved equal into the top 6 inches of soil at the specified rates per 1,000 square feet area.

C. Shrub Areas

Broadcast 3 cubic yards nitrogen stabilized Redwood Sawdust or approved equal and rototill into the top 3 inches at the manufacturer specified rates per 1,000 square feet of area.

Backfill all tree and shrub holes with soil from excavated hole.

D. Tree and Shrub Holes

Locate tree and shrub per the planting plan bringing any conflict with underground utility lines to attention of the City Engineer.

Holes shall be excavated to depth of the root ball and to a width twice the diameter of the root ball. In compacted soils, planting holes shall be excavated to a minimum depth of 1½ times the depth of the root ball. The sides and bottom of the hole shall be scarified before planting.

The Contractor shall place mulch to a depth of 4 inches on all shrub areas. The mulch shall cover all soil areas with the exception of the circular well formed around each plants drip line.

E. Finish Grading

When weeding, rough grading, and soil conditioning have been completed and soil has been thoroughly water settled, all planting areas shall be smooth graded, and ready for placement of plant materials.

Grading shall be done when soil is at optimum moisture content for working.

Grades not otherwise indicated shall be uniform slopes between points where elevations are given, or between points established by curbs. Finished grades shall be smooth, even and on a uniform plane with no abrupt change of surface. Minor adjustments shall be made if required. Finished grade shall be one inch below curb and sidewalk.

All grades shall provide for natural runoff of water without low spots or pockets. Flow line grades shall be accurately set and shall be not less than 2 percent gradient wherever possible.

4.02.09 TREE STAKING (OTHER THAN STREET TREES)

Trees shall be supported by double stakes as detailed on the standard plans. All stakes shall be at right angles to prevailing wind.

Wooden tree stakes shall be 8-foot minimum by 2-inch diameter round, pressure treated.

Stakes shall be set plumb. Tree ties shall be 24-inch minimum tire strap, "Gro Strait" or approved equal. Staking apparatus to be removed once the tree root system is well established. Follow the staking guidelines set forth in the latest edition ANSI A300 Standards – Part 6, Planting and Transplanting.

4.02.10 PLANTING

Plant materials shall not be installed until all construction work has been completed and sprinkler systems have been installed and tested. Planting areas shall have been graded and prepared as herein specified.

No planting shall be done during unfavorable weather.

All trees or shrubs shall be set so that, when settled, the natural grade at the top of container is at finished grade of the adjacent soil. No soil in muddy condition shall be used for backfilling. No filling will be allowed around trunks. The tree root flare shall be exposed at finished grade level.

All trees shall be staked per City Standard Plans T-1, T-2.

Trees planted in curb strips or near sidewalks shall be planted per City Standard Plans T-1, T-2.

Plants shall be irrigated to a depth of at least 18 inches.

Watering Basins: Form circular earth basin centered on the stem of each tree or shrub. The rim of basin shall be 4 inches above the grade at the trunk.

All plants shall be planted immediately after removal from the containers and containers shall be removed from the site so as to not present a hazard to persons using the area.

Upon completion of all planting operations, and again just prior to final inspection, all soil shall be lightly cultivated and neatly raked. Basins shall be left around trees and shrubs unless otherwise specified or directed.

All landscape areas must be treated with pre-emergent herbicides approved by the Parks and Recreation Services Department and registered for the plant materials that are planted in accordance with CDPR regulations.

4.02.11 ESTABLISHING MAINTENANCE PERIOD

As soon as all planting is completed, a planting review and preliminary inspection to determine the condition of the plantings will be held by the City Engineer upon request by the Contractor.

Upon approval of the work by the City Engineer and Parks, Trees & Facilities Manager, the 60-day maintenance period shall begin. Contractor is responsible for maintaining the plants and trees during the maintenance period.

4.02.12 MAINTENANCE

Continuously maintain all plantings in area, from the beginning of work, during the progress of work, for a minimum of 60 days after completion of all planting, and until final acceptance of all work.

Maintenance shall include continuous operations of watering, weeding, cultivating, edging, trimming, and fertilizing. Treatment of insect, disease, rodent, and any other pest control operations shall utilize Integrated Pest Management practices to assure good, normal growth.

Weed Control: All planting areas are to be treated for pre-emergent weed control with material approved by the Parks, Trees & Facilities Manager and at recommended label rates, uniformly distributed in accordance with CDPR regulations.

Planting areas shall be kept neat and free from debris at all times and shall be cultivated and weeded at not more than 10-day intervals. Planting areas shall be weed free at the end of the maintenance period.

Replacements: Immediately replace any plant materials that die, are stolen or are damaged. Replacements shall be made to the same specifications as required for original plantings.

Records of regular maintenance activities and dates must be provided to the City Parks and Recreation Department every 2 weeks. The Maintenance Period may be doubled if it is determined that the above maintenance standards have not been met.

At the termination of the Maintenance Period, all plant materials shall be live, healthy, undamaged and free from infestations. Plantings that do not conform to specifications shall be replaced and brought to a satisfactory condition before final acceptance of the work can be made. Based on City review, maintenance period may be doubled until all plant materials are sufficiently established.

4.03 TREE PRESERVATION STANDARDS

4.03.01 PURPOSE

Tree Preservation Standards shall be utilized for the protection of trees located on public property including street right of ways, public easements; or on private property where trees have been designated City of Napa Significant Trees or Protected Native Trees; as required by the City of Napa Parks and Recreation Services Department where said trees may be subjected to construction impacts or activity on either public or private land. Construction activity shall include but is not limited to: grading, trenching, excavating, and operation of construction equipment or vehicles in the vicinity of the public or Significant Tree which has the potential to harm or affect the health or vigor of the tree.

4.03.02 CONSTRUCTION INSPECTION AND SUPERVISION

All arboricultural and related soil work shall be performed under the supervision of International Society of Arboriculture (ISA) Certified Arborist (Project Arborist) or the City Engineer or designated representative.

All specified arboricultural work shall be completed prior to site grading (hand trenching, pruning, fencing, etc.)

4.03.03 PROTECTION WITHIN DRIP LINE OF INDIVIDUAL TREES

Prior to initiating any construction activity in the area, including demolition or grading, temporary protective fencing shall be installed at each site tree in the immediate vicinity of construction.

Fencing is to be located a minimum of one foot beyond the canopy drip line. If available space and logistics follow, fence shall be placed at a greater distance or up to twice the diameter of the drip line.

Fencing shall be a minimum of 5 feet in height at all locations, and shall form a continuous barrier without entry points around all individual trees, or groups of trees. Barrier type fencing such as chain link, but any fencing system which adequately prevents the entry of equipment and activity will be acceptable. The use of simple post and cable fencing is not permitted as this provides minimal protection and is easily removed or moved by construction personnel. Fencing shall be installed in a professional manner with adequate uprights and appropriate attachments. Concrete footings are not required due to the temporary nature of the fencing. Any encroachment into the drip line for fencing or construction purposed requires the permission of the City Inspector.

This fencing shall serve as a barrier to prevent drip line encroachment of any type by construction activities, equipment, materials storage, and personnel.

Contractors and subcontractors shall direct all equipment and personnel to remain outside the fenced area at all times until project is complete, and shall instruct personnel and subcontractors as to the purpose and importance of fencing and preservation.

Fencing shall remain in place and not be removed until all construction activities are completed. This shall include grading and compaction activities, installation of underground construction activities, and any other construction or activity, which may be scheduled prior to landscapes installation. There may be occasion when access is required, and fencing may temporarily be moved to facilitate the work.

Roots of single standing trees often extend two to three times the distance of the actual drip line and function primarily in the uptake of nutrients and water. The drip line is arbitrarily established as the minimum root area generally required to preserve tree health. As much area around the circumference of tree beyond the drip line should have minimum intrusion to further ensure tree survival and health.

4.03.04 GRADE CHANGES

Grade changes within a tree drip line are to be minimized wherever possible. Grade should not change from that which existed prior to grading activities without approval from the project arborist.

Maximum cut or fill within actual or estimated drip lines shall not exceed 6 inches. All cut activities should be done in conjunction with the project arborist, even those under 6 inches, to minimize root damage.

Estimated drip line is defined as the widest distance from main trunk to furthest branch tip applied around the entire circumference of each individual tree. This definition specifically applies to all trees where a one-sided or unbalanced structure exists and the actual drip line is not truly representative of the area of the root zone requiring protection. Cut and fill activities apply to this definition.

No more than 6 feet of fill soil shall occur without specifically developed mitigation measures. Removal of soil within tree drip line is also limited to 6 inches, or a lesser amount, which can be removed without contacting major roots. Detailed mitigation is required to remove a greater amount.

The amount of cut and fill is to be determined by actual tree species, rooting characteristics, soil conditions, and purpose of grade change.

All cut and fill activities within tree drip line increases percentage of short and long-term tree decline and loss, and approval of these activities, or compromise in this area, shall be done with full knowledge of the negative potential that is incurred.

Original grade shall be maintained in immediate area of the root crown, where the soil contacts tree bole, at all times. No increase in grade shall be allowed under any circumstances in this area.

Physical retaining structures are required where any fill operation is approved and exceeds 6 inches above original grade. Retaining structures function to prevent soil grade from being raised in the root crown area.

Physical retaining structures shall be permanent in nature and may be constructed from any material that is appropriate in function to hold raised grade away from root crown flare on a long-term basis. Engineering may be required in some instances.

Tree retaining structures shall be installed a minimum distance of 4 feet from any tree trunk and may completely or partially surround the tree depending on the location of grade change. If grade is raised on 50 percent of the drip line, then retaining structures must be installed to prevent that soil from moving to the immediate root crown flare in that area. If 100 percent of the grade is raised, structure must surround the tree entirely. It is the responsibility of the project designer to develop an appropriate structure for this purpose with the approval of the project arborist.

If site conditions exist which necessitate installation of retaining structures closer than 4 feet to tree trunk, the project arborist shall be consulted for details of this installation.

No part of the dry well structure shall be placed below original grade to minimize impact on root system. If necessary, structural posts may be installed to hold walls in place, providing that care is taken during the installation to minimize damage to the root system, and that posthole size is minimized. The excavation and pouring of footings and other structural support is not compatible with tree preservation.

Grade changes outside the retaining structures shall be such that drainage water of any type or source is not diverted toward or around the root crown in any manner. Grade shall drain away from root crown at a minimum of 2 percent.

If grading toward root crown is required, appropriate surface and/or subsurface drain facilities shall be installed so that water is effectively diverted away from root crown area. The project arborist shall be consulted for details and approval of installation.

Where fill is approved and/or where paving of any type is planned within the drip line, aeration tubes shall be installed from the dry well or retaining structure to the limit of the drip line and placed at a depth corresponding to slightly below original grade. A description of aeration tube use and construction follows:

- In all areas where paving, impermeable or semi-permeable surfaces, or fill over 6 inches is to be installed within any tree drip line, aeration tubes shall be required to the limit of the drip line or beyond where possible. Tubes shall radiate horizontally from each dry well to the root crown area to the limit of the drip line, and shall be located on 4-foot centers. Ends of tubes shall be connected to one another. A proportional number of tubes shall be installed when partial paving or filling within drip line is required.
- Aeration tubes shall consist of rigid and perforated PVC pipe, minimum class 200, styrene plastic, or molded ABS, minimum 3-inch diameter, 10 perforations per foot. Pipe shall be placed slightly below original grade. Each tube shall be wrapped in suitable filter fabric securely fastened with waterproof tape. Aeration tubes shall daylight within the retaining structure around tree trunk, and a grate shall be attached, but not glued, to the end of each day-lighted tube to prevent the entry of debris. Aeration tubes shall also daylight near the outer perimeter of the drip line with a fitted metal grate properly installed such that water of any type or source back drains into dry well.

The installation of aeration tubes is meant to facilitate the normal exchange of atmospheric gasses with the soil and root system. When impermeable or semi-permeable paving is installed, or when soil grade is raised, this normal exchange is limited and commonly becomes a source of root damage and potential disease.

Tree roots will be expected to grow into areas of soil fill, and quality of imported soil should be considered. Ideally, fill soil should be site soil that closely matches that present within tree

drip line. If import soil is utilized, it should be the same or slightly coarser texture than existing site soil, should have a pH range comparable to site soils, and generally should have acceptable chemical properties for appropriate plant growth. A soil analysis is required prior to importation to evaluate import soil for these criteria.

All approved soil cuts should be made outside the immediate drip line for minimal negative impact on trees. If approved within drip line, crown foliage shall be reduced accordingly to balance the estimated root loss. Any construction activity, which necessitates soil excavation in the vicinity of preserved trees, should be avoided where possible, or mitigated under the guidance of the project arborist. Roots are to be clearly hand cut and sealed wherever possible when major structural roots are encountered over one inch in diameter. The tearing of roots by equipment of any type within the drip line shall not be allowed.

4.03.05 UNDERGROUND CONSTRUCTION

All underground work within tree drip lines shall be avoided wherever possible to reduce negative impact on trees. The location of underground utilities well outside drip line is recommended as part of tree preservation.

Weakened anchorage, root system integrity, and the ability to acquire moisture from the root soil areas are the most critical issues when considering any type of root impact or removal.

Underground work in the area of site trees has a potentially serious impact on tree health and tree stability. Underground trenching for a variety of utilities will sever large structural roots reducing nutrient and water uptake and more seriously affecting the ability of each tree to remain appropriately anchored.

The existing root system within the drip line should not be severed by construction activities of any type. If undergrounding within the drip line is required for unavoidable logistical reasons, the project arborist shall be consulted to determine the impact on tree health.

All underground work required within the drip line of the trees and below original grade shall be previewed by the project arborist to determine potential impact on trees and to prepare mitigation measures. The project arborist shall be present during the actual underground work.

4.03.06 PRUNING REQUIREMENTS

The removal of dead wood, damaged branches, and structurally unsound wood including bark, narrow crotches, and crossing branches shall be the priority for any pruning work. Co-dominant leaders or lateral branches shall be removed and pruned to retard growth if possible.

Pruning shall be as minimal as possible, removing dead or damaged branches, crossing or rubbing branches, or correcting other structural deficiencies that may be present. Removal of lower branches may be required to allow for access and clearance following construction. Minimal pruning is the desired approach to all trees. Follow the pruning guidelines set forth in the latest edition ANSI A300 Standards – Part 1, Tree Pruning.

The following general guidelines shall be used during all pruning procedures:

1. Lateral Branch Removal

- (a) All laterals shall be removed immediately beyond the branch bark ridge, always preserving the branch collar.

- (b) No stub cuts should be made which leave an inch or more beyond the branch collar.
- (c) No flush cuts through the branch collar shall occur.

2. Triple Cuts

- (a) All branches too large to be hand held shall be removed by means of the triple cut; undercutting branch 4 to 8 inches beyond base, removing branch beyond undercut, and removing remaining stub utilizing a shoulder cut.

3. Terminal Pruning

- (a) Thinning: Cut back terminal portions of branches by cutting back to laterals with a basal diameter 1/3 the size of the terminal being removed. Removal of many smaller terminals is preferred over removal of a few large ones.
- (b) Size reduction: Remove portions of the crown for reducing height by removing terminals back to laterals. Each lateral remaining should be located to serve as a new terminal. This will establish the crown at a lower level. The diameter at the base of a remaining lateral should be 1/3 the diameter of the terminal being removed.

Pruning may also be required to create appropriate access for construction equipment where low limb presence may obstruct access. This pruning is to be done by a qualified arborist, and shall by no means be done by construction personnel under any circumstances.

Pruning shall occur prior to initiation of all approved underground trenching. No ground shall be broken within the drip line of street trees without having pruning completed.

Project arborist shall be consulted prior to initiation of any pruning procedures to coordinate activities with the working arborist.

4.03.07 ADDITIONAL RECOMMENDED PROCEDURES

Continued discussion and coordination between project arborist, owners, contractors, and City Engineer shall occur to further discuss and define these guidelines based on the actual work planned in the vicinity of these trees.

4.03.08 FERTILIZATION

Following completion of construction, all native trees shall be fertilized with a complete fertilizer which shall supply a minimum of 1½ pounds of actual nitrogen per 1000 square feet of drip line area, per year. A thorough irrigation shall immediately follow. This application shall be completed twice during the growing season following completion of construction. Ideally, application shall be by high-pressure soil injection or drenching.

Following completion of construction activities a determination of tree health should be conducted to visually evaluate tree performance and to recommend additional mitigation if it should be required. Owners additionally should monitor visible tree appearance and contact the project arborist should the tree exhibit unusual growth or characteristics.

4.03.09 MULCHING

Following completion of construction, 2 to 3 inches of wood chip mulch is recommended for placement under the drip line of the tree. Mulch shall remain a minimum of 2” from the trunk of the tree.

4.03.10 PEST CONTROL

A close visual examination for tree pests shall be conducted by the project arborist and/or the tree worker as he completes pruning procedures. If a serious infestation is present which was not apparent from ground observation then pesticide application should be considered at that time. However, the simple presence of tree pests does not warrant the use of chemical pesticides, and it should be clear that a serious infestation capable of causing tree decline must be present to warrant their use. The use of organic sprays or pesticidal soaps is the preferred method for treating any serious pest infestation. If infestations should occur, discussion with the project arborist is recommended. Treatment should only be performed by a licensed pest control operator/applicator under the direction of a use recommendation or prescribed treatment in accordance with labeling and in accordance with applicable California State laws and regulations. Administered by the California Department of Pesticide Regulation and regulated by the Napa County Agricultural Commissioner’s office.

4.03.11 DISEASE CONTROL

No specific measures are recommended for disease control unless otherwise noted in the Individual Tree Evaluations. The tree-pruning specialist should note any serious problem during climbing procedures if they become evident.

4.03.12 REFERENCE

The use of asphalt or concrete as a primary paving surface within the canopy drip line is prohibited. Utilization of a permeable substance which does not impede the natural percolation of water or limit the nature of gaseous exchange is recommended. Materials such as decomposed gravel or cobble are ideal for this purpose, however; generally do not function satisfactorily as a parking or driving surface.

Interlocking pavers come in a variety of shapes, colors and sizes and provide a suitable surface for driving, parking and walking. At the same time they will allow some infiltration of water and air to the original soil level. Functionally and aesthetically they are appropriate for consideration at many projects. Utilization of an installation method which excludes fine sand joints must be used, however, to maintain infiltration. A course sand leveling bed and course sand joints are recommended to increase water infiltration and aeration.

4.03.13 PLANTING UNDER EXISTING TREES

The installation of lawn beneath established native trees is prohibited. The ideal treatment under native trees is the use of organic or inert mulch. Redwood chips, gravel, or stone cobble are all excellent materials. If planting is required for aesthetic or functional purposes, the use of drought tolerant, woody species is most appropriate. Species should be selected for their ability to survive with minimal or no water through the summer months after initial

establishment period. Only drip irrigation should be utilized within the canopy drip line to minimize summer water in the root zone.