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**PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Solid Storm Drain Pipe, indicated on Landscape Drawings.
  2. Perforated Subdrain Pipe System indicated on Landscape Drawings.
  3. Inspection Tubes and Clean-outs indicated on the Landscape Drawings.
  4. Subslab Drains.
  5. Planter Drains.
  6. Cleanout and Inspection Tube Decorative Cover in Paving.
  7. Rigid Drain Mat.
  8. Flexible Drain Mat.
  9. Geotextile Fabric.
  10. Slot Drain

**1.2 REFERENCES**

- A. ASTM — American Society for Testing and Materials:
1. A 48 — Specification for Gray Iron Castings.
  2. D 1248 — Specification for Polyethylene Plastics Molding and Extrusion Materials.
  3. D 1557 — Test Method for Laboratory Compaction Characteristics of Soil Using Modified effort.
  4. D 2321 — Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
  5. D 2729 — Specification for PVC Sewer Pipe and Fittings.
  6. D 3034 — Specification for Type PSM PVC Sewer Pipe and Fittings.
  7. D 3350 — Specification for Polyethylene Plastics Pipe and Fitting Materials.
  8. F 405 — Specification for Corrugated Polyethylene Tubing and Fittings.
  9. F 679 — Specification for PVC Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
  10. F 949 — Specification for PVC Corrugated Sewer Pipe with Smooth Interior and Fittings.

**1.3 DEFINITIONS**

- A. PVC: Polyvinyl Chloride.
- B. SDR: Standard Dimensional Ratio.
- C. HDPE: High Density Polyethylene.
- D. RCP: Reinforced Concrete Pipe.
- E. Finished Subgrade Surface: Final soil subgrade surface on which topsoil, aggregate base, or paving is installed.

**1.4 SUBMITTALS**

- A. Product Data:
1. Pipe and Pipe Fittings, Solid and Perforated.
  2. Geotextile Fabric and sock
  3. Inspection Tubes and Clean-outs
  4. Clean-out Adaptor Coupling and Plug.
  5. Flexible Coupling.
  6. Drain Grates.
  7. Drain Fixtures
  8. Slot Drains
  9. Rigid Drain Mat.
  10. Flexible Drain Mat.

11. Cleanout and Inspection Tube Decorative Cover in Paving

- B. Test Reports: Sand backfill sieve analysis.
- C. Samples: Submit sample of slot drains with Manufacturer's installation instructions .

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Instructions: Slot Drain Installation Instructions.
- B. Record Documents:
  - 1. Maintain on the construction site a record of materials and equipment installed each day.
  - 2. Daily record information neatly to scale, on full-size prints of the Construction Documents.
  - 3. Include changes, substitutions, and manufacturer's names and catalog numbers for materials and equipment.
  - 4. Show actual locations of drains, grates, clean-outs and piping.
  - 5. Show dimensions from easily-identifiable permanent structures such as walls, curbs, buildings or walks.
  - 6. Procure reproducible of the current Construction Documents from the Owner.
  - 7. After Work completion, deliver information noted on reproducible to the Owner.

#### 1.6 QUALITY ASSURANCE

- A. Contractor Qualifications: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
- B. Regulatory Requirements: Meet requirements of applicable laws, codes, and regulations required by authorities having jurisdiction over Work.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Storage:
  - 1. Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product.
  - 2. Protect PVC pipes and fittings from direct sunlight.
  - 3. Store pipe on firm, well-draining, continuous surface equal to or longer than pipe.

#### 1.8 SITE CONDITIONS

- A. Environmental Requirements: Lay and join pipe in dry trenches.
- B. Existing Conditions:
  - 1. Prior to Work commencement, review and clearly mark in field horizontal and vertical locations of existing public underground utilities and structures with appropriate utility companies.
  - 2. Prior to Work commencement, review and clearly mark in field horizontal and vertical locations of existing private underground utilities and structures with the Owner's Representative.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS

- A. Solid and Perforated Pipe:
  - 1. Polyvinyl Chloride (PVC) Pipe: PVC pipe and fittings shall meet the extra strength minimum of SDR-35 of the requirements of ASTM Specification D3034. Joints shall be rubber ring for Sanitary Sewer and Storm Drainage Pipe. Manufactured by J-M Manufacturing, Stockton, CA (1-800-621-4404), Advanced Drainage Systems, Inc., Columbus, OH, or approved equal
  - 2. Solid Pipe Fittings: PVC, ASTM D 3034.
  - 3. Perforated Pipe Fittings: Solid Pipe Fittings: PVC, ASTM D 3034 by perforated pipe manufacturer.

- B. Sock for Perforated Pipe and Geotextile at Drains in Aggregate Mulch: Carthage 30 Percent; SI Geosolutions Geotex 117F, Mirafi, or equal.
- C. Clean-out for Planting Areas PVC; Schedule 80 female adaptor with brass male pipe thread plug as shown on Drawings.
- D. Dual Clean-Out in Planting Areas: PVC; Schedule 80 female adaptor with brass male pipe thread plug.
- E. Sand Backfill for Perforated Pipe: Refer to Section 32 91 13, Planting Soil Preparation.
- F. Flexible Coupling: Heavy-duty 3/8-inch thick, minimum 5 inches long, flexible PVC with stainless- steel clamps designed and manufactured specifically to connect corrugated polyethylene pipe to PVC pipe.
- G. Rigid Drain Mat on bottom of soil trenches and planters: Vespro, Inc., San Rafael, CA; (415) 459-7311; [www.vesproinc.co](http://www.vesproinc.co). or equal.
  - 1. Versicell, 30mm thick
- H. Flexible Drain Mat for Back of Walls: Tenax Tenflow, Tenax Corporation, Baltimore, MD; (800) 356-8495; [www.tenax.net](http://www.tenax.net). or equal.
- I. Catch Basins: Six-inch round Nyoplast drain basin with manufacturer's lateral connections to fit lateral pipe sizes indicated on Drawings.
  - 1. Area Drain Grate for Catch Basins in Planting: with 6-inch diameter ductile iron grate painted black.
- J. Cleanout in Paving:
  - 1. Jay R. Smith with vandal-proof Decorative Access Lids as shown.
  - 2. Or equal.
- K. Slot Drain:
  - 1. Aco Drain, Brickslot, Galvanized Steel, #98999, #98988, #96877-Access Unit. And #01318- PowerLok Grate Removal Tool.
- L. Planter Drain Fixtures for Raised Planters and Gondola area:
  - 1. Zurn Industries, Erie, PA; [www.zurn.com](http://www.zurn.com), Smith Co., or equal.
- M. Geotextile Fabric:
  - 1. Geotextile(Filter) Fabric: Mirafi #140N (800) 869-8905, Synthetic Industries Geotex #451 (800) 621-0444, or approved equal, non-woven polypropylene filter fabric weighing 4.0 oz. per square yard, treated with UV protection, and conforming with Caltrans Standard Specification Section 88.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Protection:
  - 1. Use every possible precaution to prevent damage to existing conditions to remain.
  - 2. Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
  - 3. Use every possible precaution to prevent excessive compaction of planting area soil within or adjacent to the areas of Work.
  - 4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of existing plants to remain.
  - 5. Submit written notification of conditions damaged during construction to the Owner's Representative within one working day of observed damage and before damage is covered.

**3.2 SURVEY REQUIREMENTS**

- A. Lines and Levels: Establish lines and levels, locate and lay out by instrumentation and similar appropriate means for piping and catch basins.
- B. Staking: Provide a sufficient quantity of grade stakes as required to install piping, catch basin rims, and clean outs to elevations, slopes, and horizontal locations indicated on the Drawings.

**3.3 SOLID AND PERFORATED PIPE INSTALLATION**

- A. Manufacturer's Requirements: Conform to the installation requirements of the pipe manufacturer's current printed instructions.
- B. Pipe Laying:
  - 1. Furnish and place in position necessary batter boards, string lines, plummets, graduated poles, etc., required in establishing and maintaining the lines and grades.
  - 2. Protect batter boards and location stakes from possible damage or change of location.
  - 3. Begin laying of the pipe on the prepared foundation at the outlet or downstream end with the spigot or tongue end of the pipe joint pointing downstream and proceed toward the inlet or upstream end with each abutting section of pipe properly matched, true to the established lines and grades.
  - 4. Provide acceptable equipment for hoisting and lowering the sections of pipe into the trench without disturbing the prepared bedding foundation or the sides of the trench.
  - 5. Clean ends of the pipe carefully before the pipe is placed in the trench.
  - 6. Fit and match pipe so that when laid in the prepared bedding it will form a smooth, uniform conduit.
- C. Backfill Outside of Planting Areas Over Solid Pipe:
  - 1. See Civil.
- D. Backfill in Planting Areas Over Solid Pipe:
  - 1. Backfill using "Base Soil Mix" per Section 32 91 13, Planting Soil Preparation.
  - 2. Compact granular soil backfill to a maximum 75-80 percent relative compaction as determined by ASTM D 1557.
  - 3. Backfill top 12 inches in planting areas with "Topping Mix" per Section 32 91 13, Planting Soil Preparation.
  - 4. Apply water to settle backfill.
- E. Backfill in Planting Areas Over Perforated Subdrain Pipe with filter fabric wrap or sock:
  - 1. Backfill with "Base Soil Mix" followed with "Topping Mix" per Section 32 91 13, Planting Soil Preparation to elevations indicated on Drawing.
  - 2. Apply water to settle backfill to 75-80 percent relative compaction.
  - 3. Do not compact more than 75-80 percent relative compaction.

**3.4 SLOT DRAIN**

- A. Install as shown and in accordance with Manufacturer's recommendations.

**3.5 PROTECTION**

- A. Pipe Lines and Slot Drains: Protect from excessive loads until date of Final Completion.
- B. Drain Grates: Protect from excessive loads until date of Final Completion.

**END OF SECTION**