PRODUCT DELIVERY AND ASSEMBLY

- Product shall be delivered to site in standard modules such as BPUs and/or PIPE-R™ cubes. See manufacturer's product specification sheets and information guide for available standard units and detailed dimensions.
- Handling of product delivered to site shall be performed with appropriate equipment, stored in safely place to avoid damage from other construction activities, and protected from harmful environment.
- Products shall be assembled onsite into chambers (creation of distinct units of multiple BPUs and/or cubes onsite) by the contractor in accordance to the PIPE-R™ reservoir system installation guide.
- Completely assembled chambers shall be wrapped in geotextile (pervious or impervious) to prevent soil particle migration.
- Manufacturer's representative will be available to guide installing contractors on how to accomplish the assembly of the products to create chamber(s).

SITE LAYOUT AND EXCAVATION

- The installing contractor shall follow standard procedures for trench/embankment layout excavation and bed preparation. Apply standard construction practices (OSHA approved procedures) for the entire installation procedure.
- Excavated area shall be at least 18 inches (457 mm) wider on all four sides of the PIPE-R™ reservoir system layout to allow for backfilling and compaction equipment.
- Ensure that sides of excavated trench/embankment remain stable under all working conditions. The slope or support to trench/embankment walls must satisfy all local and national safety standards.
- Ensure that trench/embankment supports provide adequate support to PIPE-R™ reservoir system throughout the installation process.
- Removal of trench supports shall not cause any disturbance to the installed PIPE-R™ system and the foundation and embedment materials. When necessary, trench/embankment supports shall be left in place to provide sufficient support to the foundation.
- If the trench side walls slough off during excavation or installation, remove all sloughed and loose material from the trench/embankment.
- Total excavation depth shall be the sum of the bedding depth, PIPE-R™ reservoir system, initial and final backfill, and if applicable, the top pavement layer depths.

Preparation of Excavated Site

- The base of the excavated site shall be prepared in accordance to the design engineer's specifications on subgrade compaction to support the surcharge loads and provide a stable base with the required bearing capacity.
- If excavation is below the intended grade, fill the trench bottom with compatible foundation or bedding materials up to the desired grade level and compact to design engineer's specifications.
- All rock and unyielding materials encountered at the trench/embankment bottom shall be removed and replaced with proper embedment material specified in the drawings.
- Excavate and remove all unstable materials at the trench bottom and replace with suitably graded material (free draining backfill material) as specified by the engineer up to the desired grade level of the designed trench bottom.
- Prevent stormwater runoff and surface water from entering the trench/embankment during installation. Maintain groundwater level at least 24 inches (610 mm) below base of PIPE-R™ reservoir system to provide a stable trench/embankment bottom or as specified by design engineer. Dewatering shall be an option to achieve the design separation between the base and groundwater elevations.
- Backfill trench/embankment after PIPE-R™ reservoir system installation to prevent disturbance of the system and embedment.

FOUNDATION MATERIALS

- The structural integrity of PIPE-R™ reservoir system is a function of the backfill material placed around the system - interaction between the soil and the structure.
- Installation practices and fill materials must meet the standard specified by AASHTO for buried flexible pipes, ASTM D2321, or as specified by the design engineer.
- See ASTM D2321 or Table for the recommended foundation, backfill, and embedment materials.
- Maintain a stable, firm and uniform bedding to minimize localized loading and differential settlement along the PIPE-R™ system coverage area. Fill materials shall be free of lumps, clods, boulders, frozen matter, organics, and debris.
- All fill materials must be firm, stable and achieve the desired density to provide support needed by the PIPE-R™ reservoir system for structural integrity and adequate performance.
- The design engineer is responsible to specify the minimum densities for all fill material - bedding, embedment, initial backfill, and final backfill.
- Contractor shall ensure that a firm, stable, and uniform bedding is provided as required by the engineer.

LINER INSTALLATION

- Design engineer shall require that the PIPE-R™ reservoir system is wrapped with a pervious or impervious geotextile liner for exfiltration or storage systems, respectively.
- Provide geotextile separator, meeting AASHTO M-288 Class 2 specifications, between layers of different particle sizes to prevent soil migration, which may weaken the layer. The design engineer should specify the geotextile liner on the engineering drawings.
- Geotextile liner is wrapped around the PIPE-R™ reservoir system chambers to prevent soil migration and/or water seepage into the reservoir cistern.
- Recommended geotextile liners meeting AASHTO M-288 Class 2 specifications, such as:
  - o For permeable cistern, use Mirafi® S800 or an equivalent geotextile with the same mechanical and hydraulic properties.
  - o For impermeable cistern, use ITL 40X (coated woven polyethylene - CWPE) or an equivalent geotextile of equal properties.
- Installation of PIPE-R™ reservoir system shall begin with the placement of appropriate geotextile (permeable for exfiltration and surficial aquifer recharge, and impermeable for storage and reuse) on the compacted foundation/bedding material.
- For smaller systems, the geotextile liner shall be laid on the foundation/bedding material where the PIPE-R™ reservoir system will be installed.
- Once the PIPE-R™ reservoir system is in place on top of the liner, wrap the chamber with the remaining geotextile such that all sides and the top are covered with a one foot (0.3 m) overlap where two liners meet. Use two-sided adhesive or geotextile wielding to seal geotextile.
- On the other hand, for large projects, a different approach can be adopted in the placement of the geotextile liner.
- The first geotextile liner is laid on the foundation/bedding material and wrapped around the PIPE-R™ chambers, but covers a couple of feet on the top. Formula for the size of geotextile liner for the first approach is calculated as
  - Length = Length + 2 × Height + 6 feet (1.8 m)
  - Width = 2 × Width + 2 × Height + 2 feet (0.6 m)
  - o A second geotextile liner is laid over the top of the bundled pipes to create a top cover that overlaps the first liner by at least one foot (0.3 m) on all sides. Formula for the size of geotextile liner for the second approach is calculated as
    - Length = Length + 2 × Height + 6 feet (1.8 m)
    - Width = Width + 2 × Height + 6 feet (1.8 m)
    - Cover = Length × Width
- In either approach, the sealing on top is made by welding or using double sided tape for reuse systems with an impermeable liner. However, welding or double sided tape is not necessary for filtration system with a permeable liner.

PIPE-R™ SYSTEM INSTALLATION

Installation of Cubes

- The PIPE-R™ reservoir system may be constructed by placing PIPE-R™ cubes into the excavated area on top of the geotextile liner and/or by placing BPUs side by side and stacking them upon one another.
- PIPE-R™ cubes are available in three standard square areas; and can be modified into custom sizes.
  - a) 88" x 88" (2235 x 2235 mm)
  - b) 88" x 42" (2235 x 1067 mm)
  - c) 42" x 42" (1067 x 1067 mm)
  - d) Standard BPUs are 7'4" (2.23 m) long
- The height varies by BPU-Layer increments. Each BPU-Layer is 8.625" (219 mm) high. The maximum allowed number of layers are 7 BPU-Layers for vehicular traffic surfaces and 9 BPU-Layers for non-vehicular traffic surfaces.
- There are three options available for the installation of the PIPE-R™ modules into the excavated layout.
- First option, PIPE-R™ cubes shall be lifted from the bottom with standard fork attachments for a skid steer or front-end loader and placed on top of the geotextile liner.
- Second option, lift the PIPE-R™ cubes from the top using rigging straps, if the excavated area is not large enough to drive into. Lift and place a cube into place on top of the geotextile liner from outside the excavated area.
  - o Place two straps through separate pipes approximately 24 inches (610 mm) from the corners of the cube. The straps go through a pipe on the bottom row and extend above the cube.
  - o Utilize a spreader bar where the equipment is attached to the straps to keep the straps from crushing the pipe when the cubes are lifted.
- A third option is to build a PIPE-R™ reservoir system by interlocking BPUs.
  - o Place the first row of BPUs on the geotextile liner.
  - o Subsequent layer placements shall be in alternate directions up to the design height per the engineering drawings.
  - o The alternating layers shall create a cube of bundled pipes that are ready to be wrapped with the geotextile liner.
- The cube of bundled pipes wrapped with appropriate geotextile liner form a reservoir having a void space of about 96%, which is referred to as PIPE-R™ reservoir system.
- When the PIPE-R™ reservoir system is completely installed in accordance with the engineering drawings, wrap the cubes in the geotextile liner as referenced in the liner section above.
- Inspection and maintenance ports shall be located as shown in the drawings. At least one inspection/maintenance port shall be installed before the manifold pipe and at the outlet manhole, if applicable. Other ports shall be located on pipe connectors between chambers at intervals of about 50 feet.

EMBEDMENT/BACKFILL MATERIALS

- For multiple rows of PIPE-R™ chambers, adjacent rows shall be separated with embedment materials at minimum of 3 ft. (0.9 m) interval or as specified by the engineer.
- The embedment material is intended to provide lateral support to the installed PIPE-R™ reservoir system from vertical loads (overburden and/or truck loads) to minimize vertical deflections.
- The engineer shall ensure that backfilling procedure shall comply with the minimum standard in ASTM D2321 or regulatory agency.
- Placement of backfill materials must not disturb or damage the installed PIPE-R™ reservoir system. Follow recommendations for compaction provided in ASTM D2321.
- Adopt techniques compatible with materials used in the trench and use compaction equipment suitable with the location - work in and tamp, handheld or work-behind compactor, vibratory compactor, or roller compactor.
- To minimize damage to PIPE-R™ reservoir system, NO heavy equipment (vehicles and construction equipment) should be placed directly on the PIPE-R™ system until a minimum backfill depth established by the engineer is achieved.
- Backfill materials shall be free of lumps, clods, boulders, frozen matter, organics, and debris.
- Install and compact initial backfill materials to a minimum of 6 inches (152 mm) above PIPE-R™ chambers using handheld equipment to avoid damage.
- Install geogrids on the surface of the initial backfill, and subsequent layers of geogrid shall have a minimum 12 in (300 mm) vertical separation. Geogrid is recommended to provide tensile strength to the backfill material above load bearing PIPE-R™ reservoir systems.
- The geogrid shall extend 36 inches (914 mm) over the layout of the installed PIPE-R™ reservoir system.
- Geogrid placement in non-traffic load applications is optional, use if specified by the design engineer.

ACCEPTABLE FILL MATERIALS

Material Locations		Descriptions	AASHTO Material Classifications/Unified Soil Classification System	Compaction/Density Requirement
I	Bedding: Fill material or stabilized foundation base of the excavation above the subgrade.	Native soil or as specified by the design engineer. Open-graded, clean, granular soil/aggregate mixtures, less than 35% fines, or processed aggregate. AASHTO M-57 Specifications	Suitable soil class: 1A, 1B, II, and III. AASHTO: A-1, A-3, A-2-4, A-2-5 or USCS: GP, GW, SW, SP, SP-SM, SM, SC	Install and compact in minimum 4" (100 mm) lift to maximum layer. Remove all loose material at the base of the foundation. Use vibratory compactor and level final grade by hand. Minimum density 95% Standard Proctor.
II	Embedment: Fill material placed between rows of the PIPE-R™ system. Located between the excavation wall and PIPE-R™ system sides. Starts from the base of the PIPE-R™ system, above the bedding.	Angular, crushed stone and stone/sand mixtures; poorly or well-graded sand and gravel, or mixture of sand/gravel. AASHTO M-147 Specifications	Suitable soil class: 1A, 1B, II, and III. AASHTO: A-1, A-3, A-2-4, A-2-5 or USCS: GP, GW, SW, SP, SP-SM, SM, SC	Minimum density of 90% and 95% Standard Proctor for gravels (stones) and sand, respectively. Install and compact in minimum 6" (152.4 mm) lift to maximum layer. Use hand tampers or vibratory compactors.
III	Initial Backfill: Fill material starts from the top of the PIPE-R™ system and to a minimum of 6" above or as specified by the engineer.	Native soil, soil, or gravel material as specified in the design by the engineer. AASHTO M-147 Specifications	Suitable soil class: 1A, 1B, II, and III. AASHTO: A-1, A-3, A-2-4, A-2-5 or USCS: GP, GW, SW, SP, SP-SM, SM, SC	Install and compact to a minimum of 6" (152.4 mm) above the top of the PIPE-R™ system. Use hand tampers or hand operated vibratory compactors, no heavy equipment. Minimum density of 90% and 95% Standard Proctor for gravels (stones) and sand, respectively.
IV	Final Backfill: Fill material starts from the top of the initial backfill to the bottom of the pavement layer. Depth as required by AASHTO for roadway design.	Same as above. However, if different from the initial backfill use angular, crushed stone or gravel as specified by the engineer. AASHTO M-147 Specifications	Suitable soil class: 1A, 1B, II, and III. AASHTO: A-1, A-3, A-2-4, A-2-5 or USCS: GP, GW, SW, SP, SP-SM	Compact as required by the engineer. Use plate compactor or roller compactor to achieve specified compaction level.
V	Pavement: Top layer of the pavement section, resting on the final backfill.	Optional: Rigid or flexible pavement, pervious or impervious pavement	N/A	As specified by the engineer in accordance to pavement type specification and design.

PIPE-R™ Operation and Maintenance Guide

Water is our most precious resource and a fundamental building block for life on this planet. Today, the way we work with water is changing and challenging both business and our environment. But we believe we can do better. Using natural products and recycled materials, we are pioneering a new way to approach water treatment and management with systems that are sustainable for our clients' bottom line and the world around us. In short, water is life - our life. We live it every day and are excited to build a custom solution which allows you to work with water in the best way - one that preserves and protects this natural resource for the future generations.

Introduction

The functionality of any underground retention system relies on its ability to infiltrate water captured by the system. Suspended solids that enter an underground system can prevent the infiltration process from taking place along with reducing the storage capacity of the system. The PIPE-R™ Reservoir System offers a multiple method approach to prevent suspended solids from entering the system. Sediment removal can be accomplished in three areas of a PIPE-R™ Reservoir System.

The initial sediment control is accomplished using the Nutrient Separating Baffle Box (NSBB) from Suntree Technologies. Suntree's NSBB is extremely effective at removing TSS and has been tested by NJCAT. The results are available upon request.

Following the NSBB is a manifold that both distributes the clean stormwater runoff to the PIPE-R™ Reservoir System and offers a second sedimentation collection area. Both sediment collection systems are easily accessible through manholes and inspection ports. The manholes and inspection ports are used for inspecting and cleaning the system as necessary. Finally, inspection ports have been placed throughout the PIPE-R™ Reservoir System as a third cleaning option, if necessary.

System Operations

PIPE-R™ reservoir system setup shall comprise of manifold/header pipe connected to a manhole with sumps, inlet and outlet pipes, PIPE-R reservoir chambers, equalizer pipes, geotextile, inspection/maintenance ports, fill materials, and optional outlet collection pipe/header for controlled discharge. If additional pretreatment is required, ECS recommends that the initial sediment control can be accomplished by installation of these pretreatment BMPs, baffle box - the Nutrient Separating Baffle Box (NSBB), grate or curb inlet filters with fine screens or trash guards, inlet protections, or any other pretreatment product approved by regulatory authority. ECS would readily recommend the NSBB as a pretreatment option because it is extremely effective at removing TSS and has been tested by NJCAT to show good removal efficiency. The results are available upon request from the manufacturer.

Following the pretreatment filter is a manifold/header pipe connected to manhole with sump, that distributes the inflow stormwater into the PIPE-R™ Reservoir System and offers a secondary sedimentation collection area in the sump. Sediment collection systems are easily accessible through manholes and inspection ports for the inspection of collected and accumulated sediments, and perform maintenance by extracting the accumulated sediments, as necessary.

If required, install additional inspection ports, rising to the top with covers that can withstand the H-20 loading, is connected to equalizer pipes at predetermined sections of the PIPE-R™ Reservoir System, as a third cleaning option. The inspection ports provide access to the bottom of the reservoir system to measure the depth of accumulated sediments, which is an indication of the amount of sediment in the chambers. If maintenance is required because of the accumulation of fine sediments, water can be introduced through the ports to agitate the sediments and make the fine sediments re-suspend, which then can be vacuumed and collected from same ports into a vacuum truck for safe and acceptable means of disposal.

It is recommended to perform installation of PIPE-R™ reservoir system as designed by engineer per the PIPE-R™ reservoir system manufacturer's Design and Installation guides. Other related accessories required for proper installation including fill materials, geotextiles, geogrids, pipe connections with pipe liner boots. The installation of the accessories shall be as recommended by the manufacturers to ensure proper installations and operations. Use only skilled workers with the requisite record of performance for underground reservoir construction, bulk earthwork, pipe connections, and other accessories to perform all installations.

Prior and during the installation of a PIPE-R™ reservoir system, coordinate all site construction activities to prevent impact to the integrity of the system. These actions shall include but not limited to the prevention of loads greater than the design loads on the system; proper placement of excavated material away from the location of the system; dewatering of the location, if required; prevention of sediments from entering any pretreatment devices and the reservoir system prior to commencement of operations; and application of only recommended compaction practices on embedment fill and backfill placements.

Maintenance Program

Inspection

The frequency of inspections and maintenance PIPE-R™ reservoir system varies by location, and may be increased per the design engineer, city, county, or state where the system is located. However, we recommend minimum inspection frequency in the life of the system. This guide acts as a recommendation and professional judgement should be used to meet the needs of each specific site per anticipated sediment load, contributing area, climate, and land use. Follow the guidelines set forth in the Operation, Maintenance, Inspection, and Cleaning Manuals for the respective pretreatment device used in the project. Request copy from the respective manufacture for the device.

An initial inspection of the manifold and inspection ports should be completed thirty days after installation to assess sediment buildup. Inspect the manifold and inspection ports quarterly after the initial inspection. If a sediment buildup is seen in the manifold upon inspection of one inch or greater, the system should be cleaned up of sediments.

STEP BY STEP MAINTENANCE PROCEDURES FOR THE PIPE-R™ RESERVOIR SYSTEM

I. Inspect the pretreatment Box for sediment
   - a. Follow the O&M requirements set forth by manufacturer in their Operation, Maintenance, Inspection, and Cleaning Manual for the pretreatment device.

II. Inspect the PIPE-R™ Reservoir System manifold for sediment
   - a. Open the manhole and inspection port covers in the manifold where applicable (Be sure to follow OSHA standards for confined space entry if entering a manhole).
   - b. Utilize a flashlight to look for sediment accumulation in the manifold.
   - c. Use deep stick to measure elevation difference between new install (or rejuvenated system - after maintenance) depth and depth at specified inspection intervals for sediment accumulation
   - d. If sediment has accumulated to a level of one inch or more, proceed to section IV. If not, please proceed to section VI.

III. Inspect the PIPE-R™ Reservoir System for sediment
   - a. Open the inspection port covers throughout the system where applicable (Be sure to follow OSHA standards for confined space entry if entering a manhole).
   - b. Utilize a flashlight to look for sediment accumulation in the system.
   - c. If sediment has accumulated to a level of one inch or more, proceed to section V. If not, please proceed to section VI.

IV. Cleaning the PIPE-R™ Reservoir System manifold
   - a. Utilize a standard culvert cleaning nozzle to move sediment into the sump at the end of the manifold.
   - b. Vacuum the sump as required to remove water and sediment. Proceed to section VI.

V. Cleaning the PIPE-R™ Reservoir System
   - a. Introduce water into the PIPE-R™ Reservoir System through the inspection port. A high-pressure hose can be used for this process. This will suspend any sediment in the system. Remove the hose once when the water level covers the sediment being removed from the system.
   - b. Vacuum the water out of the system to remove the sediment. Proceed to section VI.

VI. Replace the manhole and inspection port covers.

VII. Inspect and clean and manholes and catch basins upstream from the PIPE-R™ Reservoir System.

Property		Requirement	Test Result
HDPE Resin	Density, Dr [Uncolored resin], grams/cm³ (ASTM D1505); Density, Dp [Colored resin], grams/cm³ (ASTM D1505)	>0.947 Not Specified	>0.949* >0.960
	Melt Index, grams/10 minutes (ASTM D1238; Condition FR-190/2.16)	≤1.0	0.4700
	Carbon Black Content, % (ASTM D1603)	≥2% and <5%	2.4600
Pipe Workmanship (M 252-09; Section 7.1)		Free of foreign inclusions and visible defects (cracks, creases, unpigmented or non-uniformly pigmented pipe)	No foreign inclusions and visible defects observed
Inside Diameter	Nominal Size, mm (M 252-09; Section 7.2.1)	≥ 25mm increments from 75mm to 250mm	101.6 (4.00")
	Diameter Tolerance, % (M 252; Section 7.2.3)	Between -1.5% and +4.5% of nominal inside diameter	- 0.2 and + 0.2
Perforations (M 252-09; Section 7.4)	Class	Class 1 or Class 2	Class 2
	Appearance	Cleanly cut so as not to restrict the inflow of water	Cleanly Cut
	Slot Width, mm	≤ 3 (≤ 0.12 inch)	Maximum: 1.5mm (0.060") Average: 1.1mm (0.042")
	Slot Length, mm	≤ 25 (≤ 1 inch)	Maximum: 19.8mm (0.778") Average: 17.2mm (0.678")
	Water Inlet Area, cm²/meter of Pipe	≥ 20 (≥ 1 in²/foot)	42 (2 in²/foot)
	Slots per Corrugation Valley	Not Specified	4
	Spacing between Slots	Not Specified	90°; Offset 45° in adjacent valleys
	Corrugation Valleys, per meter of Pipe	Not Specified	56
Pipe Stiffness at 5% Deflection [mold seam parallel to loading plates], kPa (ASTM D2412 modified per M 252-09 Section 9.1)		≥ 240 (≥ 35 lb/in²)	403 (58 lb/in²)
Pipe Flattening at 20% Deflection [mold seam parallel to loading plates] (ASTM D2412 modified per M 252-09 Section 9.2)		No evidence of wall buckling, cracking, splitting or delamination. No decrease in load with increasing deflection.	No wall buckling, cracking, splitting or delamination observed. Load did not decrease with deflection.
Bent Strip ESCR [100% Igepal CO-630 at 50°C], hours (ASTM D1693 modified per M 252-09 Section 9.3)		No cracking after 24 hours	No cracking observed after 240 hours**
Cold Temperature Brittleness parallel plate impact with mold seam parallel to plates after conditioning at -4°C for 1 hour] (M 252-09 Section 9.4)		No cracking	No cracking observed

* Colored resin density, Dp, measured on test specimens cut from pipe sample. Uncolored resin density, Dr, calculated from measured carbon black content and following equation in accordance with ASTM D3350: Dr = [Dp-0.0044(CB)] where CB is the carbon black content in percent.
** Bent strip ESCR test duration exceeded the M 252-09 Section 9.2 requirement of 24 hours.

PIPE-R™ RESERVOIR SYSTEM GEOMETRIC PROPERTIES

Reservoir System Models	Size (L × W × H)	Cross Sectional Area	Weight of Reservoir (Empty)	Weight of Reservoir (Full)	Reservoir Storage Capacity	Maximum Pressure on Bedding Material
BPU-0001	12" × 13.9" × 8.63" (305 × 352 × 219 mm)	98.2 in² (0.06 m²)	1.7 lb. (0.77 kg)	40.6 lb. (18.42 kg)	2.28 ft³ (0.06 m³)	0.26 psi (1.8 kPa)
BPU-0003	12" × 13.9" × 8.63" (305 × 352 × 219 mm)	297.6 in² (0.19 m²)	5.0 lb. (2.25 kg)	129.3 lb. (58.65 kg)	6.93 ft³ (0.20 m³)	0.29 psi (2.0 kPa)
BPU-0005	12" × 60.0" × 8.63" (305 × 1524 × 219 mm)	497.4 in² (0.32 m²)	8.3 lb. (3.74 kg)	215.7 lb. (97.84 kg)	11.59 ft³ (0.33 m³)	0.30 psi (2.1 kPa)
BPU-0007	12" × 83.3" × 8.63" (305 × 2116 × 219 mm)	696.6 in² (0.45 m²)	11.6 lb. (5.24 kg)	301.9 lb. (136.94 kg)	16.24 ft³ (0.46 m³)	0.30 psi (2.1 kPa)
BPU-0009	12" × 106.4" × 8.63" (305 × 2703 × 219 mm)	895.1 in² (0.58 m²)	14.9 lb. (6.74 kg)	387.8 lb. (175.90 kg)	20.87 ft³ (0.59 m³)	0.30 psi (2.1 kPa)
BPU-0011	12" × 129.5" × 8.63" (305 × 3289 × 219 mm)	1095.0 in² (0.71 m²)	18.2 lb. (8.23 kg)	474.6 lb. (215.27 kg)	25.55 ft³ (0.72 m³)	0.31 psi (2.1 kPa)
PIPE-R424	42" × 42" × 44" (1057 × 1057 × 1120 mm)	1732.6 in² (1.12 m²)	98.2 lb. (44.5 kg)	2,707 lb. (1,228 kg)	41.5 ft³ (1.18 m³)	1.55 psi (10.8 kPa)
PIPE-R90	88" × 42" × 44" (2233 × 1057 × 1120 mm)	3657.8 in² (2.36 m²)	208 lb. (94.3 kg)	5666 lb. (2,570 kg)	87.6 ft³ (2.48 m³)	1.55 psi (10.8 kPa)
PIPE-R1890	88" × 88" × 44" (2233 × 2233 × 1120 mm)	7722.0 in² (4.98 m²)	448 lb. (203 kg)	12,030 lb. (5,457 kg)	185 ft³ (5.24 m³)	1.56 psi (10.8 kPa)

DETAILS DIMENSIONS FOR PIPE-R™ RESERVOIR PRODUCTS

PIPE-R™ PRODUCT	PIPE-R™ WIDTH	PIPE-R™ HEIGHT*	PIPE-R™ LENGTH**	PIPE-R™ STORAGE CAPACITY
PIPE-R424	41.625" [1057mm]	43.125" [1095mm]	41.625" [1057mm]	42.0 ft³ [1.20 m³]
PIPE-R90	41.625" [1057mm]	43.125" [1095mm]	87.875" [2232mm]	87.4 ft³ [2.47 m³]
PIPE-R1890	87.875" [2232mm]	43.125" [1095mm]	87.875" [2232mm]	185.0 ft³ [5.20 m³]

* HEIGHT CAN BE INCREASED TO A MAXIMUM OF SEVEN BPU LAYERS; i.e. 60.375" [1533.5mm] WITH EACH SUCCESSIVE LAYER LAID PERPENDICULAR TO PREVIOUS LAYER DIRECTION.
** LENGTH CAN BE EXTENDED IN THE LONGITUDINAL DIRECTION (AS SHOWN) TO A MAXIMUM OF 100 feet [30.48 meters].

PIPE-R-00-
Installation Guides and Notes for PIPE-R™ Reservoir Systems
DATE: 06/13/2017
DRAWN: IGA
CHECKED: IGA
PROJECT #:

DESCRIPTIONS | CHK | DRW | REV

PROJECT TITLE:
TYPICAL DRAWINGS FOR THE PIPE-R™ RESERVOIR SYSTEM

PROJECT LOCATION:
2346 VULCAN ROAD, APOPKA, FL 32703

PIPE-R Reservoir

Environmental Conservation Solutions, LLC
2346 Vulcan Road,
Apopka, FL 32703

Scale: NTS

SHEET
05

Typical PIPE-R Notes.dwg
6/20/2017