SECTION 02483 - PLANTING

CONTENTS:

SECTION 02483 - PLANTING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Prepare soil for planting, including subgrade work.

B. Furnish and install all container plantings, sod, staking, ground and related work thereto.

C. Coordinate and provide all services as required to contract or grow plant material indicated on the Drawings.

1.02 RELATED REQUIREMENTS

A. Section 02480, *"Landscape Soil Preparation"*

B. Section 02499, *"Landscape Maintenance"*

1.03 REFERENCE STANDARDS

A. *"Standardized Plant Names,"* Second Edition

B. *"A Checklist of Woody Ornamental Plants of California,"* Manual 32, University of California

C. Specifications of the California Association of Nurserymen

D. Specifications of the American Association of Nurserymen

1.04 QUALITY ASSURANCE

A. Reviews

1. The Contractor shall specifically request that the following reviews be made by the Engineer prior to progressing with the work:

a. Plant material review at nurseries

b. Plant layout on site

c. Substantial completion

d. Final acceptance

B. Submittals/Plant Material/Seeds

1. Within ten (10) working days after receiving the Notice to Proceed, the Contractor shall submit eight (8) copies of the notice to the Engineer certifying the quantity and species of plant material ordered, the nursery supplying the material and any plant material unavailable at the time, and proposed schedule for growing same to be reviewed by the Engineer.

C. Contract Growing

1. The Contractor is advised that plant material specified is not subject to substitutions and that Contractor shall contract grow or otherwise provide plant material as noted. If portions of plant material are unavailable, all other operations are to be completed within the time schedules outlined, with the remaining work to be scheduled for completion later, with no change in contract amounts or payments.

D. Nomenclature and Labels

1. Plant botanical names shall conform to *"Standardized Plant Names,"* Second Edition, and secondly, *"A Checklist of Woody Ornamental Plants of California,"* Manual 32, University of California. All plants of each clone, species, and cultivar shall be delivered to the site labeled with their full botanical and common name. Every plant species shall be labeled with no less than one (1) label for every ten (10) plants of a species.

E. Quality

1. Minimum quality of all plant material shall conform to prevailing published specifications of the California Association of Nurserymen and the American Association of Nurserymen, unless otherwise indicated.

F. Quantities

1. The quantities shown on the plant list are for the Engineer's use and are not to be construed as the complete and accurate limits of the contract. The Contractor shall furnish and install all plants shown schematically on the Drawings. Any unlabeled plants shall be considered as the smaller size shown for that type on the Drawings.

G. Root Systems

1. All container-grown stock shall be grown in its container for at least six (6) months prior to its planting. Root system shall not be girdled and roots shall be healthy and show no signs of disease. The Contractor shall allow one percent (1%) of the quantity of plants for removal and inspection. Any plant material, within two (2) years following the final acceptance of the project, determined

by the Engineer to be defective, restricted, declining or otherwise deficient due to abnormal root growth, shall be replaced by the Contractor to the equal condition of adjacent plants at the time of replacement.

1.05 MEASUREMENT AND PAYMENT

A. Trees and shrubs shall be measured and paid for as individual items at the contract price for each size and specie as indicated in the Bid Schedule.

B. Sod lawn planting and seed lawn planting shall be measured and paid for at the contract price per Square Feet or Square Yard as indicated in the Bid Schedule.

C. Ground cover planting shall be measured and paid for at the contract price per Square Feet or Square Yard as indicated in the Bid Schedule.

D. The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and other incidentals, complete in place, for planting, as shown on the Plans and specified in these specifications and Special Provisions, and as directed by the Engineer.

PART 2 - PRODUCTS

2.01 TREES

A. PROPER IDENTIFICATION

All trees shall be true to name as ordered or shown on the planting plans and shall be labeled individually or in groups by species and cultivar (where appropriate).

B. COMPLIANCE

All trees shall comply with federal and state laws and regulations requiring inspection for plant disease, pests and weeds. Inspection certificates required by law shall accompany each shipment of plants. Clearance from the County Agricultural Commissioner, if required, shall be obtained before planting trees originating outside the county in which they are to be planted. Even though trees may conform to county, state, and federal laws, the city may impose additional requirements.

C. TREE CHARACTERISTICS AT THE TIME OF SALE OR DELIVERY

1. TREE HEALTH

Contractor shall have an ISA certified arborist certify that all standards are adhered to.

As typical for the species/cultivar, trees shall be healthy and vigorous, as indicated by:

- Foliar crown density
- Length of shoot growth (throughout crown)
- Size, color and appearance of leaves
- Uniform distribution of roots in the container media
- Appearance of roots
- Absence of twig and/or branch dieback
- Freedom from insects and diseases
- Pathology reports shall be submitted to Public Works prior to delivery of trees to site. Reports shall include pathology results for leaf, stem, root tissues, and for root ball container soil.

Note: Some of these characteristics cannot be used to determine the health of deciduous trees during the dormant season.

2. CROWN

a. Form: Trees shall have a symmetrical form as typical for the species/cultivar and growth form.

Good quality nursery shade tree

i. **Central Leader**: Trees shall have a single, relatively straight central leader and tapered trunk, free of co-dominant stems and vigorous, upright branches that compete with the central leader. Preferably, the central leader should not have been headed. However, in cases where the original leader has been removed, an upright branch at least ½ (one-half) the diameter of the original leader just below the pruning point shall be present.

Note: This section applies to single trunk trees grown with normal straightness, as typically used for street or landscape planting. This specification does not apply to plants that have been specifically cultured in the nursery or selected for unusual or unique shape, such as contorted forms, topiary forms, espalier forms, multi-stem, or clump forms.

Evaluating trunk and branch structure

Trunk structure**:** Shade trees that are large at maturity, and most evergreen trees, with the best quality have a dominant or central leader or trunk up to the top of the canopy (See drawing PR-18 and PR-19). Shade trees of lesser quality have two or more leaders or trunks; they could split apart as they grow older. Small ornamental trees can have several trunks.

ii. Potential Main Branches: Branches shall be distributed radially around and vertically along the trunk, forming a generally symmetrical crown typical for the species.

1.) Potential main branches shall be evenly spaced and have appropriate space between them.

2.) Branches shall be no larger than 2/3 (two thirds) the diameter of the trunk, measured 1" (one inch) above the branch.

3.) The attachment of scaffold branches shall be free of included bark.

iii. Temporary branches: Unless otherwise specified, small "temporary" branches should be present along the lower trunk below the first potential permanent branch, particularly for trees less than 1-1/2" (one and one-half inches) in trunk diameter. Temporary branches should be distributed around and vertically along the lower trunk. They should be no greater than 3/8" (three-eighths inch) in diameter and no greater than ½ (one-half) the diameter of the trunk at the point of attachment. Heading of temporary branches is usually necessary to limit their growth.

3. TRUNK

a. Trunk diameter and taper shall be sufficient so that the tree will remain vertical without the support of a nursery stake.

b. The trunk shall be free of wounds (except properly-made pruning cuts), sunburned areas, conks (fungal fruiting-bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers and/or lesions.

c. Trunk diameter at 6" (six inches) above the soil surface shall be within the diameter range shown for each container size below:

Container	**Soil Volume***	**Trunk Diameter (in)**	**Soil level from Container Top (in)**
# 5	0.6	0.5” to 0.75”	1.25” to 2”
# 15	3.3	0.75” to 1.5”	1.75” to 2.75”
24 inch box	10.5	1.5” to 2.5”	2.25” to 3”

***** Approximate soil volume in gallons

4. ROOTS

a. The trunk, root collar (root crown) and large roots shall be free of circling and/or kinked roots. Soil removal near the root collar may be necessary in order to verify that circling and/or kinked roots are not present.

b. The tree shall be well rooted in the container. When the trunk is carefully lifted both the trunk and root system shall move as one.

c. The upper-most roots or root collar shall be within 1" (one inch) above or below the soil surface. The soil level should be within 2” (two inches) of the top of the container (see table above)

d. When the container is removed, the root ball shall remain intact.

e. The root ball periphery should be free of large circling and bottom-matted roots. The acceptable diameter of circling peripheral roots depends on species and size of root ball. The maximum acceptable size should be indicated for the species (if necessary).

f. On grafted or budded trees, there shall be no suckers from the root stock.

5. MOISTURE STATUS

At time of inspection and delivery, the root ball shall be moist throughout, and the tree crown shall show no signs of moisture stress, as indicated by wilt. Roots shall show no signs of being subjected to excess soil moisture conditions, as indicated by root discoloration, distortion, death, or foul odor.

D. INSPECTION

The City reserves the right to reject trees that do not meet specifications as set forth in these guidelines or as adopted by the buyer. If a particular defect or sub-standard element or characteristic can be easily corrected, appropriate remedies shall be required. If destructive inspection of root balls is to be done, the buyer and seller should have a prior agreement as to the time and place of inspection; minimum number and/or percentage of a species (cultivar) and as to who is financially responsibility for the inspected trees.

E. GLOSSARY

Note: The word *shall* indicate a practice that is mandatory. The word *should* refers to a practice that is highly recommended.

1. **Co-dominant** branches- Those that are roughly equal in size to the trunk or branch on which they originate, or where two or more branches of relatively equal size fork or diverge from a common point. Co-dominate branches are usually vigorous and upright.

2. **Crown**– The portion of a tree above the trunk including the branches and foliage.

3. **Cultiva**r– A named plant selection from which identical or nearly identical plants can be produced, usually by vegetative propagation or cloning.

4. **Girdling root- A** root that partially or entirely encircles the trunk and/or large buttress roots, which could restrict growth and downward movement of photosynthates.

5. **Included bark**– Bark that is entrapped in narrow-angled attachments of two or more stems, branches, or a stem and branch (es). Such attachments are weakly attached and subject to failure.

6. **Kinked root- A** taproot or a major root(s), which is sharply bent and can cause plant instability and reduction of movement of water, nutrients, and photosynthates.

7. **Leader**– The dominant stem or trunk that forms the apex of the tree.

8. **Root collar**– The flared lower portion of the base of a tree where the roots and stem merge. Also referred to as the "root crown" or “root flare.”

9. **Scaffold branches–** In decurrent (round headed) trees , the branches that are among the largest on the tree and that form the main structure of the crown.

10. **Stem-** The axis (trunk of a central leader tree) of a plant on which branches are attached.

11. **Temporary branch–** A branch(s) that will remain on the tree for only a short period. Temporary branches will protect the trunk from sunburn damage and mechanical injury, and increase trunk caliper and taper thereby increasing trunk strength and flexibility. These branches are kept small and gradually removed as the trunk develops.

12. **Trunk**– The main stem of a tree between the ground and the lowest scaffold branch.

2.02 PLANT HEALTH

A. Foliage roots and stems of all plants shall be of vigorous health and normal habit of growth for its species. All plants shall be free of all diseases, insect stages, burns, or disfiguring characteristics.

2.03 UNTRUE SPECIES

All plant material within two (2) years following the final acceptance of the project, determined by the Engineer not to be the species, clone, and/or variety specified, shall be replaced by the Contractor to equal condition of adjacent plants at the time of replacement.

2.04 LAWN SOD

A. Sod shall be grown from high quality seed in soil treated with appropriate State and Agency approved pesticides insecticides, fungicides, and herbicides and regularly inspected by the State of California Regulations Nursery Inspection. Sod shall have a well developed root structure sufficiently mature so it will hold together when held by one end of roll. Yellowing, brown, diseased, dried, or pest-infested sod shall be rejected. Soil thickness of the sod shall be one-half inch (1/2") thick, excluding top growth and thatch. Top growth shall be uniformly mowed to one and one-half inches (1-1/2") to two inches (2"), with excess clippings surface debris removed. Size of rolls or slabs shall be consistent with the supplier's standard length and width and is not to vary by more than two percent (2%) in either dimension. See landscaping plans for turf species. Sod shall not include netting.

2.05 GRASS SEED

A. At least one (1) sample of the variety of turf-type grass seeds shall be submitted to the Engineer for approval before planting.

2.06 CHEMICALS

A. The following brand names of chemicals to be used in this Section are for ease of specifying; equals or brands with similar chemicals that will match or improve performance may be used with the Engineer's approval.

1. Pre-emergent herbicide: "Treflan"

   "Dymid"

2. Anti-desiccant for foliage: "Wilt-Pruf Formula NCF"

B. The Contractor shall verify compatibility, dosage and other application procedures with the manufacturer and pre-test any and all chemicals at the site to verify compatibility with proposed plantings. The Contractor shall be responsible for damages arising from inappropriate use.

2.07 PLANT TABLETS

A. All container plants shall receive plant tablets (Agriform or approved equal) as follows:

One gallon plants	-	Four 21-gram tablets
Five-gallon plants	-	Eight 21 gram tablets
Fifteen-gallon plants	-	Twelve 21 gram tablets
24" Box trees	-	Eighteen 21 gram tablets

B. Space the tablets evenly around the rootball halfway up backfill touching side of rootball. Engineer will require excavation of plants selected at random for conformance review.

C. Note: Alternate type(s) and application rate(s) of plant tablets may be required as directed by the Engineer based on results of soil tests.

2.08 MULCH

A. Mulch shall be a shredded or chipped bark and/or wood product of uniform type and consistency. Mulch shall be rock and dirt free and the maximum allowable size for mulch can not exceed three-inch chips.

PART 3 - EXECUTION

3.01 TREE AND SHRUB PLANTING

A. All tree planting stock to be planted using these "planting specifications" shall conform at minimum to the specification guidelines for container-grown landscape trees issued by the California Department of Forestry & Fire Protection (CDF).

B. Trees are to be planted in accordance to the landscape plan as well as adhering to current recognized horticultural practices.

C. Trees shall be planted so that the root ball is equal to or slightly higher than the surrounding soil surface. Shallow is better than deep. Most people plant trees too deep. A hole three times the width of the root ball is often recommended but about one-and-one half the diameter is more common. Roots can become deformed by the edge of the hole in compacted or clayey soils if it is too small. The depth of the hole should be LESS than the height of the root ball, especially in compacted or natural wet soils. If the hole was inadvertently dug too deep, add soil and compact it with your foot. Breaking up compacted soil in a large area (out of the drip line of the tree) around the tree provides the newly emerging roots room to expand into loose soil. This will hasten root growth translating into quicker establishment.

D. The trunk flare (root crown) shall be evident and free of any container soil and/or planting backfill. The trunk flare (root flare, root crown) is the abrupt swelling where roots join the trunk. This point should be visible at the top of the root ball. If the trunk flare is not visible, remove soil or media from the top of the ball until it is visible.

E. The root flare shall be slightly above the surface of the surrounding soil at all times (See drawing PR-19). When planting on a sloping site, the top-most root in the root ball shall be even with the grade on the uphill side of the tree. Site soil will need to be added on the downhill side to cover the sides of the root ball and to construct the soil berm to hold water. It is better to plant the tree a little high than to plant it too deep. If the tree is a little deep, tip it to one side and slide some soil under it; then

tip it back the other way and slide some more soil under the root ball. Continue this until it is set at the appropriate depth. Once it is at the appropriate dept, place a small amount of soil around the root ball to stabilize it. Soil amendments should only be used as needed. The soil removed from the hole generally makes the best backfill.

F. Tree stock will be protected from excessive vibration; avoiding be thrown or bounced off mobile equipment to the ground. Trees shall not be dragged, lifted, or pulled by the trunk or foliage parts in a manner that will loosen the roots in the ball. To avoid damage when setting the tree in the hole, lift the tree with straps or rope around the root ball, not be the trunk. Special strapping mechanisms need to be constructed to carefully lift trees out of large containers.

G. Planted trees shall exhibit no circling root conditions or evidence of untreated root bound container stock. Check rooting structure of the container tree for possible root bound conditions and implement corrections if needed.

Pot bound (also called root bound) root balls from containers have large or many roots on the outer edge of the ball. It is best not to plant trees in this condition because roots could girdle the trunk as the tree grows. The tree could also become unstable later because few supporting roots grow from the outside curved portion of a root. If you must plant a tree with circling roots, these roots should be cut with a knife or pruning tool to prevent them from girdling the tree later, especially if they are near the top of the root ball. Make three or four slices in inch deep from the top of the root ball to the bottom. If in doubt about whether a root is large enough to cut, go ahead and cut it. Research shows that if there is a growth reduction from root pruning container grown trees at planting, the effect is negligible. Other work shows a reduction in shoot growth following root slicing if plants are under irrigation. Recent studies show that slicing the root ball from the top to bottom in several locations does not increase root growth after planting. It does; however, appear to enhance distribution of regenerated roots in the backfill soil profile. Instead of growing almost exclusively from the bottom of the root ball, slicing encourages root regeneration along the slices from the top to the bottom of the root ball. This could help establish the plant quicker by allowing the roots to quickly explore a larger volume of backfill soil.

H. Trees shall all be planted in an upright position avoiding appearances of leaning. Before you begin backfilling, have someone view the tree from two directions perpendicular to each other to confirm the tree is straight. Fill in with some more backfill soil to secure the tree in the upright position. Once you add large amounts of backfill, it is difficult to reposition the tree.

I. Planting tree site (hole) shall reflect proper techniques in the use of backfill soil materials to avoid evidence of large air pockets/voids within the backfill soil profile. Attempt to break up clayey soil clumps as much as possible. Do NOT step firmly on the backfill soil because this could compact it and restrict root growth, especially in clayey soil. Fill the hole around the root ball with soil. When the hole is filled with soil, the root ball should remain 2 to 3 inches above the backfill soil. Slice the shovel 20 to 30 times into the backfill to settle the soil. Add 10 to 20

gallons of water to the root ball and backfill. Fill in any holes or depressions with additional backfill soil. Do not firmly pack backfill soil in an attempt to eliminate air pockets because this could cause too much soil compaction. The water infiltrating the backfill soil will eliminate the large air pockets. The presence of small air pockets could even be of benefit because they could allow more air to reach the roots.

J. All synthetic materials from around the tree trunk and root ball shall be removed and not evident within the backfill soil mix. String, rope, synthetic burlap, plastic, strapping, and other materials that will not decompose in the soil shall be removed at planting.

K. Optional treatment: Cover the planted tree root ball area with mulch. Apply mulch material to at least a 6-foot diameter circle around the tree. Construct a berm out of mulch at the edge of the root ball only if the tree will be watered with a hose, bucket, or other high volume means. Constructing a berm in all other situations will not provide more water to the root system. Do not construct a berm from soil since this soil could end up over the root ball several months later. Water the mulch well after it is spread. Mulching: Weed and turf suppression during establishment is essential. Application of 4+ inches of mulch (after settling) is highly recommended to help discourage weeds. This area should be maintained during the establishment period at least two feet in diameter for each inch of tree trunk diameter (minimum diameter should be six feet for trees with a trunk diameter less than 3 inches). If you wish to place mulch over the root ball, apply only a thin layer over the outer half of the root ball. This keeps the trunk dry and allows rainwater, irrigation, and air to easily enter the root ball area.

L. Support trunk staking that was supplied with the container tree has been removed. Many nursery vendors provide single or double support tree stakes to minimize trunk/crown damage during transporting activities. These support stakes left on the young tree after it is planted in the ground will often inflect wounds to the trunk and lower limbs of the young tree. This transport staking in not needed when 1) proper caliper in tree stock diameter is adhered to in the tree purchase process and/or 2) proper support staking discussed under item 13 below is utilized and installed correctly.

M. Containers shall be opened and removed in such a manner that plant root is not injured. Balled plant wrappings shall be loosened or cut back after plant is positioned in the planting hole.

N. A circular watering basin slightly larger than the planting hole, three inches (3") high for trees, and two inches (2") for shrubs, shall be left around the plant.

O. Trees provided with grating covers should have the top of root balls set four inches (4") below the bottom of the grating. This four-inch (4") gap will then be filled with uniform grey-colored pea gravel up to the bottom of the grating.

3.02 STAKING

A. All trees shall be staked in accordance with applicable City Standard Drawings.

B. Two sets of round cinch trees shall be secured around the upper half of the main trunk. The top set shall be located at the weakest part of the trunk (normally ¾ of the way up the trunk). The lower set shall be located ½ the way up the trunk.

3.03 GUYING

A. Trees, 24" box or specimen size, shall be guyed. Guying shall be done immediately after planting. Three (3) guys per plant shall be installed as follows:

1. Each guy shall be secured to the appropriate main branch by a twisted loop of No. 12 BWG zinc-coated iron wire housed in a visible plastic hose.

2. Each guy shall be anchored to a driven stake located at a horizontal distance from the tree equal to the vertical distance from ground to the connection of guy wire on the tree branch. Each guy shall be covered with highly visible plastic hose or plastic tubing to a height of six feet (6') above grade.

3. Palm trees may not require guying. In any case, any need for, and direction of guying of palm trees shall be as indicated in the project Plans and/or Specifications.

3.04 GROUND COVER PLANTING

A. Ground cover shall be planted in moist soil and spaced as indicated on the Plans. Each plant shall be planted with its proportionate amount of flat soil to minimize root disturbance. A layer of one-inch (1") of Type 1, 2, 3 or 4 mulch shall be spread over the planted areas and watered immediately. Prevent pedestrian traffic during initial growing by erecting temporary protective fencing to be removed at the end of the plant establishment period.

3.05 LAWN PLANTING

A. Seed Lawn Planting

1. After area to receive lawn has been graded and cultivated, it shall be rototilled or disced and cross-disced in two directions, thoroughly pulverizing the surface.

2. The Contractor shall then spread the approved soil amendments to a depth of at least two inches (2") over the entire area in which the lawn is to be planted. Soil amendment shall be lightly disced into the surface of the soil, and then harrowed, dragged and rolled and cross-rolled. Areas that cannot be reached shall be prepared by hand.

3. The surface area to be seeded shall be raked lightly to provide a seedbed and the seed sown evenly by mechanical seeder. Sowing shall only be done in calm weather. The required seed mixture shall be sown uniformly at the rate specified or directed by the Engineer. Seeding shall be done in two (2) operations with the spreader set to sow one-half (½) of the specified amount in each operation. The second sowing shall be at right angles to the first.

4. After sowing the surface of the soil shall be raked lightly, and then rolled with a light roller, and then a film coat of well-rotted, screened or pulverized manure or an approved Redwood soil conditioner, or similar approved product shall be spread to a depth between one-quarter inch (1/4") and one-half inch (½") over the entire area.

5. Immediately after planting, the seeded area shall be thoroughly watered with a fine spray to provide a one-inch (1") depth of penetration into the soil. Water spray shall be applied in a manner that does not cause surface erosion or disturbance to the seedbed.

6. The top surface shall not be allowed to dry at any time.

B. Sod Lawn Planting

1. Finish grade to smooth, even surface allowing for sod thickness at pavement or other structures to leave the sod one half inch (1/2") below the finish grade of adjacent structures. The soil surface shall be sufficiently firm to resist impressions over one quarter inch (1/4") deep and shall be lightly rolled until meeting this firmness. The top six to eight inches (6"-8") of soil shall be watered until this zone has an optimum moisture content for root growth without being over wet.

2. Sod shall be laid in rows with staggered ends neatly and tightly butted on all edges. Sod shall be protected from wind and sun exposure during storage with a maximum storage period of twenty-four (24) hours. No overlaps, gaps, ripples or other uneven placement will be accepted. Contractors shall lightly roll all sod after installation to insure optimum contact with the soil. Trimming and cutting around structures shall be completed with sharp tools and carefully fitted so the final appearance is a solid, continuous turf. All seams and joints shall then be rolled until the sod is bonded to the subgrade.

C. Application of Chemicals

1. Treat all ground cover and seeded and soil lawn areas with herbicide twenty (20) calendar days after planting and thereafter as required to obtain maximum growth and proper weed control.

2. Apply one (1) or more applications of anti-desiccant to plants immediately after arrival at the site, and thereafter as required to minimize wind damage. When directed by the Engineer in lieu of applying anti-desiccant, the Contractor shall thoroughly water plant materials upon arrival and continue such watering until planting takes place.

3.06 SHREDDED REDWOOD MULCH

A. Shredded redwood mulch shall be applied to a minimum depth of (4"), with uniform application over all exposed soil areas. The mulched area then shall be thoroughly watered throughout the full mulch depth.

3.07 CUTTING OF ROOTS

A. No roots shall be cut without prior written approval of the Engineer and the Parks and Recreation Department. In any case, the exact type and location of cutting for any tree will be determined by the Parks and Recreation representative. In no case will cutting depth be deeper than nine inches (9”) from the existing ground surface.

End of Section