

Contech® Engineered Solutions Guide Specification

UrbanPond® EQ for Detention or Infiltration Systems

This product guide Specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, including MasterFormat, SectionFormat, and PageFormat, contained in the *CSI Manual of Practice*.

This Section must be carefully reviewed and edited by the Engineer to meet the requirements of the Project and local building codes. Coordinate this Section with other Specification Sections and the Project Plans. Delete all “*Specifier Notes*” when editing this section.

Section numbers are from *MasterFormat 2018 Edition*. Update Section numbers to current versions if required.

Specifier Notes: This Section covers Contech® UrbanPond® precast concrete, modular buried stormwater storage units. The UrbanPond® is designed to meet the specific requirements of the Project.

Consult Contech® for assistance in editing this Section for the specific Project or application.

SECTION 33 46 23 – MODULAR BURIED STORMWATER STORAGE UNITS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. UrbanPond® precast concrete, modular, buried stormwater storage units and accessories.

1.02 SUMMARY

- A. This Section includes criteria for precast concrete, modular, buried, stormwater storage units utilized for detention or infiltration of stormwater runoff. This Section covers the materials and methods for the manufacture and installation of the precast concrete, modular, buried stormwater storage units.

1.03 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures
- B. Section 31 00 00 – Earthwork
- C. Section 03 40 00 – Precast Concrete

1.04 REFERENCE STANDARDS

- A. American Society of Civil Engineers (ASCE)
 - 1. ASCE 7-16
- B. American Association of State Highway Transportation Officials (AASHTO)
 - 1. AASHTO – Standard Specifications for Highway Bridges, 17th Edition – 2002
 - 2. AASHTO M198 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 - 3. AASHTO M288 – Standard Specification for Geosynthetic Specification for Highway Applications
- C. American Concrete Institute (ACI)
 - 1. ACI 318 – Building Code Requirements for Structural Concrete
 - 2. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures
 - 3. ACI 350.3 – Seismic Design of Liquid-Containing Structures and Commentary
- D. American Society for Testing and Materials (ASTM)
 - 1. ASTM A48 – Standard Specification for Gray Iron Castings

2. ASTM C32 – Standard Specification for Sewer and Manhole Brick (Made form Clay or Shale)
3. ASTM C139 – Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
4. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
5. ASTM C595 – Standard Specification for Blended Hydraulic Cement
6. ASTM C877 – Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
7. ASTM C890 – Standard Practice for Minimum Structural Design Loading for Monolithical or Sectional Precast Concrete Water and Wastewater Structures
8. ASTM C891 – Standard Practice for Installation of Underground Precast Concrete Utility Structures
9. ASTM C913 – Standard Specification for Precast Concrete Water and Wastewater Structures
10. ASTM C920 – Standard Specifications for Elastomeric Joint Sealants
11. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
12. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
13. ASTM C1107 – Packaged Dry, Hydraulic Cement Grout (Non-Shrink)
14. ASTM C1478 – Standard Specification for Storm Drain Resilient Connectors Between reinforced Concrete Storm Sewer Structures, Pipes, and Laterals
15. ASTM D448 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction
16. ASTM D698 – Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
17. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
18. ASTM F2510 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Corrugated Dual- and Triple-Wall Polyethylene and Polypropylene Pipes

1.05 DESIGN REQUIREMENTS

- A. Design Performance: Provide Modular Buried Stormwater Storage Units capable of withstanding design loads as indicated on the Plans and in accordance with ACI 350-06, ACI 350.3-20, and ACI 318-19 and the details listed herein.
 1. Dead Loads shall be determined using the following:

- i. Minimum superimposed soil, pavement, and subbase load of 120 pcf. (Sand and gravel, wet per ASCE 7-16) based on the expected cover conditions as detailed on the plans.
 - ii. Minimum concrete load of 150pcf.
 - iii. Static Lateral Earth Pressure to be based on a minimum (at-rest equivalent fluid pressure) of 80 pcf or a submerged (at-rest equivalent fluid pressure) of 113pcf.
 - iv. Other dead loads as indicated on the Plans.
- 2. Live Loads shall be determined using the following:
 - i. Horizontal soil pressure from surface loads shall be applied as a uniform surcharge pressure of 80psf from surface to a depth of eight feet per ASTM C890.
 - ii. HL93 and Design Tandem Loading per AASHTO – Standard Specifications for Highway Bridges, 17th Edition – 2002 based on the minimum and maximum depth of burial as indicated on the Plans.
 - iii. Vehicle impact loads shall be increased 30% per ASTM C913.
- 3. Hydrostatic Load shall be determined using the following:
 - i. A minimum of 62.4 pcf water density at the maximum water storage depth as indicated on the Plans.
- 4. Maximum Soil Bearing Pressure shall be determined using the following:
 - i. The maximum allowable soil bearing pressure shall be 1,500psf or;
 - ii. The soil bearing capacities shall be as determined by the Project Geotechnical Engineer or as listed in the Project Geotechnical Report.
- B. The detention or infiltration volume of the stormwater storage system shall be as indicated on the Plans or in the Water Quality Management Plan (WQMP).
- C. The detention or infiltration system depth shall be as indicated on the Plans and shall not deviate without a hydraulic analysis indicating there is no adverse effect to the overall system performance.
- D. The detention or infiltration system footprint shall be as indicated on the Plans and shall not deviate without a hydraulic analysis indicating there is no adverse effect to the overall system performance.

1.06 QUALITY ASSURANCE

- A. The precast concrete, modular, buried, stormwater storage units shall be manufactured at a precast concrete facility that has been in the business of producing precast concrete products similar to those specified for a minimum of three years. The Precaster shall demonstrate adherence to the standards set forth in the NPCA Quality

Control Manual. He shall maintain a permanent quality control department or retain an independent testing agency on a continuing basis.

- B. The materials, methods and completed concrete, subsurface, stormwater storage system(s) shall be subject to inspection by the Engineer. Acceptance or rejection of the system shall be based on the Specifications contained in this Section.

1.07 SUBMITTALS

A. Submittals shall conform to Section 01 33 00 - Submittal Procedures.

B. Action Submittals

1. Shop Drawings

- i. Submit manufacturer's shop drawings to include plans, elevations, sections, and details to include overall dimensions and individual precast element dimensions.
- ii. Submit reinforcement design to include all structural reinforcement, lifting and erection inserts, connections, and other cast-in hardware.
- iii. Submit details that indicate the size and location of all access openings and all inlet and outlet openings.
- iv. Indicate location and details of joint treatment.

2. Concrete Design Mixtures

- i. Submit a concrete design mixture for all precast and cast-in place concrete elements and structures.

3. Water Storage Sizing

- i. Include design and/or calculations that confirm the stormwater storage system Design Storage Volume has been provided in accordance with the Plans and the Project Water Quality Management Plan (WQMP).

C. Informational Submittals (Upon Request)

1. Material Test Reports and Certifications

- i. Concrete Compressive Strength
- ii. Concrete Aggregates
- iii. Reinforcement
- iv. Cementitious materials
- v. Admixtures

2. Operations and Maintenance Manual.

- 3. Installation Verification: The installation of the subsurface, stormwater storage system shall be verified by a Licensed Professional Engineer and a certification

provided indicating that the system has been constructed and is in substantial conformance with the Approved Plans and WQMP.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all precast concrete members in such quantities and at such times to assure compliance with the agreed upon Project schedule and setting sequence to ensure continuity of installation.
- B. Transport and handle members in a manner to avoid excessive stresses that could cause cracking or other damage.
- C. Store members adequately to prevent cracking, warping or distortion.
- D. Accessories:
 - 1. Accessory components shall be delivered in the manufacturer's original, unopened packaging and/or containers with labels that clearly identify the make, model, and manufacturer.
 - 2. Accessory components shall be stored in a clean, dry area out of direct sunlight.

1.09 WARRANTY

- A. The Manufacturer shall provide a one (1) year limited warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Contech Engineered Solutions
9100 Centre Pointe Drive, Suite 400
West Chester, Ohio 45069
Phone: (800) 338-1122
Website: www.conteches.com

2.02 MODULAR BURIED STORMWATER STORAGE UNITS

- A. All material shall meet or exceed the applicable standards referenced in this Specification and shall conform to all federal, state, and local requirements.
- B. Precast Concrete Members
 - 1. ***(Specifier Note: Select the appropriate configuration and delete all other configurations. Edit the font to standard font when completed.)***
 - ***UrbanPond® 8'x8' Modules***
 - ***UrbanPond® 8'x8' Stacked Configuration***
 - ***UrbanPond® 8'x16' Modules***
 - ***UrbanPond® 8'x16' Stacked Configuration***
 - 2. Cement shall be Type II/V Portland cement conforming to ASTM C 150.
 - 3. Aggregate shall conform to ASTM C33, except that the requirement for gradation shall not apply.

4. Reinforcement shall consist of steel bar conforming to ASTM A615, Grade 60/80, steel bar conforming to ASTM A706, Grade 60/80 (when welding is necessary), or mesh conforming to ASTM A1064, Grade 60/80.
5. All sections shall be cured by an approved method.
6. Pipe openings shall be sized to accept pipes of the specified size(s) and material(s) and shall be sealed by the Contractor with hydraulic cement grout conforming to ASTM C1107 or sealed by use of a Resilient Connector conforming to ASTM C923, C1478, or F2510.
7. Access risers and any necessary associated grade adjustments shall conform to ASTM A478 for round access risers and ASTM C857, C858, or C913 for square/rectangular access risers and shall provide for an access opening with a minimum dimension of 30-inches.
8. Castings for manhole frames and covers shall be in accordance with ASTM A48. The access cover/s shall be designed for HL93 traffic loading and shall provide a minimum of 30-inch clear opening.
9. Brick or masonry used to level the manhole frames and covers to finished grade shall conform to ASTM C32 or ASTM C139 and shall be installed in conformance with all local requirements.

(Specifier Note: Section C. (Field Poured Concrete Slabs) is only necessary for certain configurations of the modular, buried, stormwater storage system. Delete this Section if the Field Poured Concrete Slab is not to be utilized.)

C. Field Poured Concrete Slab

1. The dimensions of the slab shall be as detailed on the Plans.
2. Cement shall be Type II/V Portland cement conforming to ASTM C 150 or blended hydraulic cement conforming to ASTM C595.
3. Aggregate shall conform to ASTM C33, except that the requirement for gradation shall not apply.
4. Reinforcement shall consist of steel bar conforming to ASTM A615, Grade 60/80, steel bar conforming to ASTM A706, Grade 60/80 (when welding is necessary) or mesh conforming to ASTM A1064, Grade 60/80.
5. All sections shall be cured by an approved method.

D. Accessory Components

1. Joint sealer to span between concrete members shall be a polyolefin backed exterior joint wrap conforming to ASTM C877.

E. Bedding, Backfill and Final Fill

(Specifier Note: This Section for Bedding, Backfill and Final Fill contains material requirements for detention and infiltration systems. If the Specification is intended for detention systems, then all content titled

“Infiltration” should be deleted. If the Specification is intended for infiltration systems, then all content titled “Detention” should be deleted.)

1. Bedding and Backfill material for the precast concrete, modular, buried, stormwater infiltration systems shall conform to ASTM D2487 group GP or SP. Bedding shall be a minimum of 6-inches thick. Backfill width shall be sufficiently wide to ensure adequate working room to compact the materials but at no times shall the distance be less than 18-inches.
2. Final fill material for the precast concrete, modular, buried, stormwater infiltration systems shall conform to ASTM D2487 except group OL, CH, MH, OH, and PT.
3. Bedding, Backfill and Final fill material for the precast concrete, modular, buried, stormwater detention systems shall conform to ASTM D2487 except group OL, CH, MH, OH, and PT. Bedding shall be a minimum of 6-inches thick. Backfill width shall be sufficiently wide to ensure adequate working room to compact the materials but at no times shall the distance be less than 18-inches.
4. Any open graded materials utilized for bedding, backfill, or final fill material shall be separated from the in-situ soil by a non-woven geotextile conforming to AASHTO M228, Class 2.

PART 3 – EXECUTION

3.01 Earthwork

- A. Excavation, trenching, and backfilling shall be as specified in Division 31 00 00 “Earthwork.”

3.02 Identification

- A. All precast concrete, modular, buried, stormwater storage systems shall be identified at the surface level with permanent, clearly visible markings indicating they are stormwater storage systems.

3.03 Stormwater Storage System Installation

A. General

1. Installation shall conform to ASTM C891. Where specific installation procedures are not indicated in this Referenced Specification or the Plans, follow the product manufacturer’s written instructions.
2. All precast concrete members shall be inspected for defects and cracks before being lowered into the trench. Any defective, damaged, or unsound structure or any product that has had its grade disturbed after laying shall be taken up and replaced. The interior of the treatment system shall be free from dirt, excess water and other foreign materials as the installation progresses and left clean at the completion of the installation.

3.04 Bedding

Project Owner:
Project Name:
Project No.:

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- A. Bedding shall be stable and uniform. The bedding shall be compacted to a minimum of 90% of maximum density per AASHTO T99, or as shown on the Plans. Structure bedding shall be a minimum of 6" in thickness.

3.05 Placing Precast Concrete Members

- A. Precast Modules shall be placed to within $\pm \frac{3}{4}$ " of the elevations as indicated on the Plans.
- B. Precast Modules shall be placed horizontally to within $\pm \frac{3}{4}$ " of each neighboring module. The Engineer shall determine a course of action should the placement exceed this Specification.

3.06 Jointing/Sealing

- A. Interior floor joints between concrete members (if any) shall be filled using a non-shrink hydraulic cement conforming to ASTM C595 or C1107.
- B. Exterior joints on the top and side surface shall be sealed using a polyolefin backed exterior joint wrap conforming to ASTM C877. The joint wrap shall span the joint by a minimum of 6-inches on either side of the joint.

3.07 Backfilling

- A. Backfilling Stormwater Storage System in Excavation
 - 1. After the precast concrete member and accessory drainage connections have been properly bedded, select material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along all sides of the system in layer depths to ensure minimum compaction density is obtained evenly throughout the backfill material. The backfill shall be brought up evenly on all sides of the structure. At no time shall the fill on one side be more than 1'0" higher than the fill on the opposite side. Each layer shall be compacted or vibrated with mechanical tampers or rammers to ensure that the backfill material is well seated and properly interlocked. Tests for density shall be made as necessary to ensure conformance to the compaction requirements as Specified in the Geotechnical Report.

END OF SECTION 33 46 23