

SECTION 321450 – MODULAR PRECAST CONCRETE RAIN GARDENS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Modular precast concrete rain garden system.
- B. Related Sections include the following:
 - 1. Section 321313 “Concrete Paving” for concrete walks and curbs.
 - 2. Section 321400 “Unit Pavers” for brick or concrete paver requirements.
 - 3. Section 323119 “Decorative Metal Fences and Gates” for fencing requirements.
 - 4. Section 329300 "Plants" for new plants, soils, and trees from nursery-grown sources.
 - 5. Section 334600 "Subdrainage" for below-grade drainage of landscaped rain garden system.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Data: For each type of open grades aggregate and aggregate used as setting bed for precast concrete panels
- C. LEED Submittals:
 - 1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
 - 2. Product Data for Credit MR 5: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
- D. Shop Drawings: Detail installation of modular precast concrete rain garden units. Indicate locations, plans, elevations, dimensions, and shapes required for installation.
 - 1. Include plans and elevations showing unit location.

- E. Samples: For each type of finish indicated on exposed surfaces of modular precast concrete rain garden units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For the following items, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Aggregates.
 - 3. Reinforcing materials.
 - 4. Admixtures.
 - 5. Threaded inserts.
- C. Test Reports: Provide test report showing unit strength and percentage of air entrainment of precast concrete panels.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer of modular precast concrete rain garden systems.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver modular precast concrete rain garden units in such quantities and at such times to limit unloading units temporarily on the ground.
- B. Support units during shipment on non-staining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.
- E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.
- F. Lift and support units only at threaded inserts cast into each precast concrete panel.

1.7 SEQUENCING

- A. Furnish manufacturer's instructions and directions required for complete installation.

1.8 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning excavation operations.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Subject to compliance with requirements, provide the following:
 - 1. Modular Rain Garden System, FRENO.
 - a. Distributed by Concrete Products Group, 1-800-789-0872.

2.2 SYSTEM COMPONENTS

- A. System consists of five (5) basic modular concrete shapes with lifting connections to be used for placement of modules in configuration indicated on the drawings.
- B. Modules shall be placed on a compacted granular leveling base, overlap and be secured in place with 1/2 inch diameter steel pins and internal or external structural supports as detailed on project documents.
- C. Granular Base Leveling Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 3/4 inch sieve and not more than 10 percent passing a No. 200 sieve.
 - 1. Granular base shall be compacted using a mechanical plate compactor to 95% Standard Proctor or 90% Modified Proctor of maximum soil density.
- D. Drainage Aggregate: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation operations.
- B. Protect and maintain erosion and sedimentation controls during excavation operations.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
- B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 4 inches. If applicable, extend excavations a sufficient distance from structures for placing of 18 inch wide granular leveling base and for installing system components.

3.4 EXAMINATION

- A. Examine areas indicated to receive rain garden system, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that granular leveling base is in suitable condition to begin installation according to manufacturer's written instructions.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 INSTALLATION

- A. General: Install manufactured modular concrete rain garden units according to manufacturer's written instructions unless otherwise indicated.

- B. Securely anchor with hardware recommended by manufacturer.
- C. Install external / internal lateral supports as shown on drawings to maintain alignment and to accommodate lateral movement.
- D. Tolerances: Do not exceed 1/8-inch unit-to-unit offset from flush (lippage) or 1/4 inch in 10 feet from level, or indicated slope.

3.6 SUBSURFACE DRAINAGE

- A. Refer to Section 334600 "Subdrainage" for below-grade drainage of rain garden areas.
- B. Drainage Aggregate: Place and compact filter material over subsurface drain and granular leveling course to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

3.7 COMPACTION OF SOIL BACKFILLS AND FILLS OUTSIDE OF RAIN GARDEN

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
 - 1. Backfill exterior and interior of rain garden in alternating lifts to prevent displacing rain garden precast panels. Remove temporary bracing only after backfill is complete.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to [ASTM D 698] [ASTM D 1557]:
 - 1. Under structures, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.8 BIO-RETENTION FILL INSIDE OF RAIN GARDEN

- A. Refer to Section 329300 "Plants" for proper soils and planting materials

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 321450