

SECTION 32 8423

UNDERGROUND SPRINKLERS

PART 1 - GENERAL

- A. Includes But Not Limited To:
 - 1. Furnish and install planting irrigation system as described in Contract Documents complete with accessories necessary for proper function
- B. Related Requirements:
 - 1. Section 22 1116: Stop and waste valve.
 - 2. Division 26: Controller conduit and power to controller.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference: Schedule pre-installation conference before irrigation system installation begins. In addition to items listed in Division 01, demonstrate or describe method to be used to maintain head spacing from concrete and to stabilize heads.
- B. Sequencing: Install sleeves before installation of cast-in-place concrete site elements and paving.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Test and Evaluation Reports: Results of service pressure test before beginning work on system.
- B. Closeout Submittals:
 - 1. Record Drawings:
 - a. As installation occurs, prepare accurate record drawing to be submitted before final inspection, including:
 - 1) Detail and dimension changes made during construction.
 - 2) Significant details and dimensions not shown in original Contract Documents.
 - 3) Field dimensioned locations of valve boxes, manual drains, quick-coupler valves, control wire runs not in mainline ditch, and both ends of sleeves.
 - 4) Take dimensions from permanent constructed surfaces or edges located at or above finish grade.
 - 5) Take and record dimensions at time of installation.
 - b. Reduce copy of record drawing to 11 by 17 inches 275 by 425 mm, color key circuits, and laminate both sides with 5 mil thick or heavier plastic. Mount on 1/4 inch 6 mm plywood board. Drill two 1/2 inch 13 mm holes at top of board and hang on hooks in Custodial Room.
 - 2. Operations And Maintenance Manual Data:
 - a. Modify and add to requirements of Section 01 7800 as follows:
 - 1) Instruction manual that contains complete instructions for system operation and maintenance, including winterizing and first year's scheduling.
 - 2) Complete instructions on how to drain entire backflow preventer to prevent freezing.
 - 3) Manufacturer's cut sheets for each element of system.
 - 4) Parts lists for operating elements of system.
 - 5) Manufacturer's printed literature on operation and maintenance of operating elements of system.
 - 3. Final payment for system will not be authorized until Closeout Submittals are received and accepted by Architect.
- C. Maintenance Material Submittals:
 - 1. Tools:

- a. Furnish following items before Final Closeout Review:
 - 1) One heavy-duty key for stop and waste or main shut-off valve.
 - 2) One quick coupler key with brass hose swivel.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Work and materials shall be in accordance with latest rules and regulations, and other applicable state or local laws. Nothing in Contract Documents is to be construed to permit work not conforming to these codes.
- B. Qualifications:
 - 1. Installers:
 - a. Use only trained personnel familiar with required irrigation system installation procedures.
 - b. Perform installation under direction of foreman or supervisor with five years minimum experience in sprinkling system installations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. During delivery, installation, and storage, protect materials from damage and prolonged exposure to sunlight.

1.6 WARRANTY

- A. Standard one year guarantee stipulated in General Conditions Article 12.2 shall include:
 - 1. Filling and repairing depressions and replacing plantings due to settlement of irrigation system trenches.
 - 2. Adjusting system to supply proper coverage of areas to receive water.
 - 3. Ensuring system can be adequately drained.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Manufacturer List:
 - a. Carson Industries LLC, Glendora, CA www.carsonind.com.
 - b. Hunter Industries, San Marcos, CA www.hunterindustries.com.
 - c. Nibco Inc, Elkhart, IN www.nibco.com.
 - d. Rain Bird Sprinkler Manufacturing Corp, Glendora, CA www.rainbird.com.
 - e. 3M, Austin, TX www.3m.com/elpd.
 - f. Toro Company, Irrigation Div, Riverside, CA www.toro.com.
- B. Materials:
 - 1. Rock-Free Soil:
 - a. Backfill soil around PVC pipe.
 - b. Soil having rocks no larger than 1/2 inch 12 mm in any dimension.
 - 2. Pea Gravel:
 - a. For use around drains, valves, and quick couplers.
 - b. 1/2 inch 12 mm maximum dimension, washed rock.
 - 3. Sand: Fine granular material naturally produced by rock disintegration and free from organic material, mica, loam, clay, and other deleterious substances.
 - 4. Native Material: Soil native to project site free of wood and other deleterious materials and rocks over 1-1/2 inches 38 mm.

5. Topsoil: Remove rocks, roots, sticks, clods, debris, and other foreign matter over 1-1/2 inches 38 mm longest dimension encountered during trenching.
6. Pipe, Pipe Fittings, And Connections:
 - a. Pipe shall be continuously and permanently marked with Manufacturer's name, size, schedule, type, and working pressure.
 - b. Pipe sizes shown on Drawings are minimum. Larger sizes may be substituted if at no additional cost to Owner.
 - c. Hardiness Zone 5 Through 11 Pipe:
 - 1) Pressure Lines: Schedule 40 PVC.
 - 2) Lateral Lines: Schedule 40 PVC.
 - 3) Backflow Assembly Piping: Galvanized steel.
 - 4) Quick Coupler Piping: Galvanized steel.
 - d. Fittings: Same material as pipe, except where detailed otherwise.
 - e. Sleeves:
 - 1) Under Parking Area And Driveway Paving: Schedule 40 PVC Pipe.
 - 2) All Other: Class 200 PVC Pipe.
 - 3) Sleeve diameter shall be two times larger than pipe installed in sleeve.
7. Sprinkler Heads:
 - a. Each type of head shall be product of single manufacturer.
 - b. Shrub Head Bubblers:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: S-8A, S-16A series (stream spray), PCN, PCB, MSBN series.
 - b) Orbit: 5400 series.
 - c) Rain Bird: 5 Series stream bubbler, FB series (flood bubbler).
 - d) Toro: SB series (stream bubbler).
 - e) Weathermatic: 102 Series, 106 series.
 - c. Spray Heads in Shrub and Ground Cover Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: INST-12 Institutional CV series
 - b) Rainbird: 1812 SAM-PRS Series
 - c) Toro: 12P 570 ZPR series
 - d. Spray Heads in Lawn Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: INST-06, Institutional Spray Series with CV
 - b) Rainbird: 1806 SAM-PRS Series
 - c) Toro: 6P 570 ZPR series
 - e. Stream Heads, 16 to 22 foot in Shrub Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter MPR40 Sprinkler with MP Rotator nozzles
 - f. Gear Driven Rotor Pop-ups:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: I-20 Ultra Series (17 to 45 feet) with check valve
 - b) Rain Bird: 5000/5000 Plus MPR series, 25'-35',
 - c) Toro: Super 800 (28'-50') series with 5 inch pop
8. Sprinkler Risers:
 - a. Pop-up rotor sprinkler heads shall have adjustable riser assembly, four ell swing joint assembly, unless detailed otherwise on Drawings. These swing joint fittings shall be of schedule 40 PVC plastic and nipples schedule 80 gray PVC unless otherwise designated on Drawings. Horizontal nipple parallel to side of lateral line shall be 8 inches 200 mm long minimum. All other nipples on swing joint riser shall be of length required for proper installation of sprinkler heads.
 - b. Pop-up sprinkler heads shall have risers made up one of the following ways:
 - 1) Four street ells connected to lateral tee to form an adjustable riser or pop-up riser as detailed.
 - a) Rainbird: SA Series Swing Assemblies with additional street ell.
 - b) Hunter: SJ series with barbed fittings.
 - c) Equal as approved by Architect before installation. See Section 01 6200.
9. Automatic Irrigation Control Wiring And Controller:

- a. Control wire shall be UF-UL listed, color coded PVC insulated copper conductor direct burial size 14 or PE insulated 14 AWG color coded wire. Do not use green color coded wire.
 - b. Waterproof Wire Connectors:
 - 1) Type Two Acceptable Products:
 - a) DBY6 or DBR6 by 3M
 - b) DB Y6 or DBR6 by Paige Electric
 - c) Equal as approved by Architect before installation. See Section 01 6200.
 - c. Automatic controllers:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: 8 to 32 Stations: ICC Series.
 - b) Rain Bird: 6 to 24 Stations: ESP-LX Modular.
 - c) Toro: 4 to 24 Stations: TMC Series.
 - d) Weathermatic: 4 to 30 Stations: LMC Series.
 - d. Automatic Rain Sensors:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: WRFC Series Wireless Rain and Freeze Sensor
 - b) Toro: TWRS Series Wireless Rain and Freeze Sensor
10. Valves:
- a. Manual Drain Valves:
 - 1) PVC ball valve with 'T' handle on main lines and in valve boxes on lateral lines.
 - b. Automatic Valves:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: ICV-FS series
 - b) Rain Bird: PEB series
 - c) Toro: 252E Series,
 - c. Isolation Valves:
 - 1) PVC ball valves, size to match pipe size.
 - d. Backflow Preventer: Make and Model shown on Drawings or as required by local code.
 - e. Pressure Reducing Valve: Make and model shown on Drawings or as required by local code.
 - f. Quick Coupling Valves and Keys:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: HQ-33DRC with HK-4 key and HS-100 hose swivel.
 - b) Rain Bird: 33DRC, 33DK with SH-O swivel.
 - c) Toro: 474 Series 100SLLVC with single lug key.
11. Valve Accessories:
- a. Valve manifolds:
 - 1) Type Two Acceptable Products.
 - a) Action: 1800 Series, Models 18001, and 18002, 1, 1-1/2, and 2 inch 25, 38, and 50 mm sizes.
 - b) Orbit: Model 57955/ 2 port.
 - c) Rain Bird: MS Series.
 - d) Equals as approved by Architect before use. See Section 01 6200.
 - b. Valve Boxes And Extensions:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Rain Bird: VB-STD, VB-JMB, VB-STDT or VB-JMT Series, VB-STDP or VB-JMBP Series, VB-MAX series.
 - b) Carson Industries: Model 1419-12, Model 1419-18, Model 1730-18 Jumbo.
 - c) Equal as approved by Architect before use. See Section 01 6200.
 - c. Valve ID tags:
 - 1) Type Two Acceptable Products:
 - a) Rain Bird: VID1Y24, VID24Y48, VID1P24, VID24P48.
 - b) Equal as approved by Architect before use. See Section 01 6200.
 - d. Valve Box Supports: Standard size fired clay paving bricks without holes.
12. Drip System:

- a. Drip Valve Assembly:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: PCZ 101 Series, ICZ 101 Series.
 - b) Rainbird:
 - (1) Over 4 GPM: X CZ-100-B0COM series.
 - (2) Under 4 GPM: X CZ-075-PRF series.
 - c) Toro: DZK-EZF model.
 - d) Netafim:
 - (1) Over 4 GPM: LVCZ10075-HF.
 - (2) Under 4 GPM: LVCZ10075-LF.
 - b. Distribution Tubing:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Salco: PVC-AR flex hose with fittings.
 - b) Rain Bird: Swing Pipe with barbed fittings.
 - c) Hunter: SJ Series with barbed fittings.
 - d) Toro: Super Funny Pipe with barbed fittings, SPFA-5125, SPFA-51275.
 - c. Drip Emitters
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rain Bird: XBT Series.
 - b) Salco: PST drip emitters, DMT multi-outlet emitters, wye strainers, filters, PVC fittings, distribution tubing, and tubing stakes.
 - c) Rain Bird: Dripline series tubing, air relief valves, flush valves, and fittings.
 - d) Netafim: Techline CV tubing, air relief valves, flush valves, and fittings.
 - d. Valve Boxes:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Rain Bird 12 Inch 300 mm Standard: VB-STD, VB-STDT, or VB-STDP Series.
 - b) Carson Industries 12 Inch 300 mm Standard Series: Model 1419-12, Model 1419-18.
 - c) Equal as approved by Architect before use. See Section 01 6200.
 - e. Emitter Boxes:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Rain Bird VB 10 Inch 250 mm Round Series: 10RND, 10 RNDT.
 - b) Carson Industries Model 1910-10.
 - c) Equal as approved by Architect before use. See Section 01 6200.
13. Other Components:
- a. Recommended by Manufacturer and subject to Architect's review and acceptance before installation.
 - b. Provide components necessary to complete system and make operational.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Approved Installers:
 - 1. **Aqua Irrigation-Marietta, Georgia**
 - 2. **ALL-PRO Irrigation- Marietta, Georgia**
 - 3. **Sweetwater Irrigation- Norcross, Georgia**

- B. Approved irrigation system installers shall be pre-approved and included in Construction Documents by Addendum.

3.2 EXAMINATION

- A. Site Verification Of Conditions: Perform pressure test at stub-out on main water line provided for irrigation system, or at near-by fire hydrant. Notify Architect if pressures over 70 psi 480 kPA or under 55 psi 379 kPA are found to determine if some re-design of system is necessary before beginning work on system.

3.3 PREPARATION

- A. Protection:
 - 1. Repair or replace work damaged during course of the Work at no additional cost to Owner. If damaged work is new, installer of original work shall perform repair or replacement.
 - 2. Do not cut existing tree roots measuring over 2 inches 50 mm in diameter in order to install irrigation lines.
- B. Layout of Irrigation Heads:
 - 1. Location of heads and piping shown on Drawings is approximate. Actual placement may vary slightly as is required to achieve full, even coverage without spraying onto buildings, sidewalks, fences, etc.
 - 2. During layout, consult with Architect to verify proper placement and make recommendations, where revisions are advisable.
 - 3. Minor adjustments in system layout will be permitted to avoid existing fixed obstructions.
 - 4. Make certain changes from Contract Documents are shown on record drawings.

3.4 INSTALLATION

- A. Trenching And Backfilling:
 - 1. Pulling of pipe is not permitted.
 - 2. Excavate trenches to specified depth. Remove rocks larger than 1-1/2 inch 38 mm in any direction from bottom of trench. Separate out rocks larger than 1-1/2 inch 38 mm in any direction uncovered in trenching operation from excavated material and remove from areas to receive landscaping.
 - 3. Cover pipe both top and sides with 2 inches 50 mm of rock-free soil as specified under PART 2 PRODUCTS. Remainder of backfill to within 5 inches 125 mm of finish grade shall be as specified in Section 31 2323. Top 5 inches 125 mm of backfill shall be topsoil as specified in Section 32 9113.
 - 4. Do not cover pressure main, irrigation pipe, or fittings until Architect has inspected and approved system.
- B. Sleeving:
 - 1. Sleeve water lines and control wires under walks and paving. Extend sleeves 6 inches 150 mm minimum beyond walk or pavement edge. Cover sleeve ends until pipes and wires are installed to keep sleeve clean and free of dirt and debris.
 - 2. Position sleeves with respect to buildings and other obstructions so pipe can be easily removed.
- C. Grades And Draining:
 - 1. In localities where winterization is required, grade piping so system can be completely drained or blown out with compressed air. If system is not designed to be blown out with compressed air:
 - a. Slope pipe to drain to control valve box where possible.
 - b. Where this is not possible, slope pipe to a minimum number of low points. At these low points, install:
 - 1) 3/4 inch 19 mm brass ball valve for manual drain. Do not use automatic drain valves.

- 2) Install 2 inch 50 mm Class 200 PVC pipe over top of drain and cut at finish grade.
 - 3) Provide rubber valve cap marker.
 - 4) Provide one cu ft 0.03 cu m pea gravel sump at outlet of each drain.
 - c. Slope pipes under parking areas or driveways to drain outside these areas.
 - d. Provide and install quick-coupling valve or valves in location for easy blowout of entire system. Install quick coupler valves with 4 lineal feet 1 200 mm minimum of Schedule 80 PVC pipe between valve and main line.
- D. Installation of Pipe:
1. Install pipe in manner to provide for expansion and contraction as recommended by Manufacturer.
 2. Unless otherwise indicated on Drawings, install main lines and lateral lines connecting pop-up rotor and impact sprinklers with minimum cover of 18 inches 450 mm based on finished grade. Install remaining lateral lines, including those connecting drip tubing, with minimum of 12 inches 300 mm of cover based on finish grade.
 3. Install pipe and wires under driveways or parking areas in specified sleeves 18 inches 450 mm below finish grade or as shown on Drawings.
 4. Locate no sprinkler head closer than 12 inches 300 mm from building foundation. Heads immediately adjacent to mow strips, walks, or curbs shall be one inch 25 mm below top of mow strip, walk, or curb and have one to 3 inches 75 mm clearance between head and mow strip, walk, or curb.
 5. Cut plastic pipe square. Remove burrs at cut ends before installation so unobstructed flow will result.
 6. Make solvent weld joints as follows:
 - a. Do not make solvent weld joints if ambient temperature is below 35 deg F 2 deg C.
 - b. Clean mating pipe and fitting with clean, dry cloth and apply one coat of P-70 primer to each.
 - c. Apply uniform coat of 711 solvent to outside of pipe.
 - d. Apply solvent to fitting in similar manner.
 - e. Give pipe or fitting a quarter turn to insure even distribution of solvent and make sure pipe is inserted to full depth of fitting socket.
 - f. Allow joints to set at least 24 hours before applying pressure to PVC pipe.
 7. Tape threaded connections with teflon tape.
 8. If pipe is larger than 3 inches 75 mm, install concrete thrust blocks wherever change of direction occurs on PVC main pressure lines.
- E. Control Valves And Controller
1. Install valves in plastic boxes with reinforced heavy duty plastic covers. Locate valve boxes within 12 inches of sidewalks and shrub bed edges with tops at finish grade.
 2. Place 3 inches 5 mm minimum of pea gravel below bricks supporting valve boxes to drain box. Set valve boxes over valve so all parts of valve can be reached for service. Set cover of valve box even with finish grade. Valve box cavity shall be reasonably free from dirt and debris.
 3. Wiring:
 - a. Tape control wire to side of main line every 10 feet 3 000 mm. Where control wire leaves main or lateral line, enclose it in Class 200 PVC conduit.
 - b. Use waterproof wire connectors at splices and locate all splices within valve boxes.
 - c. Use white or gray color for common wire and other colors for all other wire. Each common wire may serve only one controller.
 - d. Run one spare control wire from panel continuously from valve to valve throughout system similar to common wire for use as a replacement if a wire fails. Spare wire shall be different color than other wires, except use of green wire is not acceptable. Mark spare control wire in control box as an unconnected wire. Extend spare control wires 24 inches 600 mm and leave coiled in each valve box.
- F. Backflow Preventer: (Existing not in contract)
1. Install 24 inches 600 mm minimum from structures or hardscaping.
 2. When installed adjacent to any structure, mount test cocks on side away from structure.
 3. After installation, remove handles and turn over to Owner together with extra maintenance materials.

- G. Sprinkler Heads:
 1. Set sprinkler heads and quick-coupling valves perpendicular to finish grade.
 2. Do not install sprinklers using side inlets. Install using base inlets only.
 3. Set sprinkler heads at a consistent distance from existing walks, curbs, and other paved areas and to grade by using specified components or other method demonstrated in Pre-Construction Conference.

- H. Drip Assembly:
 1. Install pipe providing for expansion and contraction as recommended by Manufacturer.
 2. Cut tubing square and remove burrs at cut ends.
 3. Distribution tubing shall be between 14 inches 350 mm minimum and 48 inches 1200 mm maximum long. Layout PVC lateral lines as necessary to keep distribution tubing lengths within specified tolerances.
 4. Locate drip emitter on uphill side of plant within rootball zone.
 5. Layout in-line tubing for trees as indicated on Drawings. Layout in-line tubing for shrubs and groundcovers so plants receive water within rootball zones.
 6. Locate in-line tubing on top of soil but under bark mulch and filter fabric.
 7. Staple in-line tubing to ground at 6 foot 1800 mm maximum intervals and within 12 inches 300 mm of ends and intersections.
 8. Assembly Using Solvent Weld Joints:
 - a. Do not make solvent weld joint if ambient temperature is below 35 deg F 2 deg C.
 - b. Clean mating pipe and fitting with clean, dry cloth. Apply uniform coat of Weld-On PVC 721 solvent to outside of pipe and inside socket of fitting. Give joint quarter turn and make certain pipe is inserted to full depth of fitting socket.
 - c. Allow joints to set 24 hours minimum before applying pressure to pipe.
 9. Assembly Using 'Funny Pipe' Type Joints:
 - a. Connect distribution tubing to lateral line using barbed ell fitting.
 - b. Connect fitting to distribution tubing using straight barbed fitting with 1/2 inch 13 mm threaded end.

- I. Before installation of sprinkler heads and drip emitters, open control valves and use full head of water to flush out system.

- J. Arrange valve stations to operate in an easy-to-view progressive sequence around building. Tag valves with waterproof labels showing final sequence station assignments.

3.5 FIELD QUALITY CONTROL

- A. Site Tests: Before backfilling main line, test pressure at 100 psi 690 kPA minimum for 2 hours minimum and make certain there are no leaks. Notify Architect 2 working days minimum before conducting test.

- B. Inspections:
 1. Architect's irrigation design consultant, or certified water auditor recommended by consultant and approved in writing by Architect, will review irrigation system before substantial completion.
 2. Installations completed after water source has been turned off for season, as determined by Architect, will be accepted following spring, after system can be checked for proper operation.
 3. Upon acceptance of irrigation system, reviewer will provide signed acceptance certificate to be included in Operations and Maintenance Manual. Certificate will include name and signature of reviewer, reviewer's company, date of review, and reviewer's telephone number.

3.6 ADJUSTING

- A. Adjust sprinkler heads to proper grade when turf is sufficiently established to allow walking on it without appreciable harm. Such lowering and raising of sprinkler heads shall be part of original contract with no additional cost to Owner.

- B. Adjust sprinkler heads for proper distribution and trim so spray does not fall on building.
- C. Adjust watering time of valves to provide proper amounts of water to plants.

3.7 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
 - 1. After system is installed and approved, instruct Owner's designated personnel in complete operation and maintenance procedures.

END OF SECTION

SECTION 32 9001

COMMON PLANTING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common procedures and requirements for landscaping work.
- B. Related Sections:
 - 1. Section 32 0501: Common Earthwork Requirements.
 - 2. Section 32 8423: Underground Sprinklers.

1.2 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Use trained personnel familiar with required planting procedures and with Contract Documents.
 - 2. Planting shall be performed under direction of foreman or supervisor with minimum five years experience in landscape installations.
- B. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference specified in Section 31 2213.
 - 2. Schedule planting pre-installation conference after completion of Fine Grading specified in Section 31 2216, but before beginning landscape work. In addition to requirements of Section 01 3000:
 - a. Establish responsibility for maintenance of new landscaping during all phases of construction period.
 - b. Prepare two typical landscape planting excavations and conduct percolation test to verify that water drains away within two hours. Discuss results of percolation tests with Architect and Owner's representative.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in containers showing weight, analysis, and name of Manufacturer. Protect materials from deterioration during delivery and while stored at site.
- B. Deliver sod, plants, trees, and shrubs in healthy and vigorous condition and store in location on site where they will not be endangered and where they can be adequately watered and kept in healthy and vigorous condition.

1.4 SEQUENCING

- A. Do not plant trees and shrubs until major construction operations are completed. Do not commence landscaping work until work of Sections 31 2216 and 32 8423 has been completed and approved.
- B. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Four Seasons Landscape Group, Bruce Bryde – 404-427-6571
 - 2. Gibbs Landscape Company, Peter Copses - 770-432-7761
 - 3. Goldleaf, Steven McNabb – 678-290-1311
 - 4. Majestic Landscapes, L.L.C. , Laurence Lines – 770-853-5097
 - 5. Ruppert Nurseries, Michael Ward – 770-931-9900
 - 6. Elite Lawns – 770-227-9991
 - 7. Equal approved by Landscape Architect during bidding. See Section 00 4334

3.2 EXAMINATION

- A. Inspect site and Contract Documents to become thoroughly acquainted with locations of irrigation, ground lighting, and utilities. Repair damage to these and other items adjacent to landscaping caused by work of this Section or replace at no additional cost to Owner.

3.3 PREPARATION

- A. Before proceeding with work, verify dimensions and quantities. Report variations between Drawings and site to Architect before proceeding with landscape work.
 - 1. Plant totals are for convenience of Contractor only and are not guaranteed. Verify amounts shown on Drawings.
 - 2. All planting indicated on Drawings is required unless indicated otherwise.
- B. Protection:
 - 1. Take care in performing landscaping work to avoid conditions that will create hazards. Post signs or barriers as required.
 - 2. Provide adequate means for protection from damage through excessive erosion, flooding, heavy rains, etc. Repair or replace damaged areas.
 - 3. Keep site well drained and landscape excavations dry.

3.4 INSTALLATION

- A. Hand excavate as required.
- B. Maintain grade stakes until parties concerned mutually agree upon removal.
- C. When conditions detrimental to plant growth are encountered, such as rubble fill or adverse drainage conditions, notify Architect before planting.

3.5 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Architect will inspect landscaping installation approximately two weeks before Substantial Completion. Replace landscaping that is dead or appears dead as directed by Architect within 10 days of notification and before Substantial Completion.

3.6 ADJUSTING

- A. Replace damaged plantings at no additional cost to Owner.

3.7 CLEANING

- A. Immediately clean up soil or debris spilled onto pavement and dispose of deleterious materials.

3.8 PROTECTION

- A. Protect planted areas against traffic or other use immediately after planting is completed by placing adequate warning signs and barricades.
- B. Provide adequate protection of planted areas against trespassing, erosion, and damage of any kind. Remove this protection after Architect has accepted planted areas.

3.9 MAINTENANCE

- A. General:
 - 1. Before beginning maintenance period, plants shall be in at least as sound, healthy, vigorous, and in approved condition as when delivered to site, unless accepted by Architect in writing at final landscape inspection
 - 2. Maintain landscaping from completion of landscape installation to 30 days after Substantial Completion Meeting. Areas sodded or seeded after November 1st will be accepted following spring approximately one month after start of growing season, May 1st or as determined by Architect, if specified conditions have been met.
 - 3. Replace landscaping that is dead or appears unhealthy or non-vigorous as directed by Architect before end of maintenance period. Make replacements within 10 days of notification. Lawn that does not live and has to be replaced shall be guaranteed and maintained an additional 30 days from date of replacement.
- B. Seeded Lawn:
 - 1. Seeded lawn areas will not be accepted as complete and 30 day maintenance period will not begin until uniform stand of grass at least 3 inches tall has been obtained.
 - 2. After grass is established and 3 inches tall, mow lawn areas at least weekly to a height of 2 inches. During this period, perform work necessary to maintain a full, even stand of grass.
 - 3. At end of 30 days of maintenance period, fertilize lawns as specified in Section 32 9113.
 - 4. Apply weed killers as necessary in order to obtain weed free lawn. Apply weed killer in accordance with manufacturer's instructions during calm weather when air temperature is between 50 and 80 deg F.
- C. Sodded Lawn:
 - 1. Maintain sodded lawn areas until lawn complies with specified requirements and throughout maintenance period.
 - 2. Water sodded areas in sufficient quantities and at required frequency to maintain sub-soil immediately under sod continuously moist 3 to 4 inches deep.
 - 3. Cut grass first time when it reaches 3 inches high. Continue to mow at least once each week throughout maintenance period. Remove clippings.
 - 4. Apply weed killer as necessary to maintain weed-free lawn. Apply weed killer in accordance with manufacturer's instructions during calm weather when air temperature is between 50 and 80 deg F.
 - 5. At end of 30 day maintenance period, fertilize lawns as recommended in Section 32 9113.
- D. Trees, Shrubs, And Plants:

1. Maintain by pruning, cultivating, and weeding as required for healthy growth.
2. Restore planting basins.
3. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical positions as required.
4. Spray as required to keep trees and shrubs free of insects and disease.
5. Provide supplemental water by hand as needed in addition to water from sprinkling system.

END OF SECTION

ATTACHMENTS

SECTION 32 9113

FINISH GRADING AND SOIL PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Perform finish grading and soil preparation work required to prepare site for installation of landscaping as described in Contract Documents.
 - 2. Furnish and apply soil additives as described in Contract Documents.
- B. Related Sections:
 - 1. Section 31 1413: Stripping and storing of existing topsoil.

1.2 REFERENCES

- A. American Society For Testing And Materials:
 - 1. ASTM 1557-02, 'Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.'

1.3 SUBMITTALS

- A. Product Data: Product literature and chemical / nutrient analysis of soil amendments and fertilizers.
- B. Samples: Sample of soil conditioner for approval before delivery to site. Include product analysis list.
- C. Quality Assurance / Control:
 - 1. Delivery slips indicating amount of soil conditioner delivered to Project site.
 - 2. Submit test on imported topsoil by licensed laboratory before use, using Owner Form 'Topsoil Test Report' provided by others for the overall landscape plans for the project. Imported topsoil shall meet minimum specified requirements and be approved by Architect before use.
 - 3. Submit report stating location of source of imported topsoil and account of recent use.

1.4 QUALITY ASSURANCE

- A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 31 2213.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. Topsoil used in landscaped areas, whether imported or from site, shall be fertile, loose, friable soil meeting following criteria:
 - a. Chemical Characteristics:
 - 1) Acidity / alkalinity range: pH 5.5 to 8.0.
 - 2) Soluble Salts: less than 3.0 mmhos/cm.
 - 3) Sodium Absorption Ratio (SAR): less than 6.0.
 - 4) Organic Matter: greater than one percent.

- b. Physical Characteristics:
 - 1) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
 - a) Sand: 15 to 60 percent.
 - b) Silt: 10 to 60 percent.
 - c) Clay: 5 to 30 percent.
 - 2) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than 1-1/2 inch in any dimension, and other objectionable materials.
 - 3) Soil shall not contain more than 2 percent by volume of rocks measuring over 3/32 inch in largest size.
- 2. Incorporate following soil amendments into topsoil used from site:
 - a. Acceptable Soil Amendments And Application Rates:
 - 1) See Soil report provided by others for overall landscape plans and specifications for the project.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.
 - b. Acceptable Fertilizers And Application Rates:
 - 1) See Soil report provided by others for overall landscape plans and specifications for the project.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.
 - c. Acceptable Soil Conditioners And Application Rates:
 - 1) Type One Acceptable Products.
 - a) GroPower Plus soil conditioner by GroPower Inc, Chino, CA (800) 473-1307 or (909) 393-3744.
 - b) Tropic Grow Coconut Coir by Pacificoair Inc, Salt Lake City, www.pacificoair.com.
 - c) 'Soil Pep.'
 - d) 'Soil's Best Friend' Composted Manure, Elberta, UT (801) 667-3500.
 - e) EPA Class 'A' co-compost or compost with SAR less than 3.0, EC less than 4.0, and CN ratio of 15 to 25:1 passing through 1/2 inch mesh screen or other product approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not commence work of this Section until grading tolerances specified in Section 31 2216 are met.

3.2 PREPARATION

- A. Protection: Protect utilities and site elements from damage.
- B. Surface Preparation:
 - 1. Disk, till, or aerate with approved agricultural aerator to depth of 6 inches.
 - 2. Seven days maximum before beginning seeding and planting:
 - a. Loosen area 4 inches deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
 - b. Rake area to remove clods, rocks, weeds, roots, and debris.
 - c. Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.
 - 3. Limit use of heavy equipment to areas no closer than 6 feet from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet.

3.3 PERFORMANCE

- A. Site Tolerances:

1. Total Topsoil Depth:
 - a. Lawn And Groundcover Planting Areas: 5 inches minimum.
 - b. Shrub Planting Areas: 12 inches minimum throughout entire shrub bed area.
 2. Finish grade of planting areas before planting and after addition of soil additives shall be specified distances below top of adjacent pavement of any kind:
 - a. Sodded Areas: 2 inches below.
 - b. Seeded Areas: One inch below.
 - c. Shrub And Ground Cover Areas: 2 inches below.
- B. Do not expose or damage existing shrub or tree roots.
- C. Redistribute approved existing topsoil stored on site as a result of work of Section 31 1413. Remove organic material, rocks and clods greater than 1-1/2 inch in any dimension, and other objectionable materials. Provide additional approved imported topsoil required to bring surface to specified elevation relative to concrete site elements.
- D. Where topsoil depth is 12 inches or greater, place topsoil in layers not to exceed 12 inches and, to prevent settling, compact to 85 percent relative density in accordance with ASTM D 1557. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
- E. Slope grade away from building for 12 feet minimum from walls at slope of 1/2 inch in 12 inches minimum unless otherwise noted. High point of finish grade at building foundation shall be 6 inches minimum below finish floor level. Direct surface drainage in manner indicated on Drawings by molding surface to facilitate natural run-off of water. Fill low spots and pockets with topsoil and grade to drain properly.
- F. Add specified soil amendments at specified rates to lawn and ground cover areas. Roto-till or otherwise mix amendments evenly into top 4 inches of topsoil. Incorporate and leach soil amendments which require leaching, such as gypsum, within such time limits that soil is sufficiently dry to allow proper application of fertilizer and soil conditioners.
- G. After landscape areas have been prepared, take no heavy objects over them except lawn rollers. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs depending on soil type. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

END OF SECTION

SECTION 32 9219

SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install seeded lawn as described in Contract Documents.
- B. Related Sections:
 - 1. Section 32 9001: Common Planting Requirements.

1.2 SUBMITTALS

- A. Quality Assurance / Control:
 - 1. Written certification confirming lawn seed quality and mix.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver seed in original sealed, labeled, and undamaged containers.
 - 1. Be certain shelf life or date for seed is shown on label.
 - 2. Be certain label verifies seed mixture required by Contract Documents.

1.4 SEQUENCING

- A. Do not commence work of this Section until work of Sections 32 9113 and 32 9300 has been completed and approved.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Seed:
 - 1. Bermuda TifGrand seed or other only if approved by the Landscape Architect.
 - 2. Purchase seeds that bear this season's certification of weight, purity, and germination from reputable seed company.
- B. Top Dressing: Peat moss.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Site Tolerances: Final grade of soil after seeding of lawn areas is complete shall be one inch below top of adjacent pavement of any kind.
- B. Seeding: After lawn areas are graded, sow seed evenly at specified rate with adequate equipment at time when little or no wind is blowing.
- C. Top Dressing: After seeding, rake or broom seed in gently and roll area to firm in seed. After rolling, cover area evenly with top dressing of peat moss at rate of two 4 cu ft bales per 1000 sq ft of area.
- D. After Top Dressing: Thoroughly water seeded areas. Reseed areas that do not show prompt germination at 15 day intervals until an acceptable stand of grass is assured.

3.2 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Seeded areas will be accepted at final inspection if:
 - a. Seeded areas are properly established.
 - b. Lawn is free of bare and dead spots and is without weeds.
 - c. No surface soil is visible when grass has been cut to height of 2 inches.
 - d. Seeded areas have been mowed a minimum of twice.
 - 2. Areas seeded after growing season has ended will be accepted following spring approximately one month after start of growing season if specified conditions have been met.

END OF SECTION

SECTION 32 9120

TOPSOIL PLACEMENT AND GRADING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Perform topsoil placement and grading work required to prepare site for installation of landscaping as described in Contract Documents.
 - 2. Furnish and apply soil additives as described in the soil report provided by others for overall landscape plans and specifications for the project.
- B.
 - 1. Section 31 1413: Stripping and storing of existing topsoil.

1.2 REFERENCES

- A. American Society For Testing And Materials:
 - 1. ASTM 1557-02, 'Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.'

1.3 SUBMITTALS

- A. Product Data: Product literature and chemical / nutrient analysis of soil amendments and fertilizers.
- B. Samples: Sample of soil conditioner for approval before delivery to site. Include product analysis list.
- C. Quality Assurance / Control:
 - 1. Submit test on imported topsoil by licensed laboratory before use, using Owner Form 'Topsoil Test Report.'
 - a. Before use, imported topsoil shall meet minimum specified requirements and be approved by Architect.
 - b. If necessary, submit proposed amendments and application rates necessary to bring imported topsoil up to minimum specified requirements.
 - 2. Submit report stating location of source of imported topsoil and account of recent use.

1.4 QUALITY ASSURANCE

- A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 31 2213.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. Topsoil used in landscaped areas, whether imported or from site, shall be fertile, loose, friable soil meeting following criteria:
 - a. Chemical Characteristics:

- 1) Acidity / alkalinity range: pH 5.5 to 8.0.
 - 2) Soluble Salts: less than 3.0 mmhos/cm.
 - 3) Sodium Absorption Ratio (SAR): less than 6.0.
 - 4) Organic Matter: greater than one percent.
- b. Physical Characteristics:
- 1) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
 - a) Sand: 15 to 60 percent.
 - b) Silt: 10 to 60 percent.
 - c) Clay: 5 to 30 percent.
 - 2) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than 1-1/2 inch in any dimension, and other objectionable materials.
 - 3) Soil shall not contain more than 2 percent by volume of rocks measuring over 3/32 inch in largest size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not commence work of this Section until grading tolerances specified in Section 31 2216 are met.

3.2 PREPARATION

- A. Protection: Protect utilities and site elements from damage.
- B. Surface Preparation:
1. Disk, till, or aerate with approved agricultural aerator to depth of 6 inches.
 2. Seven days maximum before beginning seeding and planting:
 - a. Loosen area 4 inches deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
 - b. Rake area to remove clods, rocks, weeds, roots, and debris.
 - c. Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.
 3. Limit use of heavy equipment to areas no closer than 6 feet from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet.

3.3 PERFORMANCE

- A. Site Tolerances:
1. Total Topsoil Depth:
 - a. Lawn And Groundcover Planting Areas: 5 inches minimum.
 - b. Shrub Planting Areas: 12 inches minimum throughout entire shrub bed area.
 2. Finish grade of planting areas before planting and after addition of soil additives shall be specified distances below top of adjacent pavement of any kind:
 - a. Sodded Areas: 2 inches below.
 - b. Seeded Areas: One inch below.
 - c. Shrub And Ground Cover Areas: 2 inches below.
- B. Do not expose or damage existing shrub or tree roots.
- C. Redistribute approved existing topsoil stored on site as a result of work of Section 31 1413. Remove organic material, rocks and clods greater than 1-1/2 inch in any dimension, and other objectionable materials. Provide additional approved imported topsoil required to bring surface to specified elevation relative to concrete site elements.

- D. Where topsoil depth is 12 inches or greater, place topsoil in layers not to exceed 12 inches and, to prevent settling, compact to 85 percent relative density in accordance with ASTM D 1557. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
- E. Slope grade away from building for 12 feet minimum from walls at slope of 1/2 inch in 12 inches minimum unless otherwise noted. High point of finish grade at building foundation shall be 6 inches minimum below finish floor level. Direct surface drainage in manner indicated on Drawings by molding surface to facilitate natural run-off of water. Fill low spots and pockets with topsoil and grade to drain properly.
- F. After landscape areas have been prepared, take no heavy objects over them except lawn rollers. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs, depending on soil type. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

END OF SECTION

SECTION 32 9222

HYDRO-SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install hydro-seeded lawn as described in Contract Documents.
 - 2. Furnish and install hydro-seeded specialty seed mixes as described in Contract Documents

1.2 SUBMITTALS

- A. Quality Assurance / Control: Written certification from supplier confirming seed mi, guaranteed analysis, germination rate, and purity rate.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Chemicals used shall meet requirements of latest rules and regulations, and other applicable state or local laws. Nothing in Contract Documents is to be construed to permit use of chemicals not conforming to these codes.
 - 2. Label seed in accordance with USDA rules and regulations under Federal Seed Act.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Supply wood cellulose fiber mulch compressed in 50 lb packages.

1.5 SEQUENCING

- A. Do not commence work of this Section until work of Sections 32 9113 and 32 9300 has been completed and approved.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Seed:
 - 1. Weeping Lovegrass, *Eragrostis curvula*
 - 2. Seed shall be weed free, fresh, re-cleaned, Grade A, new crop.
- B. Hydro-Mulch:
 - 1. Cellulose wood fiber with no growth or germination inhibiting factors, dyed green. Material shall have equilibrium air-dry moisture content of 12 percent, plus or minus 2 percent, at time of manufacture.
 - 2. Fiber shall disperse rapidly in water forming homogeneous slurry and remaining in such state when agitated in hydro-mulching equipment.

3. Quality Standard: Silva-Fiber by Weyerhaeuser, Tacoma, WA.

C. Binders:

1. Tackifier to bind soil and mulch together to prevent erosion.
2. Type Two Acceptable Products:
 - a. Am-Tac by AZ-TAC Products Inc,
 - b. Soil Seal by Soil Seal Corp, Pico Rivera, CA www.soilseal.com.
 - c. Equal as approved by Architect before use. See Section 01 6200.

D. Fungicide:

1. Type Two Acceptable Products:
 - a. Banol by Nor-Am Chemical Co.
 - b. Equal as approved by Architect before use. See Section 01 6200.

E. Post-Emergent Weed Control:

1. Type Two Acceptable Products:
 - a. Enide by Upjohn.
 - b. Dymid by Elanco.
 - c. Treflan or Surflan by Dow Agrosciences, Indianapolis, IN www.dowagro.com.
 - d. Eptan by Syngenta.
 - e. Equal as approved by Architect before use. See Section 01 6200.

F. Fertilizer: 10-10-10.

2.2 MIXES

A. Quantities:

1. General:
 - a. Amount of hydro-mulch shall be 1800 lbs per acre.
 - b. Add water as necessary to provide suitable slurry mixture.
 - c. Add fungicide at rates recommended by Manufacturer on installations made between 1st of April and 30 September.
2. Turf / Specialty Seeded Areas:
3. Amount of seed shall be 1 lb per 1000 sf for 2:1 or greater slopes, or 1 lb per 10,000 s.f. for 3:1 or lesser slopes
 - a. Add fertilizer at 10 lbs per 1000 sq ft, only for areas not receiving fertilizer under Section 02917.
 - b. Add binder at rates recommended by Manufacturer always where slopes are 5:1 or over, and all other areas between 1st of October and 31 March.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Site Tolerances: Final grade of soil after seeding of lawn areas is complete shall be one inch below top of adjacent pavement of any kind.
- B. After lawn areas are graded, apply specified slurry mix with machine capable of continuously mixing slurry and providing an application meeting Contract Document requirements. Hydro-mulch shall form an absorptive mat, but not a plant inhibiting membrane, which will allow water to percolate into underlying soil.
- C. Post Application Watering:
 1. Allow slurry mixture to 'set.'

2. Water hydro-seeded areas sufficiently to insure proper seed germination, but not cause erosion or slope failure. Repeat watering at regular intervals to keep seed germinating and growing until plantings are established.
 3. After plantings are established, decrease frequency and increase amount of water per application as necessary to meet plant water requirements.
- D. If fungicide has been applied with slurry mix, make a second application of fungicide 14 days after initial application.

3.2 FIELD QUALITY CONTROL

- A. Inspection:
1. Seeded areas will be accepted at final inspection if:
 - a. Seeded areas are properly established.
 - b. Lawn is free of bare and dead spots and is without weeds.
 - c. No surface soil is visible when grass has been cut to height of 2 inches.
 - d. Seeded areas have been mowed a minimum of twice.
 2. Areas seeded after growing season has ended will be accepted following spring approximately one month after start of growing season if specified conditions have been met.

END OF SECTION

SECTION 32 9223

SODDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install sodded lawn as described in Contract Documents.
- B. Related Sections:
 - 1. Section 32 9001: Common Planting Requirements.

1.2 SUBMITTALS

- A. Quality Assurance / Control:
 - 1. Written certification confirming lawn seed quality and mix.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Harvest, deliver, store, and handle sod in accordance with requirements of 'American Sod Producers (ASPA) Specifications for Turfgrass Sod Materials and Transplanting / Installing.'
- B. Cut and lift sod by method acceptable to Architect. Cut sod in pieces approximately 3/4 to one inch thick. Roll or fold sod so it may be lifted and handled without breaking or tearing and without loss of soil.
- C. Schedule deliveries to coincide with topsoil operations and laying. Keep storage at job site to minimum without causing delays.
 - 1. Deliver, unload, and store sod on pallets within 24 hours of being lifted.
 - 2. Do not deliver small, irregular or broken pieces of sod.
- D. During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling. During dry weather, protect sod from drying before installation. Water as necessary to insure vitality and to prevent excess loss of soil in handling. Sod that dries out before installation will be rejected.

1.4 SEQUENCING

- A. Do not commence work of this Section until work of Sections 32 9113 and 32 9300 has been completed and approved.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Certified Sod:

1. Superior sod grown from certified, high quality, seed of known origin or from plantings of certified grass seedlings or stolons:
 - a. Assure satisfactory genetic identity and purity.
 - b. Assure over-all high quality and freedom from noxious weeds or an excessive amount of other crop and weedy plants at time of harvest.
2. Sod shall be TifGrand Bermuda grass unless otherwise approved by Owner or Landscape Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Site Tolerances: Final grade of soil after sodding of lawn areas is complete shall be one inch below top of adjacent pavement of any kind.
- B. Laying of Sod:
 1. Lay sod during growing season and within 48 hours of being lifted.
 2. Lay sod while top 6 inches of soil is damp, but not muddy. Sodding during freezing temperatures or over frozen soil is not acceptable.
 3. Lay sod in rows with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
 4. Lay sod flush with adjoining existing sodded surfaces.
 5. Do not sod slopes steeper than 3:1. Consult with Architect for alternate treatment.
- C. After Sodding Is Complete:
 1. Roll horizontal surface areas in two directions perpendicular to each other.
 2. Repair and re-roll areas with depressions, lumps, or other irregularities. Heavy rolling to correct irregularities in grade will not be permitted.
 3. Water sodded areas immediately after laying sod to obtain moisture penetration through sod into top 6 inches of topsoil.

3.2 FIELD QUALITY CONTROL

- A. Inspection:
 1. Sodded areas will be accepted at final inspection if:
 - a. Sodded areas are properly established.
 - b. Sod is free of bare and dead spots and is without weeds.
 - c. No surface soil is visible when grass has been cut to height of 2 inches.
 - d. Sodded areas have been mowed a minimum of twice.
 2. Areas sodded after growing season will be accepted following spring approximately one month after start of growing season if specified conditions have been met.

END OF SECTION

SECTION 32 9300

PLANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install landscaping plants as described in Contract Documents.
- B. Related Sections:
 - 1. Section 32 9001: Common Planting Requirements.

1.2 REFERENCES

- A. American Nursery & Landscape Association / American National Standards Institute:
 - 1. ANLA / ANSI Z60.1-2004, 'American Standard for Nursery Stock.'

1.3 SUBMITTALS

- A. Samples: Top dressing mulch for approval before delivery to site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver healthy and vigorous trees and shrubs.
 - 1. Do not prune before delivery, except as approved by Architect.
 - 2. Protect bark, branches, and root systems from sun scald, drying, whipping, and other handling and tying damage.
 - 3. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape.
 - 4. Provide protective covering during delivery.
- B. Handle balled stock by root ball or container. Do not drop trees and shrubs during delivery.
- C. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately.
 - 1. If planting is delayed more than six hours after delivery, set planting materials in shade and protect from weather and mechanical damage.
 - 2. Set balled stock on ground and cover ball with soil, saw dust, or other acceptable material approved by Architect. Do not place on pavement.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of trees and shrubs stored on site with fine spray. Water as often as necessary to maintain root systems in moist condition. Do not allow plant foliage to dry out.

1.5 SEQUENCING

- A. Do not commence work of this Section until work of Section 32 9113 has been completed and approved.

1.6 WARRANTY:

- A. Provide written warranties confirming following:
 - 1. Furnished shrubs, ground covers, and vines guaranteed to live and remain in strong, vigorous, and healthy condition for 90 days minimum from date landscape installation is accepted as complete.
 - 2. Trees guaranteed to live and remain in strong, vigorous, and healthy condition for one year from date landscape installation is accepted as complete.

1.7 OWNER'S INSTRUCTIONS

- A. Provide written instructions covering maintenance requirements by Owner for one year beyond Contract maintenance period specified in Section 32 0101.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plants:
 - 1. Conform to requirements of Plant List and Key on Drawings and to ANSI Z60.1.
 - 2. Nomenclature: Plant names used in Plant List conform to 'Standardized Plant Names' by American Joint Committee on Horticultural Nomenclature except in cases not covered. In these instances, follow custom of nursery trade. Plants shall bear a tag showing the genus, species, and variety of at least 10 percent of each species delivered to site.
 - 3. Quality:
 - a. Plants shall be sound, healthy, vigorous, free from plant disease, insect pests or their eggs, noxious weeds, and have healthy, normal root systems. Container stock shall be well established and free of excessive root-bound conditions.
 - b. Do not prune plants or top trees prior to delivery.
 - c. Plant materials shall be subject to approval by Architect as to size, health, quality, and character.
 - d. Bare root trees are not acceptable.
 - e. Provide plant materials from licensed nursery or grower.
 - 4. Measurements:
 - a. Measure height and spread of specimen plant materials with branches in their normal position as indicated on Drawings or Plant List.
 - b. Measurement should be average of plant, not greatest diameter. For example, plant measuring 15 inches in widest direction and 9 inches in narrowest would be classified as 12 inch stock.
 - c. Plants properly trimmed and transplanted should measure same in every direction.
 - d. Measure caliper of trees 6 inches above surface of ground.
 - e. Where caliper or other dimensions of plant materials are omitted from Plant List, plant materials shall be normal stock for type listed.
 - f. Plant materials larger than those specified may be supplied, with prior written approval of Architect, and:
 - 1) If complying with Contract Document requirements in all other respects.
 - 2) If at no additional cost to Owner.
 - 3) If sizes of roots or balls are increased proportionately.
 - 5. Shape and Form:
 - a. Plant materials shall be symmetrical or typical for variety and species and conform to measurements specified in Plant List.
 - b. Well grown material will generally have height equal to or greater than spread. However, spread shall not be less than 2/3's of height.
- B. Planting Mix: Mixture of three parts good topsoil and one part well rotted composted manure, or approved commercial mix.

- C. Planting Tablets: 21 gram Agriform 20-10-5.
- D. Tree Stakes:
 - 1. Type Two Acceptable Products:
 - a. 2 inch diameter Lodgepole Pine.
 - b. Equal as approved by Architect before installation. See Section 01 6200.
- E. Tree Staking Ties:
 - 1. Type Two Acceptable Products:
 - a. 32 inch Cinch-Tie tree ties by V.I.T. Products Inc, Escondido, CA www.vitproducts.com.
 - b. Flex strap Tree Ties by Aquarius Brands Inc, Ontario, CA www.aquariusbrands.com.
 - c. Equal as approved by Architect before installation. See Section 01 6200.
- F. Tree Guys:
 - 1. Type Two Acceptable Products:
 - a. Duckbill Model 68DTS guying kit.
 - b. Equal as approved by Architect before installation. See Section 01 6200.
- G. Pre-Emergent Herbicide:
 - 1. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a. Chipco Dimension Granular by The Andersons Inc, Maumee, IL www.andersonsinc.com.
 - b. Elanco XL2G granular by Crop Data Management Systems, Marysville, CA www.cdms.net.
 - c. Ronstar G granular by Bayer CropScience, Monheim, Germany www.bayercropscience.com.
 - d. Surflan AS liquid by United Phosphorous Inc, Trenton, NJ www.upi-usa.com.
 - e. Oryzalin 4 A.S. liquid by FarmSaver, Seattle, WA www.farmsaver.com.
- H. Bark Or Wood Top Dressing Mulch:
 - 1. Type Two Acceptable Products:
 - a. Medium size Fir bark.
 - b. Medium or large size Redwood bark.
 - c. Shredded pine bark.
 - d. Shredded Cedar.
 - e. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before proceeding with work, check and verify dimensions and quantities. Report variations between Drawings and site to Architect before proceeding with work of this Section.
- B. Plant totals are for convenience only and are not guaranteed. Verify amounts shown on Drawings. All planting indicated on Drawings is required unless indicated otherwise.

3.2 PREPARATION

- A. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas. Secure Architect's acceptance before planting. Make minor adjustments as may be requested.

3.3 INSTALLATION

- A. Excavation:

1. If underground construction work or obstructions are encountered in excavation of planting holes, Architect will select alternate locations.
 2. Plant Excavation Size:
 - a. Diameter: Twice diameter of root ball or container minimum.
 - b. Depth:
 - 1) Shrubs: Twice diameter of root ball or container minimum.
 - 2) Trees: 12 inches minimum deeper than bottom of root ball.
 3. Unless excavated material meets topsoil requirements as specified in Section 31 9113, remove from landscape areas and do not use for landscaping purposes.
 4. Roughen sides and bottoms of excavations.
 5. After tree planting holes are excavated to proper depth, auger 6 inch diameter hole 4 feet deep in low point of each excavation and fill with tamped planting mix.
- B. Planting:
1. Before planting, test two typical planting excavations with water and verify that water drains away within two hours. Inform Architect in writing if water does not drain properly. Do not plant trees or shrubs in holes that do not properly drain.
 2. Removing Binders And Containers:
 - a. Remove top one / third of wire basket and burlap binders.
 - b. Remove plastic and twine binders from around root ball and tree trunk.
 - c. Remove wood boxes from around root ball. Remove box bottoms before positioning plant in hole. After plant is partially planted, remove remainder of box without injuring root ball.
 3. Plant immediately after removing binding material and containers. Place trees and shrubs in holes so, after watering and settling, top of root ball shall be approximately one inch higher than finished grade.
 4. Properly cut off broken or frayed roots.
 5. Center plant in hole and backfill with specified planting mix. Except in heavy clay soils, make ring of mounded soil around hole perimeter to form watering basin.
 6. Add planting tablets in plant pit as follows. Place tablets in relation to root ball as recommended by Manufacturer.
 - a. One Gallon Shrub: 1 tablet.
 - b. 5 Gallon Shrub / Tree: 3 tablets.
 - c. 15 Gallon Tree: 4 tablets.
 - d. 24 inch Box Tree: 6 Tablets.
 7. Fill landscape excavations tamped planting mix. Settle by firming and watering to ensure top of ball one inch higher than surrounding soil.
 8. Do not use muddy soil for backfilling.
 9. Make adjustments in positions of plants as directed by Architect.
 10. Thoroughly water trees and shrubs immediately after planting.
 11. At base of each tree, leave 36 inch diameter circle free of any grass.
- C. Supports for New Trees:
1. Provide new supports for trees noted on Drawings to be staked.
 - a. Remove nursery stakes delivered with and attached to trees.
 - b. Support shall consist of at least two tree stakes driven into hole base before backfill so roots are not damaged. Place stakes vertically and run parallel to tree trunk. Install stakes so 3 feet of stake length is below finish grade.
 - c. Place tree ties 6 to 12 inches below crotch of main tree canopy. Second set of tree ties may be required 18 to 24 inches above finish grade, if directed by Architect.
 - d. Remove tops of tree stakes so top of stake is 6 inches below main tree canopy to prevent damage to tree branches and canopy growth.
 2. Provide guying kits to support 24 inch box and larger trees.
- D. Vines: Remove from stakes, untie, and securely fasten to wall or fence next to which they are planted.
- E. Ground Covers: Container-grown unless otherwise specified on Drawings. Space evenly to produce a uniform effect, staggered in rows and intervals shown.
- F. Post Planting Weed Control:

1. Apply specified pre-emergent herbicide to shrub and ground cover planting areas and grass-free areas at tree bases after completion of planting.
 2. Areas shall be free of existing weed growth prior to application of herbicide.
- G. Mulching:
1. After application of herbicide, mulch shrub and ground cover planting areas with 3 inches deep layer of specified top dressing or rock mulch.
 2. Cover grass-free area at tree bases with weed barrier and 3 inches of top dressing mulch or rock mulch.
 3. Place mulch to uniform depth and rake to neat finished appearance.

END OF SECTION

SECTION 32 9413

LANDSCAPE EDGING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install landscape edging and headers as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 03 3053: Concrete mow strips.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal Edging And Headers:
 - 1. 3/16 inch 5 mm thick steel headers. Shop primed and finish painted in color selected by Architect from Manufacturer's standard colors.
 - 2. Type Two Acceptable Products:
 - a. Border Guard by Border Concepts, Charlotte, NC www.borderconcepts.com.
 - b. Ryerson Steel Edging.
 - c. Any metal fabricator or manufacturer providing material meeting specified requirements as approved by Architect before installation. See Section 01 6200.
 - 3. Stakes: No. 4 rebar 12 inches 300 mm long or Manufacturer's steel stakes.
- B. Wood Edging And Headers:
 - 1. Headers And Stakes: No. 1 common grade rough Redwood or Cedar.
 - 2. Nails: Aluminum or hot dip galvanized box nails.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Metal Edging And Headers:
 - 1. Extend headers one inch 25 mm above grade and hold in place with specified stakes extending into solid earth full length. Set top of stakes 1/2 inch 13 mm below top of header.
 - 2. Attach stake to header by arc welding both sides of stake to header. Attach sections of header by overlapping 4 inches 100 mm and arc welding.
- B. Wood Edging And Headers:
 - 1. Provide 2x6 38 by 140 mm headers (or two pieces 1x6 19 by 140 mm laminated where curve is shown) to separate lawn areas from planting areas unless shown otherwise on Drawings.
 - 2. Extend headers 1/2 inch 13 mm above grade and hold in place with 1x2 19 by 38 mm stakes of length necessary to extend into solid earth 12 inches 300 mm minimum. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers. Space stakes not to exceed 4 feet 1 200 mm on center. Set top of stakes 1/2 inch 13 mm below top of header and cut at angle to slope away from header top.

C. Compact backfill on both sides of headers to density of undisturbed adjoining earth.

END OF SECTION