SECTION 32 90 00
Planting
Construction Specification

PART 1 GENERAL

1.1 PURPOSE

A. Description:

1. Provide planting work and planting maintenance complete as shown on the drawings and as specified including staking and layout of the landscaping and soil sampling as required by the State of California Model Water Ordinance.

B. Related Documents:

1. Section 31 10 01 Plant Protection

2. Section 32 84 00 Irrigation

C. Quality Assurance:

1. Reference Standards:

a. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard than is required by the above mentioned codes and regulations, the provisions of these Specifications and Drawings shall take precedence. Furnish without extra charge additional materials and labor required to comply with above rules and regulations.

b. Contractor shall be familiar with and follow the State of California Model Water Ordinance, California Code of Regulations, Title 23 Waters, Division 2, Department of Water Resources, Chapter 2.7. Also, the Contractor is responsible to follow all local water ordinances and the Soil Management/Analysis Report with verifying implementation.

c. "Sunset Western Garden Book," Lane Publishing Co., Menlo Park, California; current edition.

d. "American Standards for Nursery Stock," American Association of Nurseryman, 230 Southern Building, Washington, D.C. 20005.

e. US Composting Council Compost analysis Program (CAP)

f. Test Methods for the Evaluation of Composting and Compost (TMECC)

g. International Society of Arboriculture, Guide for Plant Appraisal, latest version.

h. United States Composting Council (USCC) Seal of Testing Assurance (STA) program.

i. TMECC: Refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

j. Manufacturer's recommendations.

2. Qualifications:

a. Experience: Assign a full-time employee to the job as foreman for the duration of the Contract who is certified landscape technician, certification through CLCA or minimum of four (4) years' experience in landscape installation and maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

b. Labor Force: Provide a landscape installation and maintenance force thoroughly familiar with, and trained in, the work to be accomplished to perform the task in a competent, efficient manner acceptable to the Owner.

3. Requirements:

a. Supervision: The foreman shall directly supervise the work force at all times and be present during the entire installation. Notify Owner's Representative of all changes in supervision.

b. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and a labor force uniformly dressed in a manner satisfactory to Owner's Representative.

c. Planting soils and organic amendments shall meet the AACWP requirement for the stormwater treatment measures used with this project work.

4. Plant Material Standards:

a. Quality and Size of Plants: Conform to the State of California Grading Code of Nursery Stock, No. 1 grade and American Standards for Nursery Stock," American Association of Nurseryman. Use only nursery-grown stock which is free from insect pests and diseases.

b. Comply with federal and state laws requiring inspection for plant diseases and infestations. Submit inspection certificates required by law with each shipment of plants, and deliver certificates to the Owner. Obtain clearance from the County Agricultural Commissioner as required by law, before planting plants delivered from outside the County in which planted.

5. Soil and Soil Amendment Testing and Analysis:

a. Soils Testing Agency: Soil and Plant Laboratory, Inc., 1101 Winchester Blvd., Suite G-173, San Jose, CA 95128, Tel. (408) 727-0330; or Root Zone Associates, P.O. Box 18911, San Jose, CA 95118; Tel. (408) 264-7024, or approved equal.

b. All existing and proposed imported soils and organic soil amendments shall be submitted and tested by an accredited soils analyst. A standard soil analysis report shall identify sample source and include chemical analysis, fertility, agricultural suitability, and infiltration rates for soils. The report shall include all major nutrients, pH, salinity, boron, sodium, micronutrients, copper, zinc, manganese and iron, adsorption rate, organic content, soil texture and particle sizes. The report shall also include recommendations for modification of the

soil(s) for agricultural suitability and compliance with the specified requirements, ordinances and regulations noted herein.

c. Upon approval of the soils report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the quantities of soil amendment, fertilizer and other additives shall be adjusted to conform with the report at no additional cost to the owner. Request Testing Laboratory to send one copy of test results directly to Landscape Architect and one copy to the Owner.

d. Topsoil Analysis Compliance Report

1) After approval of rough grading and topsoil placement, obtain minimum of two representative one quart samples of topsoil taken from accepted site locations at depth of 4" to 6" below finish grade and submit to an accredited Soils Laboratory for evaluation of physical and chemical properties of soil including all major nutrients; pH, salinity, boron, sodium, micronutrients, copper, zinc, manganese and iron; and infiltration rate, soil texture and organic content, along with a summary describing the degree of compliance with the specified requirements.

2) The existing topsoil analysis report will be used to identify any required additives that need to be added to the topsoil as well as identify if imported soils are compatible for use with the existing topsoil.

3) Submit documentation verifying implementation of soil analysis report recommendations.

4) The Contractor is responsible to follow all local water ordinances and make available to the local agency the soil analysis report and verification of its implementation as required.

6. Coordinate plant locations with irrigation emitter locations:

a. Adjust plant locations in relation to the subsurface emitter s as required to ensure that the plant roots receive the proper amount of water in order for it to thrive.

b. Coordinate planting and irrigation and provide hand watering of emitter irrigated and drip irrigated areas as required to maintain moist root zones throughout plant establishment period.

7. Damage from Deer, Rodents, Insects and Disease:

a. Investigate planting for signs of damage from Deer, Rodents, Insects and Disease and provide repellents, barriers, or treatment and/or replacement upon discovery. Replace all damaged plants as described below in Planting Establishment Maintenance.

8. Mitigation of Lime Treatment of Site Soil:

a. If site work includes Lime Treatment of the site soil, the Contractor shall remove and replace the treated soil in all planting areas with approved imported planting soil and insure that the planting areas drain. If planting areas fail to properly percolate and drain, provide subsurface drainage structures as accepted by the Owner's Representative. Refer to Part 3 -Execution for mitigation of the lime treated soil areas.

1.2 SUBMITTALS, PER SECTION [01 33 00]

A. Submit all materials related to this Section in one Submittal.

B. Submit to the Landscape Architect, Manufacturer's current catalog cuts and technical data sheets of the following:

1. Fertilizers
2. Iron Sulfate
3. Tree and Plant Ties/Support/Guying Materials
4. Root Barrier
5. Bamboo Rhizome Barrier
6. Pre-Emergence Weed Killer
7. Filter Fabric
8. Permeable Backfill (Filter Rock): Also include 1-pint sample.
9. Perforated Drain Pipe
10. Erosion Control Netting
11. Landscape Edging/ Header Board
12. Vine Support System
13. Bamboo Support System

C. Plants and Seeding Samples: Submit following planting samples along with certificates of compliance / analytical data from suppliers for degree of compliance and recommendations:

1. Plants: Submit typical sample of each plant variety, or entire plant quantity to site for approval by Landscape Architect.
2. Sod: Submit information of Sod Farm Company and type and percentage of sod mixture for approval by Landscape Architect.
3. Turf Seed Mixes: Submit 1 cup sample with Analytical Data Sheet.
4. Certificates of compliance for Hydroseed Mixes, Mulch and Tackifier for Erosion Control Seeding.
5. Plant Photographs: Prior to shipping plants, provide color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery. Review and acceptance of any or all of the photographs does not signify that those plants are acceptable, and until the plants are inspected by the Landscape Architect on site will acceptance of the plants be determined.

D. Soil Amendment and Mulch Sample and Analysis Reports:

1. Organic (Soil) Amendment(s): Submit 1-pint sample with certificate of compliance / analytical data Sheet. For Composted Organic Amendment, include STA certification.

2. Organic Mulch: Submit 1-pint sample with source and list of ingredients.

3. Rock Mulch: Submit 1-pint sample(s) and source.

4. Organic Soil Amendment Delivery Receipts

E. Planting Soil(s): Submit 1 pint samples along with Laboratory certificates of compliance / analytical data sheet and recommendations, including but not limited to the required samples listed below. The sample submitted for testing shall be from the supplier's current soil source and dated less than 6 months prior to installation. State the name and location of the supply source. Upon approval of the Laboratory's recommendations by the Landscape Architect, the recommendations in the report shall become a part of the Specifications:

1. Imported Site Makeup Planting Soil: For use in augmenting existing Site Planting Soil (TOPSOIL).

2. Subsoil Analysis Sample

3. Existing Site Topsoil Analysis (Soil Management) Report

4. Bioswale Mineral Component (Soil) Backfill.

5. Imported Dewatering Planting Soil Material (Sandy Loam)

6. Imported Treatment Planting Soil Material (Loamy Sand)

7. Imported Planting Sand

8. Lava Rock Aggregate

9. Raised / Contained Planter Base Soil Mix

10. Raised / Contained Planter Topping Soil Mix

F. Organic Soil Amendments Delivery Receipts:

1. Provide delivery receipts for quantities of organic soil amendments delivered to the site.

G. Topsoil Analysis (Soil Management) Report:

1. After approval of rough grading and topsoil placement, obtain minimum of three representative one quart samples of topsoil taken from accepted site locations at depth of 4" to 6" below finish grade and submit to an accredited Soils and Plant Laboratory for evaluation of physical and chemical properties of soil including all major nutrients; pH, salinity, boron, sodium, micronutrients, copper, zinc, manganese and iron; and infiltration rate, soil texture and organic content, along with a summary describing the degree of compliance with the specified requirements. The report shall also include recommendations for modification of the soil for agricultural suitability.

2. Upon request by Owner, submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion as required by the State of California Model Water Ordinance

H. Subsoil Analysis Sample:

1. Besides the above required soil samples, take one representative sample of any soil/subsoil that is to receive a layer of imported planting soil over it. The laboratory report shall include the soil/subsoil's total combined silt and clay content for determining the total desirable combined silt and clay content of the final imported planting soil cover specified herein.

I. Approval of Laboratory Report:

1. Upon approval of the Laboratory's report by the Landscape Architect, the recommendations in the report shall become a part of the Specifications and the quantities of soil amendment, fertilizer and other additives shall be adjusted to conform with the report at no additional cost to the owner. Request Testing Laboratory to send one copy of test results directly to Landscape Architect and one copy to the Owner.

1.3 PROJECT/SITE CONDITIONS

A. Site Visit: At beginning of work, visit and walk the site with the Owner's Representative to clarify scope of work and understand existing project/site conditions.

B. Protection of Plants from Deer: Contractor shall be responsible for protection of all planting from deer as described in Part 3- Execution.

1.4 WARRANTY AND REPLACEMENT, PER SECTION [01 78 36]

A. Pre-Emergence Weed Killer: Warrant the work against weed growth for a period of four (4) months after application.

B. Warrant all plants and planting to be in a healthy, thriving condition until the end of the maintenance period, and deciduous trees, shrubs and vines beyond that time until active growth is evident.

C. Replace all dead and damaged plants and plants not in a vigorous condition immediately upon discovery and as directed by the Owner's Representative at Contractor's expense. Install replacement plants before the final acceptance at the size specified.

D. Warrant all plant material for a period of one year after final acceptance of the maintenance period against plant materials with defects at the time of installation.

E. Warrant plant installation and maintenance by Contractor against defects for a period of one year.

PART 2 PRODUCTS

2.1 PLANTS

A. Plant the variety, quantity and size indicated. The total quantity tabulated on the drawings are considered approximate and furnished for convenience only. Contractor shall perform his/her own plant quantity calculations and shall provide all plants shown on the Drawings. If plants are shown on the Drawings but are not identified, Contractor shall provide plants of similar size and variety to nearby identified plants at no additional cost to the Owner.

B. Measure trees and shrubs with branches in normal position. Height and spread dimensions indicated refer to the main body of the plant, and not from branch tip to tip.

C. Tag plants of the type or name indicated and in accordance with the standard practice recommended by the American Association of Nurserymen.

D. Install healthy, shapely and well rooted plants with no evidence of having been root-bound, restricted or deformed.

E. Ensure that the plants arrive at the site in proper condition for successful growth. Protect plants in transit from windburn and sunburn. Protect and maintain plants on site by proper storage and watering.

F. Substitutions will not be permitted, except as follows:

1. If proof is submitted to the Landscape Architect that any plant specified is not obtainable, a proposal will be considered for use of nearest equivalent size or variety with an equitable adjustment of contract price.

2. Substantiate and submit proof of plant availability in writing to the Landscape Architect within 10 days after the effective date of Notice to Proceed.

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

1. Central Leader for Single Trunk Trees: 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 the diameter of the original leader just below the pruning point shall be present.

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

3. Headed temporary branches should be distributed around and along the trunk as noted above and shall be no greater than 3/8" diameter, and no greater than ½ diameter of the trunk at point of attachment.

H. Tree Trunk:

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

a. 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.

b. Tree trunk diameter at 6" above the soil surface shall be within the diameter range shown for each container size below, except where shown otherwise:

Container	Trunk Diameter in inches	Soil level from Container Top
5 gallon	0.5" to 0.75"	1.25 to 2"
15 gallon	0.75" to 1.0"	1.75 to 2.75"
24" Box	1.5" to 2. 5"	2.25 to 3"

c. Tree trunks shall be undamaged and uncut with all old abrasions and cuts completely callused over. Do not prune plants prior to delivery.

I. Tree Roots:

1. Trunk root collar (root crown) and large roots shall be free of circling and/or kinked roots. Contractor may be required to remove soil near the root collar in order to verify that circling and/or kinked roots are not present.

2. The tree shall be well rooted in the container. When the trunk is lifted the trunk and root system shall move as one and the rootball shall remain intact.

3. The top-most roots or root collar shall be within 1" above or below the soil surface. The soil level in the container shall be within the limits shown in above table.

4. The rootball periphery shall be free of large circling and bottom-matted roots.

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

J. Shrubs:

1. Each shrub must stand upright without support.

2. All container shrubs shall be free of girdling roots, defined as those roots greater than 1/8" diameter circling the periphery of the rootball. The top of the rootball shall be free of "Knees" (roots) protruding above the soil, and the bottom shall be free of matted roots.

K. Bamboo:

1. Bamboo shall be as indicated on the Drawings.

2. Bamboo shall be measured from the top of the rhizome mass (soil line) to the tip of the shoot.

L. Grasses (Turf):

1. Turf Seed:

a. At least 98% pure, weed-free mixture and a minimum of 85% germination, recleaned, Grade A "new crop" seed, delivered in the original containers, unopened and bearing a guaranteed analysis and dealer's label. Mixture as follows:

Tall Fescue Mix
30% CAMARILLO Dwarf-type Fescue
30% WILDCAT Turf-type Tall Fescue
30% CAREFREE Turf-type Tall Fescue
10% Blue Grass
Seed Rate: 10 pounds/1,000 square feet

Dwarf Fescue Mix
30% MONTAUK Dwarf-type Fescue
30% GENESIS Dwarf-type Fescue
30% CAMARILLO Dwarf-type Fescue
10% Blue Grass
Seed Rate: 10 pounds/1,000 square feet

Shade/Sun Mix
25% STALLION Perennial Ryegrass
25% CASINO Brand Perennial Ryegrass
25% Creeping Red Fescue
15% Kentucky Bluegrass

10% CHATEAU Kentucky Bluegrass
Seed Rate: 8 pounds/1,000 square feet

Salt-Tolerant Turfgrass Park Mix
20% Arena Perennial Ryegrass
40% ColiseumPerennial Ryegrass
20% Fiesta 3Perennial Ryegrass
10% Midnight Kentucky Blue Grass
10 % SeaLink Slender Creeping Red Fescue
Seed Rate: 8 pounds/1,000 square feet

Seeded Playfield Mix
35% Focust Tall Fescue
% WatchdogTall Fescue
15% Arena Perennial Ryegrass
% Fiesta 3 Perennial Ryegrass
Seed Rate: 10 pounds/1,000 square feet
No-Mow or Mow-Free Seeded Mix
Blend of Tall-type Fescue available from Pacific Coast Seed as "NonMow Fine Fescue Blend", 34% Festuca rubra subsp. Rubra 'Jasper II'- Creeping Red Fescue; 33% Festuca rubra subsp. Commutate 'Intrigue'- Chewings Fescue; & 33% Festuca longifolia 'Minotaur' – Hard Fescue, (925) 373-4417; or Delta Blue Grass MowFree Fescue Blend, 30% Spartan II Hard Fescue; 30% Azay Blue Sheep Fescue; 20% Victory II Chewings Fescue & 20% Jasper II Creeping Red Fescue, (800) 637-8873; or approved equal.
Seed Rate: Minimum 8 pounds/1,000 square feet

2. Turf Sod:

a. Blends as follows:

Tall Fescue Sod Mix (Grown on Sand)
80% ti 90% Dwarf-type Fescue and Tall-type Fescue
10% to 20% Blue Grass
Available from Delta bluegrass (800) 637-8873

No-Mow/Mow-Free Sod Mix (Grown on Sand)
Blend of Tall-type Fescue available from Pacific Coast Seed as "NonMow Fine Fescue Blend", 34% Festuca rubra subsp. Rubra 'Jasper II'- Creeping Red Fescue; 33% Festuca rubra subsp. Commutate 'Intrigue'- Chewings Fescue; & 33% Festuca longifolia 'Minotaur' – Hard Fescue, (925) 373-4417; or Delta Blue Grass MowFree Fescue Blend, 30% Spartan II Hard Fescue; 30% Azay Blue Sheep Fescue; 20% Victory II Chewings Fescue & 20% Jasper II Creeping Red Fescue, (800) 637-8873; or approved equal.

3. Sod Thatch:

a. Machine cut sod to a uniform thickness of 3/4-inch excluding top growth and thatch. Each individual sod piece shall be strong enough to support its own weight when lifted by the ends, in vigorous condition, dark green in color, free of disease, weeds and harmful insects. Broken pads, irregularly shaped pieces, and torn and uneven ends will be rejected.

M. Special Hydroseed Mixes for Erosion Control (Non-irrigated unless noted otherwise):

1. Seed: Incorporate the following seed uniformly in hydromulch with tackifier at the specified rates per acre. Provide seed of the latest crop, labeled in accordance with the California Food Agricultural Code with the following ingredients per acre:

   Erosion Control Hydroseed Mix:
   65% Zorro Fescue (Festuca megalura)
   35% Hykon Clover / Rose Clover (Trifolium hirtum)
   Seed Rate: 60 lbs/acre
   Wood Fiber: As specified below, minimum 1,800 lbs/acre
   Fertilizer (16-20-0): 450 lbs/acre
   Stabilizer: As provided with Hydroseed Mulch with Tackifier specified below, minimum 80 lbs/acre

   As available from Pacific Coast Seed, Livermore, CA (925) 373-4417; Delta Growers Seed, Stockton, CA (209) 931-0684 and others.

2. Seeds of Legumes: Inoculated with pure culture of nitrogen-fixing bacteria prepared specifically for legume species in accordance with inoculant manufacturer's instructions.

3. Seed Certification: All seed shall be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. In addition, the container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. Prior to seeding at the request of the owner, the contractor shall provide a letter of certification, original Association of Official Seed Analysts (AOSA) seed test results, and calculations of PLS content.

4. Seed Inoculation: All legume seed shall be pellet-inoculated and provided in Bulletin AXT-280 of the University of California Cooperative Extension, "Pellet Inoculation of Legume Seed." Inoculant sources shall be species specific and shall be applied at a rate of 2 pounds of inoculant per one hundred pounds of seed.

5. Fiber Mulch with Tackifier: ["Conwed Fibers Hydro Blanket" at the rate of 3000 lbs per acre (for slopes flatter than 3:1)] ["Conwed Fibers Hydro Blanket" at the rate of 4000 lbs. per acre (for slopes 3:1 or steeper)] ["Conwed Fibers Flex Terra" at the rate of 4000lbs. per acre for very steep, difficult slopes], Buffalo Grove, IL, (800) 366-1180. Or equal: fibrous, wood cellulose with tackifier containing no growth or germination inhibiting factors and manufactured in such a manner that after addition and agitation in slurry tanks with fertilizer, seed, water and other approved additives, the fibers in the material become uniformly suspended to form a homogeneous slurry; and that when hydraulically sprayed on the ground, the material forms a blotter-like ground cover impregnated uniformly with seed; and which, after application, allows the absorption of moisture and rainfall to percolate to the underlying soil. The fibrous mulch in its air-dry state shall contain not more than 15% by weight of water. The fiber shall have a temporary green dye and shall be accompanied by a certificate of compliance stating that the fiber conforms to these specifications.

6. The Tackifier/Stabilizer: Shall be an organic substance supplied in powder form and shall be psilium-based and packed in clearly marked bags stating the contents of each package. The California Department of Food and Agriculture shall certify the material as an Auxiliary Soil Chemical.

7. Hydroseed Fertilizer: Hydroseed fertilizer to be used in the slurry shall be commercial fertilizers conforming to the requirements of the California Food and Agricultural Code;

uniform in composition, with a guaranteed chemical analysis of 16% Nitrogen, 20% Phosphoric Acid, and 0% Potash (16-20-0) plus Sulfur (approximately 15%).

2.2 FERTILIZERS

A. Commercial fertilizer, pelleted or granular form, conform to the requirements of Chapter 7, Article 2, of the Agricultural Code of the State of California for fertilizing materials as follows:

Type A:
6% Nitrogen, 20% Phosphorus Acid and 20% Potash, (6-20-20).

Type B:
21 gram planting tablets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Agriform or 10gm BestPacks packets 20% Nitrogen, 10% Phosphoric Acid and 5% Potash (20-10-5) available from Best Fertilizer Co.

Type C:
Complete fertilizer 21% Nitrogen, 7% Phosphoric Acid and 14% Potash (21-7-14).

If commercial fertilizer having this analysis is not obtainable, other similar commercial fertilizer may be used providing it meets the approval of the Landscape Architect.

a. Maintenance Fertilizer: Type C

b. Iron Sulfate: Agricultural dry form

c. Sod Fertilizer: Provided by grower.

d. Bamboo Maintenance Fertilizer: Slow-release Scotts Osmocote High N with micro-nutrients (22-4-8) topdressing.

B. Organic Amendment: For use with in situ soils (on-grade):

1. Ground Redwood or Ground Fir Bark with the following properties:

Percent Passing	Sieve Designation	
100	9.51 mm	3/8"
50-60	6.35 mm	1/4"
20-40	4.76 mm	No. 4
0-20	2.38 mm	No. 8 8 mesh

Redwood Sawdust
Dry bulk density, lbs. per cu. yd., 260-280
Nitrogen stabilized - dry weight basis, min. 0.4%
Salinity (ECe): 4.0 maximum
Organic Content: 90% minimum
Reaction (pH): 4.0 minimum

Ground Fir and/or Pine Bark
Dry bulk density, lbs. per cu. yd., Min. 350
Nitrogen stabilized - dry weight basis, min. 0.5%
Salinity (ECe): 4.0 maximum
Organic Content: 90% minimum
Reaction (pH): 4.0 minimum

2. Submittal: Submit one pint sample along with analytical data from an approved laboratory for degree of compliance to the Landscape Architect within two weeks after award of Contract.

C. Ground Nitrolized Fir Bark Organic Amendment: For use with Raised Contained Planter Backfill Mix:

1. Ground Nitrolized Fir Bark with the following properties:

a. Grain size distribution:

Percent Passing	Sieve Designation	
100	9.51 mm	3/8"
95-100	6.35 mm	1/4"
80-100	4.76 mm	No. 4
75-100	2.38 mm	No. 8 8 mesh
20-70	1.00 mm	No. 18 16 mesh
0-40	500 micron	No. 35 32 mesh

b. Dry bulk density, lbs. per cu. yd., Min. 350

c. Nitrogen stabilized - dry weight basis, min. 0.5%

d. Salinity (ECe): 4.0 maximum

e. Organic Content: 90% minimum

f. Reaction (pH): 4.0 minimum

2. Submittal: Submit one pint sample along with analytical data from an approved laboratory for degree of compliance to the Landscape Architect within two weeks after award of Contract.

D. Plant Backfill:

1. Except for acid loving plants (Azaleas, Rhododendrons, Ferns, Camellias, etc.), use a mixture of 2 parts soil from the hole, and 1 part amendment with iron added at the following rates:

Size	Rate
1 gallon can plants	iron, 1/4 cup
5 gallon can plants	iron, 1/3 cup
15 gallon can plants	iron, 1/2 cup
24" box and larger	iron, 1 cup

a. Mix the iron, amendment and soil thoroughly for use only in the top 8 inches of backfill around plants. For acid loving plants, mixture to be 1/2 soil from the hole and 1/2 amendment only in the top 8 inches.

E. Mulch:

1. Organic Mulch:

a. Decorative Fir bark, dark in color; [Small 1/4-inch to 3/4-inch] [Medium 1/2-inch to 1-1/2-inch] [Large 1-1/2-inch to 3-inch] size.

b. Walk-On Bark; Coarsely shredded White Fir, Red Fir or Pine bark.

c. Redwood Bark; Single grind (Coarse) Coast Redwood Bark (Gorilla Hair)

d. Redwood Bark; Double grind (Fine) Coast Redwood Bark

2. Rock Mulch:

1) Hard, durable smooth, river washed stone, [3/4-inch to 1-inch] [1-inch to 1-1/2 inch] diameter in [color range], Lin Creek or equal.

b. Bioswale Mulch: Hard, durable smooth, river washed stone, [3/4-inch to 1-inch] [2-inch to 4-inch] diameter in [color range], Lin Creek or equal. Mulch shall cover the soil, a minimum 3" thick layer.

3. Submittal: Submit samples of organic and rock mulches to the Landscape Architect for approval within two weeks of award of Contract. Resubmit until acceptable to Owner, at no extra cost.

F. Tree Support Poles (On-Grade Planting): Peeled lodge pole pine logs, clean, smooth, new, and sized as follows:

1. Support poles for trees up to 36” box size.

2. Type: Peeled lodge pole pine logs, clean, smooth, new, and sized as follows:

a. Two-inch (2") diameter by eight feet (8') long for trees less than 8' high and 1" caliper.

b. Three-inch (3") diameter by eight to ten feet (8' - 10') long for trees greater than 8' high and 1-1/2" and larger caliper.

G. Tree Ties:

1. Rubber strap, 24-inch minimum length without sharp edges adjacent to trunk, V.I.T. cinch-tie, Dublin, CA, (818)882-9530, or approved equal.

H. Tree Guying:

1. Install guying if subgrade does not accept poles sufficiently to stabilize the tree, or unless otherwise noted on Drawings.

2. For trees 3" to 6" caliper, 1/8" galvanized steel cable with 21" minimum long rubber tree collar, secured with cable clamp, 3" take-up eye to eye turnbuckle, and attached to anchor for below-grade location, Duckbill Model 68 DTS, or approved equal.

3. For trees in raised planters, provide expansion bolt anchors into concrete planter walls and secure cables to anchor bolts as accepted by Owner's Representative.

I. Support for Bamboo:

1. Contractor shall provide temporary bamboo frame supports system made from 1 ½” to 2” diameter bamboo poles wired together with 12 ga. bare copper wire, or similar as accepted by Owner’s Representative. Support shall be neat, uniform and orderly.

2. Submittal: Submit shop drawing for approval showing temporary bamboo support system

J. Root Barrier:

1. UB 18-2 as manufactured by Deep Root Corporation (800)458-7668, Root Solutions, Inc. (800) 554-0914, or equal.

K. Bamboo Rhizome Barrier:

1. Black, smooth polyethylene barrier, 30” wide as manufactured by Deep Root Corporation (800)458-7668.

L. Existing Planting Soil (Topsoil):

1. Existing Planting Soil (topsoil) is defined as on-site surface soil. Satisfactory planting soil shall be free of subsoil, clay, lumps, stones, and other objects over 4" in diameter, and without weeds, roots, and other objectionable material.

2. Strip planting soil up to a depth of 12”. Do not inter-mingle planting soil with subsoil or other objectionable material if encountered within the 12” depth. Topsoil stripping is limited to area outside “Drip Line” of existing trees to remain and areas indicated on drawings and as approved by the Owner's Representative.

3. Remove heavy growths of grass from areas before stripping.

4. Stockpile topsoil in storage piles in areas shown, or where designated by Owner. Do not mix topsoil with subsurface soils. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

5. If herbicide contamination is suspected then a radish/ryegrass growth trial must be performed. Consult with Landscape Architect prior to decision to test or not.

6. If sufficient on-site surface topsoil is not available, provide imported planting soil as specified below. Placement of dissimilar soils shall be coordinated with irrigation system valving to maintain separate valves for dissimilar soils.

M. Subsoil Sampling Submittal (Existing Site Soil):

1. Contractor to obtain a minimum of one representative sample of existing site soil from approved site soil location(s) where any subgrade soil is to receive a layer of imported planting soil over it and submit sample to an accredited Soils Laboratory for analysis and comparison to imported soil for evaluation of compatibility. The laboratory report shall show chemical analysis stating source, fertility, agricultural suitability and particle size including total combined silt and clay content for determining the total desirable combined silt and clay content of the imported planting soil.

2. Submittal: Submit sample and analysis report for approval by the Landscape Architect as noted in PART 1, Submittals.

3. Imported Planting Soil:

a. Imported Planting Soil for general use in augmenting Existing Planting Soil shall be fertile, friable, natural, productive soil containing a normal amount of humus, and shall be capable of sustaining healthy plant life. Imported planting soil shall be screened and shall be free of subsoil, heavy or stiff clay, rocks, gravel, brush, roots, weeds, noxious seeds, sticks, trash, and other deleterious substances. Soil shall not be infested with nematodes or with other noxious animal life or toxic substances. Soil shall be obtained from well-drained, arable land, and shall be of an even texture. Soil shall not be taken from areas on which are growing any noxious weeds such as Morning Glory, Sorrel, or Bermuda Grass.

b. Imported Planting Soil shall have a pH value of between 6.0 and 7.5, a boron concentration of the saturation extract of less than 1 ppm, salinity of the saturation extract at 25 degrees C. of less than 4.0 millimoles, and a sodium absorption rate (SAR) of less than 8.

c. The silt and clay content of Imported Planting Soil shall not exceed that of the existing soil it is to be placed over. Except where otherwise required, it shall be a "Sandy Loam" as classified in accordance with USDA Standards with a combined total of between 25% to 40% Clay and Silt.

d. Submittal: Submit for approval a 1-quart sample of proposed import soil, together with a standard soil analysis report by an accredited soils analyst showing chemical analysis stating source, fertility, agricultural suitability and particle size distribution of the soil. Deliver the sample to the Landscape Architect minimum two weeks before starting the contemplated hauling of the soil.

e. Submittal: Also, provide Existing Site Soil sample analysis report for comparison with the Imported Planting Soil report.

f. Following approval of the sample, provide a one-half cubic yard sample, which shall be stored at the site of work for comparison with subsequent loads of soil. The comparison sample shall be protected by a cover until the furnishing of all soil has been completed and accepted. Should the soil submittal lack certain requirements which can be added to the soil, the Landscape Architect will consider a request by the Contractor to amend the soil as recommended by the Soils Analyst at the Contractor's expense.

N. Bioswale Planting Soil Backfill Mix:

1. Bioswale backfill mix to receive planting shall be as specified below and as shown in Drawings (guidelines courtesy of Soil & Plant Laboratory, Inc. Santa Clara, CA):

a. The mineral component shall be classified as USDA sand or loamy sand and shall conform to the following particle size and characteristics.

US Sieve	Size (mm)	Class	% weight retained
#10	2.0	Gravel	0-10
#270	<0.05	Silt & Clay	6-12
Rocks ½ to 1 inch =		0-5% by volume with none > 1 inch	
Organics		0-3% by weight for below 6 inches from finish grade	

b. Percolation Rate: Must fall in the range of 10 inches per hour Initial Rate and 5 inches Sustained rate as determined by SPL method A06-2.

c. Chemistry Suitability Considerations:

1) Salinity: Saturation Extract Conductivity (ECe) Less than 3.0 dS/m @ 25o C.

2) Sodium: Sodium Adsorption Ratio (SAR) Less than 6.0

3) Boron: Saturation Extract Concentration Less than 1.0 ppm

4) Reaction: pH of Saturated Paste: 5.5 – 7.8 without high lime content.

d. Profile Preparation: If organic content of the mineral component is less than 0.6% weight, then it should be blended with compost, as described below, in volume proportions of 5% compost to 95% mineral. After placement the top 6 inches should be blended with compost. If bulk blended, proportions should be 1 part compost to 4 parts of the above mineral component. If blended in place this would be equivalent to 4 ½ cubic yards per 1000 square feet for blending to 6 inches.

e. Yard Waste Compost (specification courtesy of Soil and Plant Laboratory, Inc. Santa Clara, CA)

1) Gradation: A minimum of 90% of the material by weight shall pass a ½" screen. Material passing the ½" screen shall meet the following criteria.

Percent Passing	Sieve Designation
85 – 100	9.51 mm (3/8")
50 – 80	2.38 mm (No. 8)
0 – 40	500 micron (No. 35)

2) Organic content: Minimum 50% based on dry weight and determined be ash method. Minimum 250 lbs. organic matter per yard of compost.

3) Carbon to nitrogen ratio: Maximum 35:1.

4) pH: 5.5 – 8.0 as determined in saturated paste.

5) Soluble salts: Soluble nutrients typically account for most of the salinity levels but sodium should account for less than 25% of the total. To avoid a leaching requirement, the addition of the compost shall result in a final ECe of the amended soil of less than 4.0 dS/m @ 25 degrees C. as determined in a saturation extract. Use the following table to determine the maximum allowable ECe (dS/m of saturation extract) of compost at the desired use rate.

Desired Use Rate		Salinity (ECe) of On-Site Soil		
Cu. Yds. Amendment per 1000 sq. ft. for incorporation to 6" depth	Volume Percentage of Amendment	3 dS/m	2 dS/m	1 dS/m
		Maximum ECe of Compost		
2	11	7	14	21
3	16	5	9.5	14
4	22	3.5	7	10.5
5	27	3	5.5	8.5

Example: Specification calls for 4 cu. yds. Compost per 1000 sq. ft. to a 6" depth, and site soil has an ECe of 2.0.

In order to avoid exceeding an ECe of 4 in the final blend, compost ECe should be less than 5.5 dS/m.

6) Contaminants: The compost shall be free of contaminants such as glass, metal and visible plastic. Heavy metals, fecal coliform, and Salmonella sp shall not exceed levels outlined in California Integrated Waste Management regulation/

7) Maturity characteristics:

a) Color: dark brown to black

b) Odor: Acceptable = none, soil-like, musty or moldy
Unacceptable = sour, ammonia or putrid

c) Particle characterization: Identifiable wood pieces are acceptable but the balance of material should be soil-like without recognizable grass or leaves.

2. Bioswale Backfill Mix is available from TMT Enterprises, www.tmtenterprises.net, (408) 432-9040,1996, San Jose, CA; American Soil and Stone, in Richmond, CA (510) 292-3000 and San Rafael, CA (415) 456-1381; and Lyngso Garden Materials, www.lyngsogarden.com, (650) 364-1730, Redwood City, CA.

3. Submittal: submit for approval a 1-quart sample of proposed BIOSWALE PLANTING SOIL BACKFILL MIX, together with a standard soil analysis report by an accredited soils analyst showing chemical analysis stating source, fertility, agricultural suitability, particle size distribution of the soil, and percolation rate. Deliver the sample to the Owner's Representative minimum two weeks before starting the contemplated hauling of the soil.

O. Imported Planting Sand:

1. 100% medium/coarse, washed, sharp, angular, silt-free sand with the following sieve analysis:

USDA Discipline Name	Particle Size mm	USDA Standard Sieve #	% Retained	% Passing
Gravel	4.76	4	0%	100%
Fine Gravel	2.00	10	0-5%	95-100%
Very Coarse Sand	1.00	18	0-10%	90-100%
Coarse Sand	500 micron	35	0-35%	65-100%
Medium Sand	250 micron	60	50-100%	0-50%
Fine Sand	105 micron	140	0-30%	0-20%
Very Fine Sand	53 micron	270	0-15%	0-5%
Silt and Clay		Pan	0-5%	

Reaction (pH) of the saturated sand shall be between 6.0-8.0 as determined on the saturation extract solution:

2. Permissible range of Salinity, Boron and Sodium as follows:

1) Salinity (Ece) 0-3.0 dS/m

2) Boron 0.1.0 ppm

3) Sodium 0-20 meq/L

3. Submittal: Submit one pint of Imported Planting Sand sample, product's technical data sheet, and analysis report from an approved soils laboratory for approval by the Landscape Architect. The analysis report shall include degree of compliance to these specifications.

P. Lava Rock Aggregate:

1. Required properties:

a. Grain size distribution, per Sieve Analysis by ASTM 136:

U.S. Std. Sieve Size	% Retained per Screen	% Weight Passing - Cumulative
12.5mm	0	95-100
8 mm	1	90-100
4.75 mm (#4)	58	35-50
1.18 mm (#16)	34	0-20

.850 mm (#20)	0.9	0-20
.500 mm (#35)	0.1	0-20
.212 mm (#70)	0.6	0-20
.150 mm (#100)	1	0-15
.075 mm (#200)	3	0-5
.053 mm (#270)	1	0-5

b. The sieve analysis shall be as shown above and with not more than 5% passing the #200 sieve.

1) pH: 6.0 to 7.8

2) Chloride: ppm 9.5 to 19

3) Sulfate: ppm .4 to 1.1

4) Absorption: 15 to 30%

5) Loose Unit Weight: 43 Lbs PCF (ASTM C 29)

6) Absorption: Lava Rock aggregate shall retain a minimum of 18% of its weight in absorbed water and shall be free of toxic materials, insects, diseases, weed seeds and other pests

2. Submittal: Submit one pint Lava Rock Aggregate sample, product's technical data sheet, and analysis report from an approved soils laboratory for approval by the Landscape Architect. The analysis report shall include degree of compliance to these specifications.

Q. Raised/Contained Planter and Planter Pot Soil Backfill Requirements:

1. Raised / Contained Planter Backfill Includes the following:

a. "Raised/Contained Planter Base Soil": a mixture of 50% herein specified Imported Planting Sand and 50% herein specified Lava Rock Aggregate. Planter Base Soil shall be installed in bottom of raised planters up to minus 12 inches from finish grade.

b. "Raised/Contained Planter Topping Soil Mix": a mixture of 70% of above described "Raised/Contained Planter Base Soil" and 30% herein specified Nitrolized Fir Bark Organic Amendment, and Raised Planter Fertilizer ingredients listed below. Planter Topping Mix shall be installed only in the top 12 inch layer of raised planters.

c. Raised Planter Fertilizer

Ingredient	Rate per cubic yard of Topping Mix
Potassium Nitrate 13-0-44	0.75 pound
Calcium Nitrate 15.5-0-0	0.5 pound
Urea Formaldehyde 38.0 0	0.5 pounds
Single Superphosphate 0-25-0	2.5 pounds
Calcium Carbonate Lime	4.0 pounds
Kaiser 65 Dolomite	4.0 pounds
Iron Sulfate (min. 20% Fe)	1.0 pounds

d. Submittal: Submit one pint samples of both the above described Raised/Contained Planter Base Soil Backfill, and the Raised/Contained Planter

Topping Soil Backfill along with analytical data of each from an approved laboratory for degree of compliance.

R. Pre-Emergence Weed Killer:

1. Clean non-staining as recommended by a licensed pest control specialist.

S. Filter Fabric:

1. Polyester or polypropylene non-woven filter fabric with uniform fiber distribution by "Terra Bond" #1115, "Mirafi, Inc." #140N, or approved equal.

T. Perforated Drain Pipe:

1. Polyvinyl Chloride (PVC) pipe and pipe fittings shall meet extra strength minimum of SDR-35 of the requirements of ASTM Specification D3034.

2. Perforated and non-perforated corrugated polyethylene pipe, 3- to 10-inch diameter, shall meet the requirements of ASTM D883 and ASTM F412, and shall conform to Section 68 of the Standard Specifications.

a. Corrugated polyethylene pipe fittings shall comply with all requirements of AASHTO M-252-85I for 3- to 10-inch diameter pipe. Couplings shall be split or snap-on type for perforated pipe and split couplings with gaskets for non-perforated pipe. Cutting pipe with integral couplings will not be allowed.

b. Corrugated polyethylene pipe and fittings manufactured by Advanced Drainage Systems, Inc., shall be considered the standard to determine compliance to this specification.

3. Inspection Tube Cap:

a. Provide black or chocolate-brown tube cap. If pre-colored caps are unavailable, provide caps painted with one coat chocolate-brown color using fat, exterior grade latex paint as accepted by Owner's Representative.

U. Permeable Backfill (Filter Rock):

1. Permeable backfill used in subsurface drain installations to be Class 2 permeable material in conformance with Section 68 "Subsurface Drains" of the Standard Specifications; gradation to 3/4" maximum size without fines. Submit Sample for approval.

V. Erosion Control Netting:

1. New, with a uniform, open plain-weave, flame-retardant mesh. The mesh shall be natural brown-tan and 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. Furnish jute mesh in rolled strips to meet the following requirements:

a. Width: 48 inches, with a tolerance of one-inch wider or narrower.

b. Not less than 78 warp ends per width.

c. Not less than 41 weft ends per yard.

d. Weight shall average 1.22 pounds per linear yard, with a tolerance of 5 percent heavier or lighter.

W. Vine Ties:

1. Provide vertical supports for all vines as required for vines to climb onto shown horizontal supports (trellis, arbor, etc.). Vertical support shall be clear vinyl coated 1/8" stainless steel cables secured taut with aluminum turnbuckles and cable clamps at base and top of structure. If a suitable connection point at base of structure is unavailable, anchor the cable i ground with 1 inch by 15 inch galvanized pipe stake driven flush with drilled hole to receive the cable, or similar approved method. Train vine branches to supports with green nursery tape.

X. Arbor-Guard:

1. AG 8-4 as manufactured by Dimex (800/334-3776), or approved equal.

Y. Header Board (Metal):

1. 3/16" X 4" by 8' black anodized finish with 12" min long stakes set ½" below grade at each joint and maximum 4' spacing, in-line joints without offset or double thickness, by Sure-Loc, knieboer@surelocedging.com, (800) 787-3562; Aluminum Pro, or approved equal.

Z. Header Board (Wood):

1. 2 by 6 inch "Rough" Construction Heart Redwood with 2 by 4 by15" Construction Heart Redwood stakes at each joint and maximum 4' spacing.

AA. Header Board (Recycled Plastic):

1. 1 by 4 inch "bender board", color brown with standard stakes maximum 4' spacing.

BB. Weed Barrier Landscape Fabric:

1. Spun-bound polypropylene, 1.5ox. Fabric weed inhibitor, having a permeability rate of 247 gpm/sf min., 91% opaque and UV treated.

PART 3 EXECUTION

3.1 FINE GRADING AND SOIL PREPARATION

A. General:

1. Soil in all planting areas shall be moist, but not so moist that it sticks to a hand shovel, and loose and friable to a minimum depth of 12 inches with a relative maximum compaction of 85%. Rip and scarify and dry any areas that do not meet this requirement.

B. Before proceeding with the work: Carefully inspect all areas and verify all dimensions and quantities. Immediately inform the Landscape Architect of any discrepancy between the drawings and specifications and actual conditions and secure approval to proceed.

3.2 PLACEMENT OF RAISED/CONTAINED PLANTER SAND BACKFILL MIX

A. Raised/Contained Planter Sand Backfill Mix Placement: Prior to installing planter mix, inspect the waterproofing and drainage installation of the container to verify that it is approved and acceptable to receive the planter mix soil. Install Raised Planter Base Soil

and Raised Planter Topping Mix as described in PART 2 -PRODUCTS herein. Install specified Raised Planter Topping Mix as a final 12 inch thick lift in all raised planters to finished grades and contours indicated. Specified Raised Planter Base Soil backfill shall be placed below the 12 inch topping mix.

3.3 LIME TREATED SOIL REMOVAL

A. All Lime treated soils shall be removed full depth of treated soil from planting areas where it occurs and replaced with approved planting soil as accepted by Owner's Representative.

B. As-Built Drawing Requirement: Contractor shall field measure and record all lime treated areas on As Built Drawings showing both depth and extent of areas treated to aid in subsequent removal of material in planting areas.

C. Following removal of lime treated material, scarify subgrade to a minimum depth of 6 inches and test for drainage.

D. Test subgrade in all planting areas for drainage by flooding with minimum 4 inch depth of water puddle and verify complete absorption of standing water within two hours. If standing water is still present after two hours, provide perforated pipe and drain rock "French Drain" system in bottom of non-draining planters and connect to storm drainage system, as accepted by Owner's Representative prior to backfilling with approved planting soil.

3.4 PLANTING SOIL PLACEMENT

A. Planting Soil Placement:

1. Inspect planting areas and remove all base rock and other foreign material. Verify placement of planting soil within dripline of trees with Owner's Representative. Except within tree driplines, rip all planting areas in two directions full depth of compacted fill (to a minimum of 12 inches) into undisturbed native soil prior to backfilling. Scarification of any planting area which cannot be accomplished with a tractor shall be accomplished by an alternative method approved by the Owner’s Representative to the specified depth to ensure proper percolation/drainage.

2. Prior to placing planting soil secure the Owner’s Representative's acceptance of the planting areas subgrade condition. Test depth of loose soil with hand shovel in presence of Owner's Representative in several locations as directed. After acceptance of the planting areas subgrade condition, uniformly distribute and spread planting soil backfill over scarified subgrade in planting areas as specified and compact to a maximum of 85% relative compaction.

3. Do not work planting soil in a wet or muddy condition or dump or spread in areas where subgrade is not in proper condition.

4. Water settling, puddling, and jetting of fill and backfill materials as a compaction method is not acceptable.

5. Provide a minimum of 12” depth in planting areas, or more where shown or specified otherwise.

B. Planting Soil Placement in Planting Islands and Adjacent to Pavement Areas:

1. Provide planting soil as a final lift in all planting areas within and adjacent to paved areas and other construction where native site soil has been covered by engineered

fill and/or base rock. Remove all engineered fill, base rock and compacted subgrade full depth of compaction and replace with approved planting soil, a minimum lift of 12". Unless shown otherwise, finish grade in planting islands shall be crowned with a minimum 2 % pitch to the edges.

2. All planting areas soil shall be loose and friable prior to planting. Rip any overly compacted and re-compacted planting areas in two directions full depth of compacted soil prior to planting.

3. Planting operations shall be performed only during periods when beneficial results can be obtained. When excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped until conditions are satisfactory.

4. Thoroughly wet down the planting areas to settle the soil and confirm irrigation coverage and operation. Allow soil to dry so as to be workable as described herein.

5. Drag to a smooth, even surface. Grade to form all swales. Pitch grade with uniform slope to catch basins, streets, curb, etc., to ensure uniform surface drainage. Areas requiring grading include adjacent transition areas that shall be uniformly sloped between finish elevations. Slope surface away from walls so water will not stand against walls or buildings. Control surface water to avoid damage to adjoining properties or to finished work on the site. Take required remedial measures to prevent erosion of freshly graded areas and until such time as permanent drainage and erosion control features have been installed. Refer to Erosion Control Netting below for treatment of slopes 3:1 and steeper.

6. Finish Grade: Hold finish grade and/or mulch surface in planting areas1/2-inch below adjacent pavement surfaces, tops of curbs, manholes, etc. The subgrade of the mulch in mulched planting areas shall be a minus 2 inches for a distance of 12 to 18 inch from the edge of pavement. The remainder of the planting area shall be graded to receive the required 3 inch layer of mulch.

7. In Situ Soil Preparation:

    a. Spread organic amendment, iron and Type A fertilizer evenly over installed and rough graded on-site topsoil in all planting areas including turf, ground cover and shrub areas at the following rates:

        1) Organic Amendment: 6 cubic yards per 1,000 square feet

        2) Fertilizer: Type-A (6-20-20) at 20 lbs. per 1,000 square feet.

        3) Iron Sulfate: 10 lbs. per 1,000 square feet

    b. In the case of a contradiction between the quantity of organic amendment required by the Contractor-obtained soils laboratory analysis and the specified quantity shown above, the greater of the two quantities shall take precedence.

    c. Rototill above additives into soil 6 to 8 inches deep. Keep iron sulfate off pavement and other surfaces to prevent rust staining. Correct all rust damage to work.

    d. Planting soil shall have a pH range of 6.5 to 7.5.

8. After the rototill work, float areas to a smooth, uniform grade as indicated on the drawings. Slope all planting areas to drain. Roll, scarify, rake and level as necessary to obtain true, even planting surfaces. Remove rocks, sticks and debris 1 inch and

larger in size in turf areas and 2 inches or larger in shrub and ground cover areas. Secure approval of the grade by the Landscape Architect before any planting.

3.5 WEED GERMINATION

A. Following soil preparation and fine grading of planting areas, irrigate the planting areas to germinate any weed seeds for a minimum period of 21 days. Maintain the soil in a damp condition for a minimum depth of 4 inches. Following approval of the weed germination by the Owner's Representative, spray kill the weeds using a short lived systemic weed killer that will not affect subsequent planting. Confirm the weed kill and allow the soil to dry out to optimum degree for planting prior to planting.

3.6 BIOSWALE PLANTING SOIL BACKFILL MIX

A. Install the above specified bioswale backfill mix as shown in Drawings after approval of the drainage material installation.

3.7 ROOT BARRIER

A. Install in continuous sheet parallel and adjacent to curb or pavement edge as required on drawings and in accordance with manufacturer's recommendations.

3.8 EROSION CONTROL NETTING

A. Verify finished grades and provide Jute Mesh with single grind Redwood bark mulch over the mesh on all slopes 3:1 and steeper as accepted by the Owner's Representative. Install jute mesh loosely up and down the slope in accordance with manufacturer's specifications and as follows. Fit the soil surface contour and hold in place with 12-inch long, 11-gauge (minimum) steel wire staples driven vertically into the soil at 18- to 24-inch spacing. Jute mesh strips shall overlap along all edges at least 6 inches. Ends of side strips shall be buried into the soil at least 6 inches. Drive staples along edges to securely anchor mesh to ground.

3.9 SEEDED TURF PLANTING

A. Lightly roll surface and reshape to level humps and hollows. Secure the Landscape Architect's approval before seeding.

B. Sow seed at rate noted above. Use an approved seeding method, sowing one-half of the amount in one direction and the remaining one-half in a direction 90 degrees to the first during a windless period. Rake lightly to cover seed. Hydroseeding is also an acceptable turf seeding method.

C. Wet seeded areas slowly but thoroughly and keep moist, but not saturated, at all times until the grass has germinated.

3.10 SODDED TURF

A. Lightly roll surface and re-shape to level humps and hollows. Secure Landscape Architect's approval prior to sodding. Do not sod on dry soil.

B. Lay first strip of sod along a straight line (use a string in irregular areas). Butt joints tightly, do not overlap edges. On second strip, stagger joints. Use a sharp knife to cut sod to fit curves, edges and sprinkler heads.

C. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to sod and to water until installation is complete.

D. After laying all sod, roll lightly to eliminate irregularities and to form good contact between sod and soil. Avoid a heavy roller and excessive initial watering.

E. Thoroughly water the completed sod surface to at least 8 inches deep. Repeat sprinkling at regular intervals to keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application.

F. Turf with subsurface drip irrigation shall require 21 days minimum supplemental hand watering until sod is established.

G. Protect turf areas by erecting fences, barriers and signs necessary to prevent trespass.

H. Keep barriers neat and well maintained.

3.11 TREE AND SHRUB PLANTING

A. Mark tree and shrub locations on site using stakes, gypsum or similar approved means and secure location approval by the Landscape Architect before plant holes are dug. Review location of plants in relationship to irrigation heads and adjust location(s) that interfere with the function of the spray heads as accepted by the Landscape Architect prior to planting.

B. Test drainage of plant beds and pits by filling with water (minimum 6"). The retention of water in planting beds and plant pits for more than two (2) hours shall be brought to the attention of the Landscape Architect. If rock, underground construction work, tree roots, poor drainage, or other obstructions are encountered in the excavation of plant pits, alternate locations may be selected by Landscape Architect.

C. Excavate tree, shrub and vine pits as follows:

Excavation for	Width	Depth
Boxed Trees	3 X Box width	depth of Box
Canned Trees (15 gc)	3 X Can width	depth of Can
Canned Shrubs/Vines (1 or 5 gc)	2 X Can width	depth of Can

D. Square Tree Pits:

1. Drilled tree pits shall be modified to a square pattern with pit walls scarified to promote root penetration.

    1) Break and loosen the sides and bottom of the pit to ensure root penetration and water test hole for drainage as required above.

    2) Backfill plant holes with mix as specified, free from rocks, clods or lumpy material. Backfill native soil free of soil amendments under rootball and foot tamp to prevent settlement. Backfill remainder of the hole with soil mix and place plant tablets or packets (Type B fertilizer) 3 inches below finish grade and 1/2-inch from roots at the following rates:

Size	Rate
1 gallon can plant	1 tablet or packet
5 gallon can plant	3 tablets or packet
15 gallon can plant	6 tablets or packet
24-inch box plant	6 tablets or packet
36-inch box plant	8 tablets or packet

2. Carefully remove and set plants without damaging the rootball. Superficially cut edge roots vertically on three sides. Remove bottom of plant boxes before planting. Remove sides of boxes after positioning the plant and partially backfilling.

3. Set plants in backfill with top of the rootball 2 inches above finished grade. Backfill remainder of hole and soak thoroughly by jetting with a hose and pipe section. Water backfill until saturated the full depth of the hole.

4. Build 6" high watering basin berms around trees and shrubs to drain through rootball. Basins are not required around trees in turf areas.

5. Stake and/or guy trees as detailed and noted herein. Drive stake(s) until solid (at least 12" beyond bottom of rootball) and remove excess stake protruding above top tree tie to prevent rubbing against branches. Avoid driving stakes through rootball. If subgrade does not accept stakes to a stable degree, delete stakes and guy the trees as specified herein and as detailed. Locate tree ties to avoid contact with tree branches. Locate top tie at tree flex point.

6. Guy Trees using 3 cables with below grade anchors and rubber collars secured with cable clamps.

7. Remove any soil from top of plant rootballs and secure Landscape Architect's approval of rootball height prior to mulching.

8. After approval of rootball height, install mulch as required below.

3.12 BAMBOO PLANTING

A. After installation and approval of bamboo rhizome barrier and subsurface drainage if required, mark bamboo locations and secure location approval by the Landscape Architect before planting.

B. Rest bamboo rootball on compacted soil substrate and backfill with plant backfill mix. Match Planted height with original height planted at nursery.

C. Support for Bamboo

1. Refer to temporary bamboo frame support requirements above in Part 2 - PRODUCTS

3.13 GROUND COVER PLANTING

A. Plant in neat, straight, parallel and staggered rows as indicated on plan. Plant first row one-half required ground cover spacing behind adjacent curbs, structures, or other plant bed limits. Plant ground cover to edge of water basins of adjacent trees and shrubs.

3.14 MULCH

A. Except where rock mulch is required, mulch all tree, shrub and ground cover areas with organic mulch to a 3-inch depth, except adjacent to walkways where soil grade is 2 inches below top of pavement, mulch shall be 2 inches deep, and 2-inches deep where planting ground cover plants from flats. Hold bark mulch away from base (trunk) of plant 4" or as directed by the Landscape Architect. Individual trees and/or shrubs planted in non-irrigated areas shall, at minimum, receive bark mulch over their watering basin and berm. No mulch is required around trees in turf areas.

B. Install rock mulch to a 4-inch depth where shown.

3.15 RAISED/CONTAINED PLANTER PLANTING

A. Install “Raised/Contained Planter Base Soil”, "Raised/Contained Planter Topping Soil Mix" and “Raised Planter Fertilizer” ingredients as shown and as specified. Refer to Raised/Contained Planter Backfill Mix Requirements herein.

3.16 ROOT BARRIER

A. Install in linear fashion along and adjacent to the edges of the planting area as detailed or, if not shown, in accordance with manufacturer's recommendations. Set top of barrier approximately ½-inch above finished soil surface to allow concealment with mulch, as accepted by Owner’s Representative.

3.17 BAMBOO RHIZOME BARRIER

A. Install in linear fashion along and adjacent to the edges of the planting area as detailed or, if not shown, in accordance with manufacturer's recommendations. Overlap at joints minimum 12” using double stick tape as recommended by barrier manufacturer. Set top of barrier approximately 2-inches above finished soil surface to allow concealment with mulch, as accepted by Owner’s Representative.

3.18 HEADER BOARD (METAL)

A. Install in continuous strips as indicated and in accordance with manufacturer’s recommendations with stakes spaced 48 inches on center maximum and at all joints.

3.19 HEADER BOARD (WOOD)

A. Install in continuous, smooth alignment as indicated with stakes spaced 48 inches on center maximum and at all joints.

3.20 HEADER BOARD (RECYCLED PLASTIC)

A. Install per Manufacturer’s recommendations and in continuous, smooth alignment as indicated with stakes spaced 48 inches on center maximum.

3.21 ARBOR-GUARD

A. Install arbor guard on all trees in turf areas. Install according to manufacturer's specifications and as shown.

3.22 WEED BARRIER

A. Install Weed Barrier Landscape Fabric in accordance with manufacturer’s recommendations and as follows:

1. Remove all weeds, grasses and unwanted living plants from the area to receive the weed barrier. Lay; fabric over the entire area overlapping a minimum of 6 inches.

3.23 PLANT POT INSULATION

A. Install specified insulation flush with the inside walls of the planter as accepted by the Owner’s Representative.

3.24 PRE-EMERGENCE WEED KILLER

A. Apply pre-emergence weed killer in all areas to receive ground cover planting. Work shall be done under the supervision of a person licensed by the State of California as a pest control applicator and holding a qualified applicator license or a Qualified Applicator Certificate. Obtain approval of the finish grades prior to applying weed killer and coordinate planting and watering with the pest control specialist prior to planting. Take care to keep weed killer off areas to be seeded.

1. Hydroseed:

a. Hydroseed preparation: Do all slurry preparation at the job site as per above for seeded planting.

b. Hydroseed Application:

1) General: All hydroseed applications are to be applied in a sweeping motion to form a uniform application and form a mat at the specified rates.

2) Two-Step Hydroseed Application:

Step One:

Lbs/Ac	Material
2,000	Hydrstraw, or equal
1000	7-2-3 Slow release fertilizer
Varies	Seed as per mix specification
60	AM120 Mychorrizal Inoculant
100	Organic Stabilizer – M Binder or equal

Step Two:

Lbs/Ac	Material
2,000	Hydrostraw, or equal
1000	Organic Stabilizer – M Binder or equal

c. Protection, handling of unused loads and reseeding as per seeded turf section above

3.25 WATERING

A. Water all trees, shrubs and ground cover immediately after planting. Apply water to all plants in sufficient amounts as conditions require to maintain the plants in a healthy vigorous growing condition until completion of the Contract. Do supplemental hand watering of plants as required to maintain optimum moisture in the root zones.

3.26 PRE-MAINTENANCE PERIOD REVIEW AND APPROVAL OF PLANTING

A. Maintain plants from time of delivery to site until final acceptance of landscape installation.

B. Receive approval of the installed planting prior to commencement of planting establishment maintenance period. Notify the Landscape Architect a minimum of seven (7) days prior to requested review. Before the review, complete the following:

1. Complete all construction work.

2. Present all planted areas neat and clean with all weeds removed and all plants installed and appearing healthy.

3. Plumb all tree stakes.

4. Seed [sod] all turf areas.

5. No partial approvals will be given.

3.27 PLANTING ESTABLISHMENT MAINTENANCE

A. General Requirements:

1. Maintenance Period: The planting establishment maintenance period required shall be 90 calendar days after all planting is complete, turf is seeded, and installation approved. A longer period may be required if the turf is not thick, vigorous and even and has been mowed a minimum of 4 times, or if the plant material is not acceptably maintained during the maintenance period. The maintenance period may be suspended at any time upon written notice to the Contractor that the landscaping is not being acceptably maintained, and the day count suspended until the landscape is brought up to acceptable standards as determined by the Landscape Architect.

2. Planting establishment maintenance immediately follows, coincides with, and is continuous with the planting operations, and continues through turf installation, and after all planting is complete and accepted; or longer where necessary to establish acceptable stands of thriving plants.

3. Keep all walks and paved areas clean. Keep the site clear of debris resulting from landscape work and maintenance operations.

4. Check sprinkler systems at each watering; adjust coverage and clean and repair non-functioning heads immediately. Adjust timing of sprinkler controller to prevent runoff and flooding.

5. Maintain adequate moisture depth in soil to ensure vigorous growth, without overwatering. Check rootball of trees and shrubs independent of surrounding soils and hand water as required.

6. Keep Contract areas free from weeds by cultivating, hoeing or hand pulling. Use of chemical weed killers will not relieve the Contractor of the responsibility of keeping areas free of weeds over 1-inch high at all times.

B. Plant Protection and Replacement:

1. Protect all areas against damage, including erosion, trespass, insects, rodents, deer, disease, etc. and provide proper safeguards, including trapping of rodent and applying protective sprays and fencing to discourage deer browsing. Maintain and keep all temporary barriers erected to prevent trespass.

a. Repair all damaged planted areas. Replace plants and reseed or resod turf immediately upon discovery of damage or loss, including damage from Deer and Rodents.

C. Tree, Shrub and Ground Cover Maintenance:

1. Maintain during the entire establishment period by regular watering, cultivating, weeding, repair of stakes and ties, and spraying for insect pests. Prune when requested by the Landscape Architect.

2. Keep watering basins in good condition and weed-free at all times.

3. Replace all damaged, unhealthy or dead trees, shrubs, vines and ground covers with new stock immediately; size as indicated on the drawings.

D. Turf:

1. Maintain during the entire establishment period. Cut as frequently as growth of grass requires. Cut to a height of two inches (2"), unless otherwise directed by the Landscape Architect.

2. Maintain constant moisture to a depth of eight inches (8").

3. Trim edges of turf at paving and headerboards at time of second cutting, and at each later cutting.

4. Keep a 2-foot diameter area at tree trunk free of turf at all times to serve as a mowing band. Do not create low area around base of tree.

5. Keep turf areas free of undesirable weeds and grasses by the application of suitable selective weed killers or hand pulling.

6. Reseed all damaged areas as soon as evident.

7. Repair any hollow, settled or eroded areas by filling, rolling and resodding.

8. See 3.10.F above for irrigation establishment requirement.

E. Non-irrigated Hydroseeded Erosion Control Areas: To be watered by winter rains unless noted otherwise.

F. Fertilizing:

1. Upon approval and after submitting fertilizer delivery tags, maintenance fertilization shall begin 30 days after planting is complete. Fertilize all turf and ground cover areas by broad-casting Type C (21-7-14) fertilizer at the rate of 5 lbs. per 1,000 square feet evenly throughout. Reapply every forty-five (45) days until acceptable.

2. During the winter, for quick turf greening effect, calcium nitrate (15.5-0-0) may be applied at the rate of 6 lbs. per 1,000 square feet.

3. Early spring and fall substitute a complete fertilizer such as 15-15-15 applied at the rate of 6 lbs. per 1,000 square feet, to help insure continuing adequate phosphorus and potassium.

4. Apply ammonium sulfate fertilizer as necessary to maintain vigorous, green grass between fertilizings mentioned above.

5. Observe plant's color, and if a soil pH imbalance is suspected, take soil samples and obtain laboratory analysis for confirmation. Take necessary action recommended in laboratory analysis such as top dressing with soil sulfur, leaching soil, etc.

3.28 FINAL PLANTING REVIEW AND ACCEPTANCE, PER SECTION [01 77 00]

A. At the conclusion of the Maintenance Period, schedule a final review with the Owner, the Owner's maintenance person, and the Landscape Architect. On such date, all project improvements and all corrective work shall have been completed. If all project improvements and corrective work are not completed, continue the planting establishment, at no additional cost to the Owner, until all work has been completed. This condition will be waived by the Owner under such circumstances wherein the Owner has granted an

extension of time to permit the completion of a particular portion of the work beyond the time of completion set forth in the Agreement.

B. Submit written notice requesting review at least 10 days before the anticipated review.

C. Prior to review, weed and rake all planted areas, repair plant basins, mow and edge turf, plumb tree stakes, clear the site of all debris and present in a neat, orderly manner.

END OF SECTION