SECTION 32 93 00 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Trees.
2. Shrubs.
3. Ground Cover.
4. Plants & Plant Plugs.
5. Edgings.
6. Mineral Mulch.
7. Geotextile Fabric.
8. Planting & Mulching.
9. Maintenance & Warranties.

B. Related Sections:
1. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
2. Division 1 Section “Temporary Soil Erosion and Sedimentation”
3. Division 33 Section “Stormwater Structures” for below-grade drainage of landscaped areas, paved areas and wall perimeters.

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated and or diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated and or diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed

from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

H. Finish Grade: Elevation of finished surface of planting soil.

I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

L. Planting Area: Areas to be planted.

M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS - GENERAL

A. General: Provide each submittal according to the Conditions of the Contract and Division 1 Specification Sections, and as described below.

1. Label each submittal with the Specification number and line-item number(s).
2. Do not combine submittals from different Sections.

B. Planting Submittals Tracking List: Submit spreadsheet indicating each submittal required by this Section, labeled by name and Specification line-item number, with columns for each submittal indicating dates of submittals, reviews, and completion of reviews/revisions process.

1. Submit to Owners Representative no later than three months after project start date, or two months prior to planting, whichever is earlier.
2. Update and submit monthly during months of preparation, purchasing, planting, maintenance, and close-out.
3. Provide copies of each correspondence to Project Landscape Architect, ThinkGreen LLC.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in 3- by 5-inch print or as high quality 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. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:

1. Manufacturer's certified analysis for standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Samples: For each of the following:

1. 2 lb of topsoil and planting soil mixes for each soil type tested, in labeled plastic bags.
2. Organic amendment: duplicate samples of 1 quart.
3. 2 lb of organic mulch for each color and texture required, in labeled plastic bags.
4. Mineral mulch: Eight stones of 3 inch diameter and larger sizes, and one-half gallon bag of smaller stones, for each type of mineral mulch, in labeled plastic bags, including full range of color and size.

D. Qualification Data: For Landscape Installer.

E. Material Test Reports: For existing surface soil, AND imported topsoil, AND planting soil mixes.

1. Existing Source Soil: 1 material test report for each topsoil type.
2. Imported Topsoil and Planting Soil Mixes: 1 material test report for each 100 cubic yards of material from random samples.

F. Planting Schedule: Indicating anticipated planting dates for exterior plants, in each area of the site.

1. Submit no later than two months prior to planting.
2. Submit update one week prior to completion of planting markouts.
3. Submit update one week prior to start of planting.
4. Provide copies directly to Project Landscape Architect, ThinkGreen LLC.

G. Plant Sources: Indicating nursery locations and list of plants supplied by each nursery.

1. Submit, in writing, a plant list outlining the source for all plants, their estimated delivery date, and length of time plants are to be stored at an off-site location.
2. Provide a copy directly to Project Landscape Architect, ThinkGreen LLC.

H. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

I. Plant Substitutions Requests: Plant substitutions will be permitted only upon written approval by the Owners Rep and/or their designee, using input from Project Landscape Architect.

1. Submit no later than one month prior to anticipated purchasing.
2. Provide a copy directly to Project Landscape Architect, ThinkGreen LLC.

1.6 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network, the American Nursery and Landscape Association and or have landscape installation credentials to be reviewed by Owners Representative.
2. Experience: Five years' experience in landscape installation in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, with installation, maintenance and irrigation specialty area(s), designated CLT-Exterior.
    b. Certified Landscape Technician - Interior, designated CLT-Interior.
    c. Certified Ornamental Landscape Professional, designated COLP.

5. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Certificates: Provide certificates required by authorities having jurisdiction, including any composted materials containing sewage sludge. Approval as EPA Type 1 “exceptional quality” is required as well as well standards for application of composted organic materials by the Commonwealth of New Jersey.

D. Sources for Soil Components and Planting Soil Mixes: Submit information identifying sources for all soil components and the contractor responsible for mixing of planting soil mixes.
1. Owner or Owners Representative shall have the right to reject any soil supplier.
2. Soil mix supplier shall have a minimum of five years experience at supplying custom planting soil mixes.
3. Submit supplier name, address, telephone and fax numbers and contact name. the soil scientist can assist in locating acceptable suppliers within the area.
4. Submit certification that the accepted supplier is able to provide sufficient quantities of materials and mixes for the entire project. Indicate quantity and type of material from each supplier.

E. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.

    a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
4. Refer to Section 329200 Turf and Grasses for additional requirements.

F. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1., “American Standard for Nursery Stock.”

1. Selection of plants will be made by the Owners Representative, who will tag plants at their place of growth before they are prepared for transplanting.

G. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

H. Plant Material Observation: Owners Representative may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Tree tagging with Owners Representative at Nursery locations is required with three days notice minimum.
2. Notify Owners Representative of sources of planting materials seven days in advance of delivery to site.

I. Preinstallation Conference: Conduct conference at project site to review planting intent with Owners Representative.

1.8 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall contact the Owners Representative 24 hours prior to the delivery of any plant material.

B. The Contractor is responsible for having the planting plan, grading plan, plant list, and all applicable installation details on site at all times so that it can be reviewed by the Owners Representative.

C. Plant material shall be inspected by the Owners Representative at the job site upon delivery. Only plants approved by the Owners Representative shall be stored or planted. The Owners Representative reserves the right to refuse plant material they deem unacceptable. Rejected plant materials shall be removed from the job site on the day of rejection.

D. Each tree, shrub, groundcover flat, container of fertilizer or other construction material shall be labeled by grower or manufacturer as separate items.

1. Plant identification labels shall be durable and waterproof. Labels shall be securely attached to plants, bundlers, or containers of plants and shall state the correct botanical plant name and size. Labels shall not be removed from the plants until final acceptance.

E. Bulk deliveries of mulch, topsoil, and inert material shall be accompanied with delivery tickets showing weight, origin, and composition and stored in such a manner as to prevent the inclusion of foreign materials.

F. Plant Storage: Trees, shrubs, and groundcovers not installed on the day of delivery to the site shall be stored and protected.

1. No plants shall be stored on the site for a period greater than 5 business days.

2. Storage locations shall be continually shaded and protected from the wind.

3. Plants stored on the project site shall be protected from drying at all times by covering the balls or roots with moist woodchips, shredded bark, peat moss or other suitable heel-in material.

4. If planting is delayed more than six hours after delivery, protect from weather and mechanical damage, and keep roots moist.

5. Do not remove container-grown stock from containers before time of planting.

6. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

G. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

H. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

I. Deliver plants freshly dug.

J. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

K. Handle planting stock by root ball.

L. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

1.9 PROJECT CONDITIONS

A. Planting areas shall be free of waste or debris developed by other trades. Any discrepancy from such conditions shall be reported to the Owners Representative before beginning any installation.

B. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

C. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Architect no fewer than five days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Architect's/Owners written permission.

D. No plants are to be planted when the ground is frozen or during days of extreme heat (≥80 degrees). No plants shall be installed before March 1st or after the ground freezes.

1. If work must be performed outside of these parameters, the Owners Representative must be contacted.

E. Planting Restrictions: Within the limitations stated above, plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Trees and Shrubs:
   a. Spring Planting: March 1 to May 1
   b. Fall Planting: September 1 to November 1
2. Plugs
   a. Spring Planting: March 1 to May 1
   b. Fall Planting: September 1 to October 15
3. Bulbs
   a. Fall Planting: September 1 to October 15
4. Contractor shall schedule tree selection and digging operations so as to comply with nursery industry recognition of 'Spring Dig Only' or 'Fall Hazard' plant materials. No substitutions of plant materials will be allowed for fall planting based on unavailability due to 'Spring Dig Only' or 'Fall Hazard' restrictions.

F. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

G. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.10 ACCEPTANCE

A. Conditions at end of Maintenance Period: If plant material is reviewed when it is in full leaf, leaves shall be plump with water with a shape indicative of the species and shall be free of insect, pest and disease damage. Twigs shall have living cambium for their full length. Twigs and branches shall have a full bud set for their full length, including terminal buds. Trunks and branches shall be free of frost cracks, sunscald, damage due to insect, pests and disease, structural defects, and damage resulting from machinery or tools. Plant materials inspected and reviewed when the plants are not in full leaf shall have twigs, branches and trunks meeting the above requirements. All plants regardless of the season of review shall have a minimum of 75 percent healthy, balanced branching structure with a healthy terminal leader(s) with viable terminal bud(s).

B. If any number of plants do not meet these Acceptance Standards at the time of inspection, or if in the Owners Representative's opinion, workmanship is unacceptable, written notice will be given by the Owners Representative to the Contractor in the form of a punch list, which itemizes necessary planting replacements and/or other deficiencies to be remedied. The Contractor's responsibility for maintenance of all plants shall be extended until replacements are made or other deficiencies are corrected. Plants that do meet these Acceptance Standards shall be removed from the project within seven days of receipt of punch list. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner.

C. Following the correction of all punch list deficiencies, the Contractor shall request in writing that the Owners Representative formally inspect the planting work. If plant materials and workmanship are acceptable, the Owners Representative will issue a written acceptance and date of Substantial Completion.

1.11 WARRANTY

A. Special Warranty: Installer agrees to warrant, repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.

2. Warranty Periods begin from Date of Substantial Completion:
a. Refer to Establishment Period article in this Specification.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

4. Exclusions from Warranty: Where evidence exists of damage that is beyond the control of the Landscape Contractor, advise Owners Representative in writing, stating location and nature of Damage. The Owners Representative, upon receipt of such notice, may order the Landscape Contractor to correct the damage at Owner’s expense, or exclude the damaged areas from the warranty and correct the damage by any arrangement deemed appropriate by the owner.

1.12 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: up to the end of the Establishment Period.

B. Ground Cover and Plants: Maintain for the following maintenance period by watering, weeding the plants, fertilizing, and other operations required to establish healthy, viable plantings.

1. Maintenance Period: up to the end of the Establishment Period.

C. Watering: Review watering needs, temporary establishment irrigation system operations, and weather conditions with Owner.

D. During the Maintenance Period, any decline in the condition of plantings shall require the contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturists to inspect plant materials, identify problems, and recommend corrective measures. The Owners Representative shall be notified immediately of such actions.

E. If Owner chooses to perform all or part of the maintenance during the warranty period, submit maintenance instructions to be performed by the owner and set up a schedule for regular on-site review to assure compliance. Submit instructions and schedule before date of Substantial Completion.

1. Owner's performance of maintenance during the warranty period shall not limit Contractor's obligations under provisions of the warranty.

1.13 CHEMICAL SPRAYING PROGRAM

A. Follow requirements as specified in Section 329200 Turf and Grasses.

PART 2 - PRODUCTS

2.3 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

2.4 SHADE AND FLOWERING TREES

A. Shade Trees: Single-Stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1
   1. Provide balled and burlapped trees.

B. Small Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:
   1. Stem Form: Single stem or, as indicated, multistem, with multiple stems.
   2. Provide balled and burlapped trees.

C. Multistem Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:
   1. Stem Form: Clump and shrub.
   2. Provide balled and burlapped trees.

2.5 DECIDUOUS SHRUBS & EVERGREEN SHRUBS

A. Form and Size: Deciduous shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.
   1. Provide balled and burlapped or, if indicated or allowed, container-grown shrubs.

2.6 GROUND COVER PLANTS

A. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.

2.7 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

   1. Organic Matter Content: 25 -55% percent of dry weight.
   2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.8 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight. Follow soil test requirements.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

E. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 5-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

F. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.9 PLANTING SOILS

A. Planting Soil, Use local, native planting soil: ASTM D 5268 topsoil, with pH range of 5.5 to 8, a minimum of 10 percent organic material content (by weight) and a maximum of 20 percent; free of stones 1/2 inch or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil as recommended by required soil tests.

1. Ratio of Loose Compost to Topsoil by Volume: per required soil tests and recommendations.
2. Weight of Bonemeal per required soil tests and recommendations.
3. Weight of Superphosphate per required soil tests and recommendations.
4. Weight of Commercial Fertilizer per required soil tests and recommendations.
5. Weight of Slow-Release Fertilizer per required soil tests and recommendations.

2.10 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, subject to approval of Owners Representative, consisting of the following:

1. Type: Triple Shredded hardwood.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

B. Mineral Mulch (Riverstone): Free from deleterious materials, consisting of the following:

1. Color: as indicated on Drawings.
2. Size Ranges: as indicated on Drawings.
3. Product: as indicated on Drawings.

2.11 Staking and Guying:

A. Tree stakes shall be two 2”x2” stakes, a minimum of 6 feet long with 2 feet in ground. Guying shall consist of nylon straps wrapped loosely around the trunk.

2.12 Non-woven Geotextile Fabric: Mirafi 140N or approved equal.

PART 3 - EXECUTION

3.3 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.4 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree, shrub, plant locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Owners Representative's acceptance of layout before excavating or planting. Make minor adjustments as required. Notify Owners Representative three days prior to layout and staking.

D. Lay out plants at locations directed by Owners Representative. Stake locations of individual trees and shrubs and outline areas for multiple plantings. Notify Owners Representative three days prior to layout and staking.

3.5 PLANTING AREA ESTABLISHMENT

A. Prior to commencing any finished grading, the Contractor shall notify the Owners Representative allowing enough time for a thorough inspection of the subgrade.

B. Perform all finished grading necessary to bring site to required finished elevations indicated on the grading plan and to allow for positive drainage.

C. Use topsoil stockpiled on the site during earthwork operations and provide any additional topsoil required. Refer to Section 329200 Turf and Grasses for additional requirements.

D. Topsoil shall not be placed when the subgrade is frozen, excessively wet, or extremely dry, and no topsoil shall be handled when in a frozen or muddy condition.

E. Loosen subgrade of planting areas to a minimum depth of 12 inches. Remove stones larger than 1/2 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer as directed or required by soil tests directly to subgrade before loosening.
2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer as directed or required by soil tests on surface, and thoroughly blend planting soil.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

3. Spread planting soil to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 8 inches of subgrade. Spread remainder of planting soil.

F. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

G. After completion of topsoil placing and approval of finish grading by the Owners Representative, remove any excess topsoil from the site and deliver to location determined by the Owners Representative.

H. Leave finish graded area clean, well raked, and ready for planting.

I. Before planting, restore planting areas if eroded or otherwise disturbed after finish grading.

3.6 PLANTING LAYOUT:

A. Layout of plants prior to planting shall be verified by the Owners Representative. Any alterations to the planned planting layout must be approved by the Owners Representative and/or their designee.

3.7 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately three times as wide as ball diameter for balled and burlapped, balled and potted, container-grown stock.
2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected overnight, after working hours and when unattended by Installer's personnel.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations may be used as planting soil if it meets the requirements recommended by the soil tests.

C. Obstructions: Notify Owners Representative if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations, or if hardpan is encountered.

D. If an impervious, hard pan layer remains in the bottom of the pit after excavation the Owners Representative shall be notified prior to any additional planting activities to inspect the excavation and develop an alternate course of action. The Owners Representative may recommend the following action in item 1 below:

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet , whichever is less, and backfill with free-draining material.

2. Refer to Section 329200 Turf and Grasses for 3.2.D for required treatment in hardpan areas that is also required in planting areas if the general area is hard pan.

E. Drainage: Notify Owners Representative if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

F. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.8 TREE AND SHRUB PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.

1. Use local, native planting soil that meet the soil test requirements in planting areas shown on landscape plans for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 3 inches from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set balled, potted and container-grown stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.

1. Use local, native planting soil that meets the soil test requirements for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 3 inches from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.9 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Landscape Plans & Details. Notify Owners Representative three days prior to layout and staking.

B. Use local, native planting soil that meet the soil test requirements for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 STAKING AND GUYING:

A. Staking and guying shall be done immediately after trees are planted using specified staking materials.

B. Trees shall stand plumb prior to staking.

3.11 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 2-inch to 3-inch average settled thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 2-inch to 3-inch average settled thickness of organic mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.12 PLANT MAINTENANCE

A. The Contractor shall be responsible for providing the following maintenance on all newly planted trees, shrubs, groundcovers, and herbaceous perennials.
1. Watering: During any 7 day period that yields less than 1/2 inch of rainfall - as measured by a nearby Weather Service station - the contractor shall water all plant material to maintain a constant suitable moisture level for adequate plant growth. The Contractor shall be responsible for providing all watering hoses, watering devices or other water delivery methods including tankers. The Owner will provide the water source.
2. Insect, Disease, and Weed Control: Weed control shall be by mechanical or hand weeding. The use of herbicides, insecticides, fungicides, nematicides, fumigants or other chemicals are only acceptable upon approval by the Owner under the provisions of a Chemical Spraying Program approved by the Owners Representative.

B. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

C. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

D. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 ESTABLISHMENT PERIOD

A. The Establishment Period will begin upon notice of substantial completion by the Contractor and inspection by the Owners Representative and will last for a total of 120 days during the growing season. The growing season is defined as the period between April 1st and November 1st. If planting occurs in the autumn, the Establishment Period will carry over to the next growing season until a total of 120 days have been established.

B. Plants shall be guaranteed during the Establishment Period and shall be alive and in satisfactory growth at the end of that period. Plants which die within the establishment period will be removed by the Contractor within five (5) business days of notice or the Owner will remove the plants and bill the Contractor accordingly. Replacement plants may be installed during the next appropriate planting season for the species specified. All replacements shall be plants of the same species and size specified in the plant list. They shall be furnished and planted according to all previous specifications noted and shall be guaranteed through an additional 120 day Establishment Period, as outlined above. The cost of replacement shall be borne by the Contractor, except for possible replacements resulting from removal, loss or damage due to vandalism, or act of neglect on the part of others.

C. The Contractor is responsible for all maintenance activities, including watering, weeding, insect and disease control or other methods required to insure the overall health of the plants during the Establishment Period.

3.14 FINAL INSPECTION AND ACCEPTANCE:

A. At the end of the Establishment Period, an inspection will be made by the Owners Representative and the Contractor. Any plant determined to be of insufficient quality or unsatisfactory growth, as determined the Owners Representative, shall be removed from the site and replaced at the Contractor’s expense.

3.15 RIVERSTONE, METAL EDGE RESTRAINT, AND FABRIC INSTALLATION AT DRIP STRIPS

A. Verify finish grades and review with Architect on site.

B. Excavate to depth required.

C. Compact soil under the drip strip.

D. Install metal edge restraint according to manufacturer’s instructions.

1. Tolerance: maximum 1/4” horizontal variance in 20 linear feet, and 1/2” in 50 linear feet.
2. Utilize full-length pieces wherever possible.

E. Install nonwoven geotextile fabric per manufacturer’s instructions.

1. Overlap fabric 12” minimum: lay uphill fabric over downhill fabric and install one u-shaped stake at each overlap.
2. Wrap fabric up the face of edging and wall, trim cleanly 1 inch below top of edge restraint and below top of riverstone.

F. Place riverstone and rake riverstone to settle small stones into larger stones, to meet settled depth indicated on Drawings.

3.16 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.17 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally recycle or dispose of them off Owner's property.

END OF SECTION 329300