SOIL CELLS SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Soil Cell system for planting and paving, including Soil Cell assemblies and related accessories.
2. Other materials including, but not limited to, geotextile, geogrid, aggregate, subbase material, backfill, root barrier, and planting soil.

B. Materials Installed But Not Furnished Under This Section:

1. Planting soils are furnished in Section 32 91 13 – SOIL PREPARATION

C. Related Requirements:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Section 01 33 00 - SUBMITTAL PROCEDURES: For administrative and procedural requirements for processing of submittals during the construction phase.
3. Section 01 77 00 - CLOSEOUT PROCEDURES: For administrative and procedural requirements for completion of the Work.
4. Section 32 12 16 - ASPHALT PAVING.
5. Section 32 13 13 - CONCRETE PAVING.
6. Section 32 14 00 - UNIT PAVING.
7. Section 32 84 00 - PLANTING IRRIGATION.
8. Section 32 93 00 – PLANTS.

1.02 REFERENCES

A. Definitions:

1. AGGREGATE BASE COURSE: Aggregate material between the paving and the top of the Soil Cell deck below, designed to distribute loads across the top of the deck.
2. AGGREGATE SETTING BED FOR PAVERS: Aggregate material between the aggregate base course and unit surface pavers, designed to act as a setting bed for the pavers.
3. AGGREGATE SUBBASE: Aggregate material between the bottom of the Soil Cell base and the compacted subgrade below, designed to distribute loads from the Soil Cell bases to the subgrade.
4. BACKFILL: The earth used to replace or the act of replacing earth in an excavation beside the Soil Cell system to the excavation extents.
5. FINISH GRADE: Elevation of finished surface of planting soil or paving.
6. PLANTING SOIL: Soil as defined in Division 32, Section 32 91 13 - SOIL PREPARATION, intended to fill the SOIL Cell system and other planting spaces.
7. SOIL CELL SYSTEM:
    a. Soil Cell: load bearing, engineered plastic, structural cellular system with interlocks designed to assemble together to create a matrix under pavements.

b. Soil Cell System: Two or more Soil Cells used in combination with each other and with required accessories.

8. SUBGRADE: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill.

9. WALK-THROUGH COMPACTION: A process for light compaction of soils by walking through the soil following placement.

a. Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

B. Reference Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):

a. AASHTO H-20

2. ASTM International (ASTM):

a. ASTM D448-12, Standard Classification for Sizes of Aggregate for Road and Bridge Construction

b. ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3)

c. ASTM D1241-07, Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses

d. ASTM D3786/D3786M-13, Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

e. ASTM D4491-99a(2014)e1, Standard Test Methods for Water Permeability of Geotextiles by Permittivity

f. ASTM D4533-D4533M-15, Standard Test Method for Trapezoid Tearing Strength of Geotextiles

g. ASTM D4632-D4632M-15, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

h. ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile

i. ASTM D4833/D4833M-07(2013)e1, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

j. ASTM D5262-07(2012), Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

k. ASTM D6241-14, Standard Test Method for Static Puncture Strength of Geotextile and Geotextile-Related Products Using a 50mm Probe

l. ASTM D6637-11, Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Prior to installation of the Soil Cell system and associated work, meet with the Contractor, Soil Cell system installer and their field supervisor, manufacturer's technical representative, the Landscape Architect, and Project Engineer, the Owner at the Owner's discretion, and other entities concerned with the Soil Cell system performance.

1. Provide at least 72 hours advance notice to participants prior to convening preinstallation conference.
2. Introduce and provide a roster of individuals in attendance with contact information.
3. The preinstallation conference agenda will include, but is not limited to the review of:
    a. Required submittals both completed and yet to be completed.
    b. The sequence of installation and the construction schedule.
    c. Coordination with other trades.
    d. Details, materials, and methods of installation.
        1) Review requirements for substrate conditions, special details, if any, installation procedures.
        2) Installation layout, procedures, means and methods.
    e. Mock-up requirements.

B. Sequencing and Scheduling:

1. General: Prior to beginning Work of this Section, prepare a detailed schedule of the Work involved for coordination with other trades.
2. Schedule utility installations prior to beginning Work of this Section.
3. Where possible, schedule the installation of the Soil Cell system after the area is no longer required for use by other trades and Work. Where necessary to prevent damage, protect installed system if Work must occur over or adjacent to the installed Soil Cell system.

1.04 SUBMITTALS

A. Action Submittals: Submit these to the Landscape Architect for review and acceptance not less than 45 days prior to start of installation of materials and products specified in this Section.

1. Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these specifications.
2. Test and Evaluation Reports:
    a. Submit results of compaction testing required by the Specifications for approval.
    b. Include analysis of bulk materials including soils and aggregates, by a recognized laboratory that demonstrates that the materials meet the Specification requirements.
3. Samples:
    a. One full size sample of an assembled Soil Cell (copy of manufacturers brochure with images of product may be accepted in lieu of product sample).
    b. Manufacturer's product data/specification sheet for geogrid.
    c. Manufacturer's product data/specification sheet for geotextile.

4. Manufacturer's Report: Submit Soil Cell system manufacturer's letter of review and approval of the Project, including Drawings and Specifications, Addenda, Clarifications and Modifications, and for compliance with product installation requirements.
5. Qualification Statements:
    a. Manufacturer:
        1) Submit list of completed projects demonstrating durability and longevity of in-place systems.
            a) Include project name, location, and date of completion.

B. Closeout Submittals: Submit in accordance with Section 01 33 00

C. Closeout Submittals: Submit these to the Landscape Architect at completion of installation.
1. Warranty: Submit manufacturer's warranty, fully executed.

1.05 QUALITY ASSURANCE

A. Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary permits/approvals from these authorities.

B. Manufacturer Qualifications:
1. A manufacturer whose product is manufactured in an ISO/TS 16949 compliant and ISO 9001 - 2008 registered factory.
2. A manufacturer with not less than 100 Soil Cell systems in-place, each system in use for not less than 7 years, confirming durability and longevity of the system.
3. A manufacturer with documented written approval of their product for use as a stormwater treatment device by a minimum of 3 governmental jurisdictions.
4. A manufacturer with an established and demonstrated utility service and repair process, including written procedure and photographs demonstrating work.
5. A manufacturer with a published operating and maintenance manual

C. Installer Qualifications: A qualified installer with not less than 5 years of successful experience installing Soil Cell systems or related products and materials, and whose work has resulted in successful installation of underground piping, chambers and vault structures, planting soils, and planter drainage systems of a similar scope and scale in dense urban areas.

D. Installer's Field Supervisor: A full-time supervisor employed by the installer with not less than 5 years of successful experience similar to that of the installer and present at the Project site when Work is in progress. Utilize the same field supervisor throughout the Project, unless a substitution is submitted to and approved in writing by the Landscape Architect.

E. Mock-Up: Prior to the installation of the Soil Cell system, construct a mock-up of the complete installation at the Project site in the presence of the Landscape Architect.

1. Size and Extent: Minimum of 100 sq. ft. (10 sq. m.) in area and including the complete Soil Cell system installation with subbase, aggregate subbase, drainage installation, Soil Cell decks, posts, and bases, base course aggregate, geotextile, geogrid, backfill, planting soil, and necessary accessories.
2. The mock-up area may remain as part of the installed Work at the end of the Project provided that it remains undamaged and meets the requirements of the Drawings and Specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Soil Cell System: Protect Soil Cell system components from damage during delivery, storage, and handling.

1. Store components on smooth surfaces, free from dirt, mud, and debris. Store under tarp to protect from sunlight when time from delivery to installation exceeds one week.
2. Perform handling with equipment appropriate to the size (height) of Soil Cells and site conditions; equipment may include, hand, handcart, forklifts, extension lifts, or small cranes, with care given to minimize damage to Soil Cell bases, posts, decks, and adjacent assembled Soil Cells.

B. Packaged Materials: Deliver packaged materials in original, unopened containers indicating weight, certified analysis, name and address of manufacturer, and indication of conformance with State and Federal laws, if applicable. Protect materials from deterioration during delivery and while on the Project site.

1. Do not deliver or place backfill, soils, or soil amendments in frozen, wet, or muddy conditions.
2. Provide protection including tarps, plastic and/or matting between bulk materials and finished surfaces sufficient to protect the finish material.
3. Bring planting soil to the site using equipment and methods that do not overly mix and further damage soil peds within the soil mix.

C. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated material, backfill, soil amendments and planting mix within the Project limits as needed.

1.07 FIELD CONDITIONS

A. Existing Conditions: Do not proceed with Work when subgrades, soils and planting soils are in a wet, muddy, or frozen condition.

1.08 WARRANTY

A. The Contractor shall warrant the Soil Cell system to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by manufacturer's written warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturers:

DeepRoot Green Infrastructure, LLC

101 Montgomery Street, Suite 2850
San Francisco, CA, 94104

Phone: 415.781.9700
Toll Free: 800.458.7668
Fax: 415.781.0191
www.deeproot.com

B. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual.

C. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual. If such instructions are not included in Division 00 or Division 01, submit requests as specified herein.

1. Submit proposed substitutions to the Landscape Architect not less than 7 days prior to the date for receipt of Bids.

2.02 DESCRIPTION

A. The term Soil Cell shall be used to refer to a single Soil Cell.

B. Soil Cells shall be designed for the purpose of growing healthy trees and providing stormwater management.

C. Soil Cells shall be modular, structural systems.

D. Each Soil Cell shall be structurally independent from all adjacent Soil Cells for incorporating utilities and other site features as well as for future repairs.

E. Soil Cells shall be capable of supporting loads up to and including AASHTO H-20 (United States) when used in conjunction with approved pavement profiles.

F. Soil Cells shall be open on all vertical faces and horizontal planes and shall have no interior walls or diaphragms.

G. Soil Cells shall be capable of providing a large, contiguous, continuous volume of planting soil that does not inhibit or prevent the following:

1. Placement of planting soil
2. Walk through compaction
3. Compaction testing of planting soil, once in place
4. Movement and growth of roots
5. Movement of water within the provided soil volume, including lateral capillary movement
6. Installation and maintenance of utilities placed within, adjacent to, or below the Soil Cell.

H. Soil Cells shall be able capable of being filled with a variety of soil types and soils that include peds 2 inches (50 mm) or larger in diameter as is appropriate for the application, location of the installation, and tree species.

2.03 SILVA CELL MATERIALS AND ACCESSORIES

A. Silva Cell System Components: Each "Silva Cell" soil cell module (hereafter Silva Cell or "cell") is composed of one base, 6 post assemblies, and one deck.

1. 1x Silva Cell System:

a. Components: One base, six 1x posts, and one deck.

b. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 16.7 inches high (1200 mm long by 600 mm wide by 424 mm high).]

B. Silva Cell Materials and Fabrication:

1. Bases and Posts: Homopolymer polypropylene.
2. Decks: Fiberglass reinforced, chemically coupled, impact modified polypropylene.

C. Manufacturer's Related Silva Cell Installation Accessories:

1. Strongbacks: An accessory designed to stabilize the Silva Cell posts temporarily, during soil placement, and removed for reuse prior to placing decks.
2. Anchoring Spikes: 10" landscape spike for securing assembled Silva Cells to subbase.

2.04 RELATED PRODUCTS

A. Geogrid: Net-shaped woven polyester fabric with PVC coating, uniaxial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids; used to provide a stabilizing force within soil structure as the fill interlocks with the grid.

1. Tensile strength at ultimate (ASTM D6637):
   a. 1850 lbs/ft (27.0 kN/m) minimum
2. Creep reduced strength (ASTM D5262):
   a. 1000 lbs/ft (14.6 kN/m) minimum
3. Long term allowable design load (GRI GG-4):
   a. 950 lbs/ft (13.9 kN/m) minimum
4. Grid aperture size (MD):
   a. 0.8 inch (20 mm) minimum
5. Grid aperture size (CD):
   a. 1.28 inch (32 mm) maximum
6. Roll size: 6-foot (1.8-m) width is preferred, up to 18-foot (5.4-m).
7. Products meeting this specification:
   a. Stratagrid SG 150; http://www.geogrid.com
   b. Miragrid 2XT; http://www.tencate.com
   c. Fortrac 35 Geogrid; (http://www.hueskerinc.com
   d. SF 20 Biaxial Geogrid; http://www.synteen.com

B. Geotextile: composed of high tenacity polypropylene yarns which are woven into a network such that the yarns retain their relative position and is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

1. Tensile strength at ultimate (ASTM D4595):
   a. 4800 lbs/ft (70.0 KN/m) MD minimum
   b. 4800 lbs/ft (70.0 KN/m) CD minimum
2. Tensile strength at 5% strain (ASTM D4595)
   a. 2400 lbs/ft (35.0 KN/m) MD minimum

b. 3000 lbs/ft (43.8 KN/m) CD minimum

3. Flow rate (ASTM D4491):
   a. 30 gal/min/ft2 (2648 l/min/m2) minimum
4. Apparent opening size (ASTM D4751):
   a. 30 sieve (0.60 mm)
5. UV Resistance (at 500 hours):
   a. 80 percent strength retained
6. Products meeting this specification:
   a. Mirafi HP570; http://www.tencate.com
   b. Geolon PP40; http://www.tencate.com
   c. Nilex Woven 2044 (Nilex); http://www.nilex.com

C. Plastic Cable Ties: A tensioning device or tool used to tie similar or different materials together with a specific degree of tension.

2.05 OTHER RELATED MATERIALS

A. Aggregate Subbase (Below Soil Cell Base):
   1. Aggregate meeting one of the following specifications:
      a. Complying ASTM D1241, Type I, Gradation B; Type I mixtures shall consist of stone, gravel, or slag with natural or crushed sand and fine mineral particles passing a No. 200 sieve.

Sieve	Percent Passing
1-1/2 inches (37.5 mm)	100
1 inch (25 mm)	75 to 95
3/8 inch (9.5 mm)	40 to75
No 4 (4.75 mm)	30 to 60
No 10 (2 mm)	20 to 45
No 40 (425 mm)	15 to 30
No 200 (75 mm)	5 to 15

      b. Local Department of Transportation (DOT) virgin aggregate that most closely meets the gradation of ASTM D1241.

B. Aggregate Base Course (Above Soil Cell Deck):
   1. Same as aggregate subbase specified above.

C. Setting Bed for Unit Pavers (Above Soil Cell Deck):
   1. Aggregate complying with ASTM D448, No. 8.

Sieve	Percent Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85 to 100
No 4 (4.75 mm)	10 to 30
No 8 (2.36 mm)	0 to 10
No 16 (1.18 mm)	0 to 5

D. Backfill Material (Adjacent to Soil Cells): Clean, compactable, coarse grained fill soil free of organic material, trash, and other debris, and free of toxic material injurious to plant growth.

E. Planting Soil: Refer to Section 32 91 13 – SOIL PREPARATION.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the conditions under which the Soil Cells are to be installed.

1. Carefully check and verify dimensions, quantities, and grade elevations.
2. Carefully examine the Drawings to become familiar with the existing underground conditions before digging. Verify the location of aboveground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system.
3. Notify the Contractor and the Landscape Architect in writing in the event of conflict between existing and new improvements, of discrepancies, and other conditions detrimental to proper and timely completion of the installation.
4. Obtain written approval of changes to the Work prior to proceeding. Proceed with installation only after changes have been made and unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Take proper precautions as necessary to avoid damage to existing improvements and plantings.

B. Prior to the start of Work, layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the complete Soil Cell system.

C. Coordinate installation with other trades that may impact the completion of the Work.

3.03 TEMPORARY PROTECTION

A. Protect open excavations and Soil Cell system from access and damage both when Work is in progress and following completion, with highly visible construction tape, fencing, or other means until related construction is complete.

B. Do not drive vehicles or operate equipment over the Soil Cell system until the final surface material has been installed.

3.04 EXCAVATION

A. General: Excavate to the depths and shapes indicated on the Drawings. Provide smooth and level excavation base free of lumps and debris.

B. Confirm that the depth of the excavation is accurate and includes the full section of materials required to place the subbase aggregate, Soil Cell, and pavement profile as indicated on the Drawings.

C. Over-excavate beyond the perimeter of the Soil Cell to allow for:

1. The extension of aggregate subbase beyond the Soil Cell layout as shown on the Drawings.
2. Adequate space for proper compaction of backfill around the Soil Cell system.

D. If unsuitable subgrade soils are encountered, consult the Owner's geotechnical consultants for directions on how to proceed.

E. If conflicts arise during excavation, notify the Landscape Architect in writing and make recommendations for action. Proceed with Work only when action is approved in writing.

3.05 SUBGRADE COMPACTION

A. Compact subgrade to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method, or as approved by the Owner's geotechnical representative.

B. Do not exceed 10 percent slope for subgrade profile in any one direction. If the 10 percent slope is exceeded, contact manufacturer's representative for directions on how to proceed.

3.06 INSTALLATION OF GEOTEXTILE OVER SUBGRADE

A. Install geotextile over compacted subgrade.

1. Lay geotextile flat with no folds or creases.
2. Install the geotextile with a minimum joint overlap of 18 inches (450 mm).

3.07 INSTALLATION OF AGGREGATE SUBBASE BELOW SOIL CELL BASES

A. Install aggregate subbase to the depths indicated on the Drawings.

B. Extend subbase aggregate a minimum of 6 inches (150 mm) beyond the base of the Soil Cell layout.

C. Compact aggregate subbase to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method.

D. Do not exceed 10 percent slope on the surface of the subbase. Where proposed grades are greater than 10 percent, step the Soil Cells to maintain proper relation to the finished grade.

3.08 INSTALLATION OF SOIL CELL BASE

A. Install the Soil Cell system in strict accordance with manufacturer's instructions and as specified herein; where requirements conflict or are contradictory, follow the more stringent requirements.

B. Layout and Elevation Control:

1. Provide layout and elevation control during installation of the Soil Cell system to ensure that layout and elevations are in accordance with the Drawings.

C. Establish the location of the tree openings in accordance with the Drawings. Once the trees are located, mark the inside dimensions of the tree openings on the prepared subbase.

D. Locate and mark other Project features located within the Soil Cell layout (e.g., light pole bases, utility pipes). Apply marking to identify the extent of the Soil Cell layout around these features. Follow the layout as shown on the Drawings to ensure proper spacing of the Soil Cell bases. Refer to the Drawings for offsets between these features and the Soil Cells.

E. Check each Soil Cell component for damage prior to placement. Reject cracked or chipped units.

F. Place the Soil Cell bases on the compacted aggregate subbase. Start at the tree opening and place Soil Cell bases around the tree openings as shown on the Drawings.

G. Working from tree opening to tree opening, place Soil Cell bases to fill in the area between tree openings.

1. Maintain spacing no less than 1 inch (25 mm) and no more than 6 inches (150 mm) apart, assuming geotextile covering the decks meets the specifications in section 2.04, paragraph C.

H. Follow the Soil Cell layout plan as shown on the Drawings.

I. Install Soil Cell bases around, over, or under existing or proposed utility lines, as indicated on the Drawings.

J. Level each Soil Cell base as needed to provide full contact with subbase. Adjust subbase material, including larger pieces of aggregate, so each base sits solidly on the surface of the subbase. Soil Cell bases that rock or bend over any stone or other obstruction protruding above the surface of the subbase material are not allowed. Soil Cell bases which bend into dips in the subbase material are not allowed. The maximum tolerance for deviations in the plane of the subbase material under the bottom of the horizontal beams of each Soil Cell base is 1/4 inch in 4.

K. Anchor Soil Cell base with 2 anchoring spikes per base.

3.09 INSTALLATION OF SOIL CELL POSTS

A. Soil Cell System:

1. Attach 1x posts to the installed Soil Cell base. Each base will receive six 1x posts. Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.]

3.10 INSTALLATION OF STRONGBACKS, GEOGRID, BACKFILL AND PLANTING SOIL

A. For Soil Cell systems that have a perforated drain line located inside or adjacent to the system, consult Drawings for layout and details for requirements.

B. Install strongbacks on top of the Soil Cell posts by snapping into place over installed posts prior to installing planting soil and backfill.

1. Strongbacks are required only during the placement and compaction of the planting soil and backfill.
2. Move strongbacks as the Work progresses across the installation.
3. Remove strongbacks prior to the installation of the Soil Cell decks.

C. Install geogrid around the perimeter of the Soil Cell system where the compacted backfill and planting soil interface.

1. Do not place geogrid between the edge of the Soil Cells and adjacent planting areas.
2. Cut the geogrid to allow for a 6-inch overlap at the Soil Cell base and a 12-inch overlap at the Soil Cell deck.
3. Provide a minimum 12-inch overlap between adjacent sheets of geogrid.
4. Secure geogrid with cable ties below the top of the posts, along the post ridges.

D. Place the first lift of backfill material loosely around the perimeter of the Soil Cell system, between the geogrid and the sides of the excavation. Place backfill to approximately the midpoint of the Soil Cell post. Do not compact.

E. Place the first lift of planting soil in the Soil Cell system to approximately the midpoint of the Soil Cell post.

1. Level the planting soil throughout the system.
2. Walk-through the placed planting soil to remove air pockets and settle the soil.
    a. Lightly compact soils by walking through the soil following placement.
    b. Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

F. Compact the first lift of backfill material, previously spread, to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method or in accordance with Project Specifications for hardscape areas, whichever is greater.

G. Add and compact additional backfill material so that the final finished elevation is at approximately the same level of the placed planting soil within the Soil Cells.

1. Maintain the geogrid between the Soil Cell system and the backfill material at all times.

H. Place the second lift of backfill material loosely around the perimeter of the Soil Cell system, between the geogrid and the sides of the excavation so that the material is 2 to 3 inches below the top of the posts. Do not compact.

I. Place the second lift of planting soil inside of the Soil Cell to the bottom of the strongbacks. Walk through compact.

3.11 INSTALLATION OF SOIL CELL DECK

A. Obtain final approval by the Landscape Architect of planting soil installation prior to installation of the Soil Cell decks.

B. Remove strongbacks, level out the planting soil, and immediately install decks over the posts below. Place deck over the top of the posts. Push decks down until the deck clips lock into the posts, snapping the deck into place.

C. Fold the 12 inches of geogrid onto the top of the decks.

3.12 FINAL BACKFILL PLACEMENT AND COMPACTION

A. Place and compact final lift of backfill material to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method, such that the backfill is flush with the top of the installed deck. Do not allow compacting equipment to come in contact with the decks.

3.13 INSTALLATION OF GEOTEXTILE AND AGGREGATE BASE COURSE OVER THE DECK

A. Ensure geotextile meets the specifications in section 2.04 paragraph C.

B. Place geotextile over the top of the deck and extend to the edge of the excavation. Overlap joints a minimum of 18 inches. Leave enough slack in the geotextile for the aggregate base course to push the geotextile down in the gaps in between the decks.

C. Install the aggregate base course (including aggregate setting bed if installing unit pavers) over the geotextile immediately after completing the installation of the fabrics. Work the aggregate from one side of the layout to the other so that the fabric and aggregate conform to the Soil Cell deck contours.

D. Maintain equipment used to place aggregate base course completely outside the limits of the Soil Cell excavation area to prevent damage to the installed system.

E. For large or confined areas, where aggregate cannot easily be placed from the edges of the excavated area, obtain approval for the installation procedure and types of equipment to be used in the installation from the Soil Cell manufacturer.

F. Compact aggregate base course(s) to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Utilize a vibration or plate compactor with a maximum weight of 800 lbs (362.87 kg).

G. Do not drive vehicles or operate equipment over the completed aggregate base course.

3.14 INSTALLATION OF CONCRETE CURBS AT TREE OPENINGS, AGGREGATE SUBBASE AND PAVEMENT ABOVE THE SOIL CELL SYSTEM

A. Place concrete curbs along planting areas and tree openings as shown on the Drawings to retain the aggregate base course from migrating into the planting soil.

B. When staking concrete forms (e.g., curbs around the tree openings), prevent stakes from penetrating the Soil Cell decks.

C. Turn down edge of concrete paving to the Soil Cell deck along the edges of tree openings or planting areas to retain the aggregate base course material.

D. When paving type is a unit paver or other flexible material, provide a concrete curb under the paving at the edge of the Soil Cell deck to retain the aggregate base course material at the tree opening.

E. Place paving material over Soil Cell system in accordance with the Drawings.

1. The Soil Cell system does not fully meet loading strength until the final paving is installed. Do not operate construction equipment on top of the Soil Cell system until paving installation has been completed.

F. Use care when placing paving or other backfill on top of Soil Cell system to prevent damage to the Soil Cell system or its components.

3.15 INSTALLATION OF ROOT BARRIERS

A. Install root barrier in accordance with manufacturer's installation instructions.

3.16 INSTALLATION OF PLANTING SOIL WITHIN THE TREE PLANTING AREA

A. Remove rubble, debris, dust, and silt from the top of the planting soil within the tree opening that may have accumulated after the initial installation of the planting soil within the Soil Cells.

B. Install additional planting soil within the tree openings, to the depths indicated on the Drawings.

1. Use the same soil used within the Soil Cells for planting soil within the tree openings.

C. Compact planting soil under the tree root ball as needed to prevent settlement of the root ball.

D. Place trees in accordance with the Drawings.

3.17 PROTECTION

A. Keep construction traffic away from the limits of the Soil Cells until the final pavement profile is in place. The Soil Cell system does not fully meet loading strength until the final paving is installed.

1. Do not operate equipment directly on top of the Soil Cell system until paving installation has been completed.
2. Provide fencing and other barriers to prevent vehicles from entering the Soil Cell area.

B. When the Soil Cell installation is completed and the permanent pavement is in place, limit traffic and construction related activities to only loads less than the design loads.

3.18 CLEAN UP

A. Perform clean up during installation and upon completion of the Work. Maintain the site free of soil, sediment, trash, and debris. Remove excess soil materials, debris, and equipment from the site following completion of the Work of this Section.

B. Repair damage to adjacent materials and surfaces resulting from installation of this Work using mechanics skilled in remedial work of the construction type and trades affected.

END OF SECTION