SECTION 02620
SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction (SSPWC), latest Edition.

1.2 SUMMARY

A. This Section includes subdrainage systems for the following:

1. Under play surface areas.

1.3 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. Subdrainage: Drainage system that collects and removes subsurface or seepage water.

1.4 SUBMITTALS

A. Shall be submitted to the Architect for review and approval in accordance with 2-5.3 of the SSPWC. The Contractor shall allow **10** working days for review by the Architect.

B. Product Data: For the following:

1. Pipe.
2. Pipe fittings.
3. Catch basin.

PART 2 - PRODUCTS

2.1 SOLID-WALL PIPES AND FITTINGS

A. PVC Pipe and Fittings shall be SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals and conforming to Section 207-17 of the SSPWC.

2.2 SPECIAL PIPE COUPLINGS

A. Comply with plans and manufacturers recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surface and area for suitable conditions where subdrainage system is to be installed.

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

3.2 EARTHWORK

A. Excavating, trenching, and backfilling for the subdrainage system shall be in accordance with the plans and Section 306 of the SSWPC.

3.3 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Install PVC piping according to plans, manufacturers recommendations and SSPWC.

3.4 PIPE JOINT CONSTRUCTION

A. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

3.6 FIELD QUALITY CONTROL

A. Testing: After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

3.7 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 02620

SECTION 02630
STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Standard Specifications for Public Works Construction (SSPWC), latest Edition.

C. Eastern Municipal Water District Standards and Specifications (EMWD), latest Edition.

D. Standard Drawings for Riverside County Flood Control & Water Conservation District (RCFC & WCD), latest Edition.

E. Standard Plans and Specifications for County of Riverside (CR), latest Edition.

F. Standard Specifications for Construction of Local Streets and Roads for California Department of Transportation (CALTRANS), latest Edition.

1.2 SUMMARY

A. This Section includes gravity-flow storm drainage outside the building, with the following components:

1. Drains (catch basins/ grates).
2. Stormwater inlets.
3. Cleanouts.
4. Manholes/ Junction Structures.
5. Corrosion-protection piping encasement.
6. Precast concrete manholes.
7. Filtration/ water quality system.

1.3 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. HDPE: High-Density Polyethylene.

C. RCP: Reinforced Concrete Pipe.

1.4 PERFORMANCE REQUIREMENTS

A. Gravity-Flow pipe shall be PVC SDR 35 Pipe conforming to Section 207-17, RCP, Class IV conforming to Section 207-2 and HDPE perforated and non-perforated pipe conforming to Section 207-18 of the SSPWC.

1.5 SUBMITTALS

A. Shall be submitted to the Architect for review and approval in accordance with 2-5.3 of the SSPWC. The Contractor shall allow 10 working days for review by the Architect.

B. Product Data: For the following:

1. Pipe.
   a. Perforated.
   b. Non-perforated.
2. Pipe fittings.
3. Covers/ grates and frames
4. Drains.
5. Catch basin.
6. Manholes/ Junction structures.
7. Riprap.
8. Trash Rack.
9. Filtration/ water quality system.

C. Shop Drawings: For the following:

1. Manholes/ Junction Structures: Include plans, elevations, sections, details, and frames and covers.
2. Wingwall and trash rack: Include plans, elevations, sections and details.
3. Catch Basins and Stormwater Inlets including filtration component. Include plans, elevations, sections, details, and frames, covers, and grates.
4. Water Quality System and all components: Include plans, elevations, sections, details, frames and covers, design calculations.

D. Field quality-control test reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes/ junction structures according to manufacturer's written rigging instructions.

D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Do not proceed with interruption of service without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements of the plans and specifications.

2.2 PIPING MATERIALS

A. Gravity-Flow pipe shall be PVC SDR 35 Pipe conforming to Section 207-17, RCP, Class IV conforming to Section 207-2 and HDPE perforated and non-perforated pipe conforming to Section 207-18 of the SSPWC.

2.3 PIPE AND FITTINGS

A. PVC Pipe and Fittings shall be SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

B. RCP Pipe shall be Class IV with tongue-and-groove mortar type joints with a minimum D-Load of 2000-D.

C. HDPE perforated and non-perforated Pipe and Fittings shall be smooth interior type S or type D high density polyethylene pipe with water tight joints and fittings and shall be ADS N-12 storm drain pipe or approved equal.

a. Perforated pipe less than 24-inches in diameter shall have AASHTO Class II Perforation Patterns.
b. Perforated pipe greater than 24-inches in diameter shall have AASHTO Class I Perforation Patterns.

2.4 DRAINS

A. Area Drains: Shall be installed at locations per plan with grate or lid of depth and size indicated.

1. Manufacturers:

a. Brooks

b. NDS.

2.5 CORROSION-PROTECTION PIPING ENCASEMENT

A. Shall be per EMWD.

2.6 MANHOLES

A. Shall be installed at locations per plan per RCFC & WCD with grate or lid of depth and size indicated.

2.7 CONCRETE

A. General: Shall be per Section 201 of the SSPWC.

2.8 CATCH BASINS

A. Standard Precast Concrete Catch Basins: Shall be installed at locations per plan with grate or lid of depth and size indicated.

1. Manufacturers:

a. Brooks

b. NDS

B. Frames and Grates: Dimensions, opening pattern, free area, and other attributes as indicated per plan. Inlet grates shall be galvanized steel unless otherwise noted on the plans. All grates shall meet H-20-44 load standard and shall be approved for bicycle use and ADA compliant with a maximum ½" grate opening. Inlets shall be installed in accordance with manufacture's recommendation, as called for on the plans including all details and the SSPWC.

2.9 STORMWATER INLETS

A. Curb Inlets: Shall be installed at locations per plan per CR with frame and lid of depth and size indicated.

2.10 WATER QUALITY SYSTEM

A. Shall be installed at location per plan with grate or lid of depth and size indicated.

1. Manufacturers:

a. Bio Clean Environmental Service

1) Model Number NSBB 5-10-84
2) Model Number NSBB 8-12-96

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling for the storm drain system shall be in accordance with the plans, Section 306 of the SSWPC and in accordance with applicable standards.

3.2 PIPING APPLICATIONS

A. Shall be in accordance with the plans, Section 306 of the SSWPC and in accordance with applicable standards.

3.3 PIPING INSTALLATION

A. General Locations and Arrangements: Improvement plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Contractor shall pothole join point(s), and where crossing possible existing utilities to determine horizontal and vertical locations and notify the Architect of any discrepancies or conflicts before starting construction. Where specific installation is not indicated, follow piping manufacturer's written instructions.

1. Payment – Full compensation for potholing including pavement repair per City requirements shall be considered included in the contract unit prices paid for other items of work that are either incidental or appurtenant and shall be considered full compensation for furnishing all labor, materials, tools, equipment and incidentals for accomplishing the work as specified herein and no additional compensation will be allowed.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes/ catch basins for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing storm drain is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed in accordance with applicable standards of EMWD, RCFC & WCD and/or CR.

F. Install gravity-flow drainage piping in accordance with the plans, Section 306 of the SSWPC, and EMWD, RCFC & WCD and/or CR Standards.

G. Install corrosion-protection piping encasement per EMWD, RCFC & WCD and/or CR Standards.

3.4 PIPE JOINT CONSTRUCTION

A. Join PVC SDR-35 drainage piping according to the plans and manufacturer's written instructions.

B. Join RCP drainage pipe according to the plans and manufacturer's written instructions.

C. Join HDPE drainage piping according to the plans and the following:

1. Corrugated HDPE pipe and fittings shall have bell and spigot joints, smooth interior complying with AASHTO designation M-252 (4"-10"), M-294 (12"-36") type S or MP6-95 (42" & 48") type S or D. The pipe and fittings shall be made of virgin HDPE compounds conforming to the requirements of cell classification 32440C. Pipe and fittings shall be installed in accordance with ASTM D-2321 and the project specifications.

2. All pipe shall be joined with a bell and spigot type of rubber gasketed joint. All fittings shall utilize rubber gasketed joints. All rubber gaskets shall meet the requirements of ASTM F-477.

3. Where HDPE storm drain lines are shown on a radius, the contractor shall furnish elbows or short lengths, or a combination of both. The maximum allowable angle is 45 degrees. The maximum allowable horizontal deflection at a joint without an elbow is 3 degrees

D. Join dissimilar pipe materials per manufacturer's recommendations.

3.5 DRAIN INSTALLATION

A. Install type of drain at locations indicated per plan, complete with appurtenances and accessories indicated.

3.6 MANHOLE INSTALLATION

A. Install manholes at locations indicated per plan, complete with appurtenances and accessories indicated in accordance with applicable standards.

3.7 CATCH BASIN INSTALLATION

A. Construct/ install catch basins/ gates to sizes and shapes at locations indicated per plan complete with appurtenances and accessories indicated.

B. Set frames and grates to elevations indicated.

3.8 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides at locations indicated per plan and per applicable standards.

B. Riprap: ¼ ton class per CALTRANS Section 72-2.02 and placed according to CALTRANS Section 72-2.03 Method B to the depth and configuration indicated per plan.

1. Grout interstices with 520-C-2500P per SubSections 300-11.3.1 & 300-11.3.2 of the SSPWC.

3.9 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318/318R.

B. Place 2-sack slurry per plan.

3.10 CONNECTIONS

A. Connections to existing piping and manholes shall be in accordance with the plans and specifications. Contractor shall pothole join point(s) to determine horizontal and vertical locations and notify the Architect of any discrepancies or conflicts before starting construction.

3.11 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Shall be abandoned per Section 306-5 of the SSPWC and per EMWD, RCFC & WCD and/or CR Standards.

B. Abandoned Manholes and Structures: Manholes shall be abandoned per Section 306-5 of the SSPWC and per EMWD, RCFC & WCD and/or CR Standards.

C. Backfill to grade according to Division 2 Section "Earthwork."

3.12 IDENTIFICATION

A. Install warning tape as directed per EMWD, RCFC & WCD and/or CR Standards

3.13 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.14 CLEANING

A. Clean interior of piping of dirt and superfluous materials and according to requirements of authorities having jurisdiction.

END OF SECTION 02630