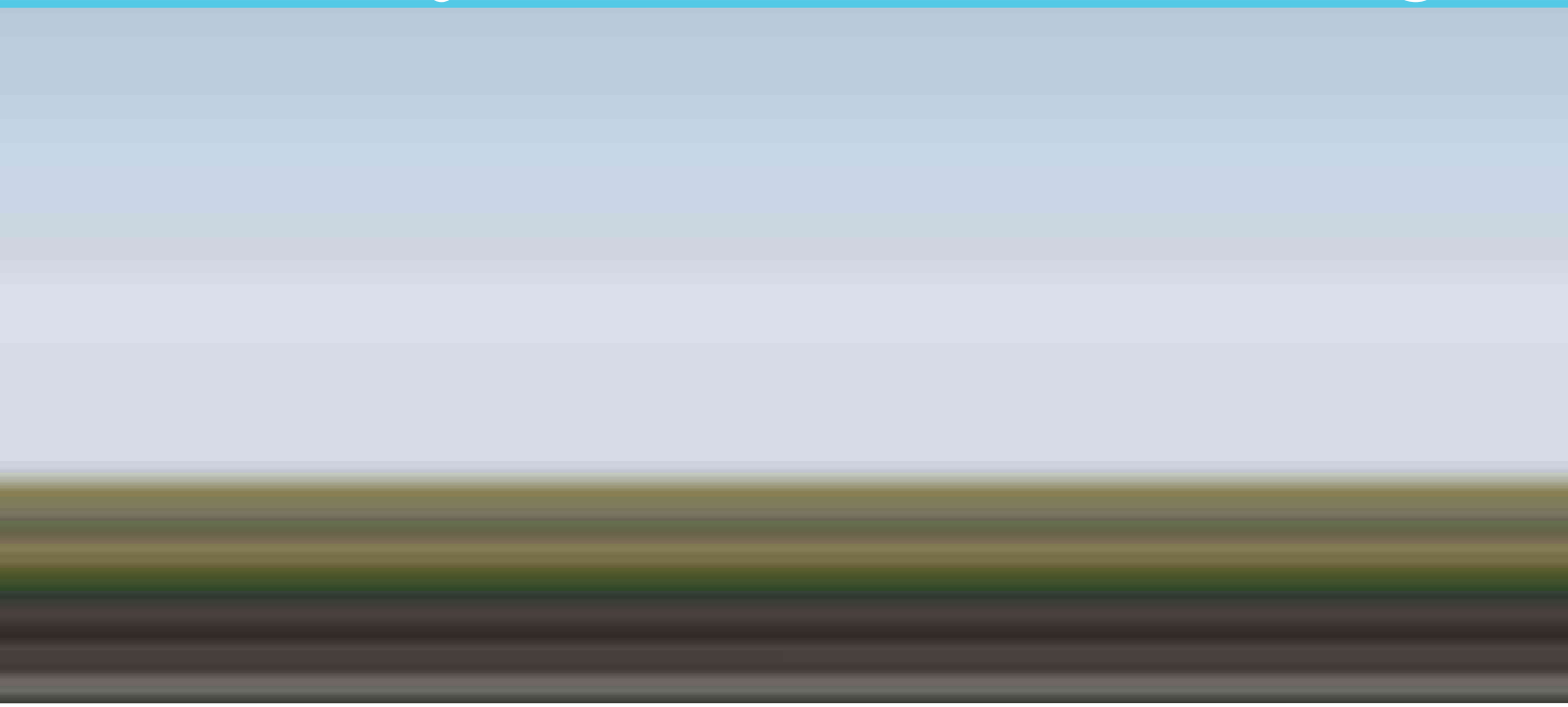
CONTECH®
ENGINEERED SOLUTIONS

ChamberMaxx®
Open-Bottom Infiltration

The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

ChamberMaxx® can be installed by hand without the need of heavy equipment.

Maximize Stormwater Storage in Shallow Footprints – ChamberMaxx®

The ChamberMaxx corrugated, open-bottom plastic infiltration chamber system allows you to meet stormwater runoff reduction requirements and maximize available land space by providing economic infiltration below grade. By utilizing subsurface infiltration, space is preserved for development or green space, runoff is reduced or eliminated, and groundwater recharge can occur.

ChamberMaxx maximizes storage volume in a small footprint, and its low profile shape is ideal for sites with shallow footprints. Each chamber provides 47 ft^3 (1.3 m^3) of storage.

The integrated end caps eliminate the expense associated with loose end caps that are common on many chamber systems and add to chamber strength.

ChamberMaxx is manufactured per ASTM F 2418 and is structurally designed to exceed HS-20/HS-25 live loads in accordance with AASHTO LRFD design specifications for stormwater chambers.

ChamberMaxx® Features and Benefits

FEATURE	BENEFIT
Each chamber provides 47 ft3 (1.3 m3) of storage	Maximized storage space
Low profile (51″ span x 30″ rise x 91″)	Allows for infiltration on sites with shallow footprint
Integrated end caps	Structural integrity and fewer parts to handle during installation
Manufactured per ASTM F 2418	Strength and durability
Lightweight	Installed by hand without the need of heavy equipment

APPLICATION TIPS

- Best practice designs for subsurface infiltration include pretreatment to reduce cost and frequency of maintenance while ensuring the infiltration capacity of the facility.
- Look for chamber systems that have integrated end caps to reduce installation time

ChamberMaxx® Applications

Bioretention

ChamberMaxx is designed with a minimum of 6″ stone above and below the units. The ChamberMaxx can help make bioretention practical by storing 75.1 CF per unit, including storage in stone, before discharging back into the surrounding soil.

Subsurface Infiltration

The open-bottom plastic chamber allows infiltration into surrounding soil, effectively achieving runoff reduction objectives often required by an LID design. By utilizing subsurface infiltration, space is preserved for development, runoff is reduced or eliminated and groundwater recharge can occur. The ChamberMaxx is ideal when you need to maximize storage capacity in a shallow footprint.

Practical for sites with marginal soils

ChamberMaxx® System Sizing

The ChamberMaxx system combines middle chambers, which are open on both ends, with start and end chambers, which include an integral end wall. Water is stored in both the chamber and in the void space in the surrounding stone backfill providing 75.1 cubic feet of storage per chamber. The ChamberMaxx system can be configured with up to 24-inch diameter (0.61 m) inlet/outlet manifold.

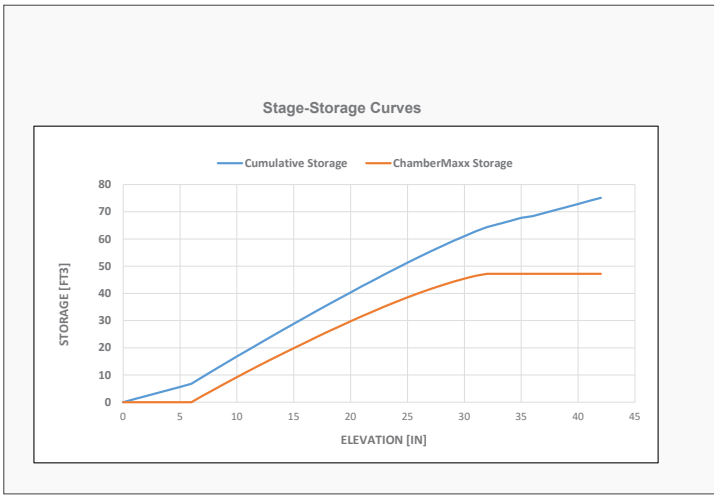
CHAMBER PART	WIDTH (IN) (M)	HEIGHT (IN) (M)	WEIGHT (LBS) (KG)	ACTUAL LENGTH (IN) (M)	INSTALLED LENGTH (IN) (M)	STORAGE VOLUME (CF) (M^3)	INSTALLED STORAGE VOLUME (CF) (M^3)*
Start	51.4 (1.31)	30.3 (0.77)	83.0 (37.65)	98.4 (2.50)	96.2 (2.44)	50.2 (1.42)	78.1 (2.21)
Middle	51.4 (1.31)	30.3 (0.77)	73.0 (33.11)	91.0 (2.31)	85.4 (2.17)	47.2 (1.34)	75.1 (2.31)
End	51.4 (1.31)	30.3 (0.77)	76.0 (34.47)	92.0 (2.34)	88.5 (2.25)	46.2 (1.31)	74.1 (2.10)

** 6" (152 mm) of stone above and below chamber, 5.6" (142 mm) chamber spacing and 40% porosity.*

Integral end caps eliminate loose end caps and add to chamber strength.

ChamberMaxx® Flow Routing

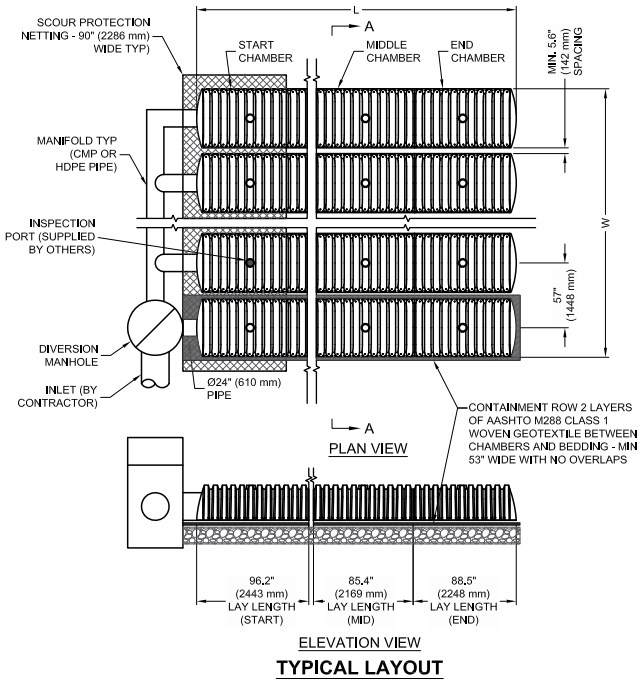
Proper design of any detention system typically requires that flow routing be performed. Engineers at Contech can be a valuable resource when designing a ChamberMaxx retention system. Typically, stage-storage curves like those shown are utilized in the analysis. Contech stage-storage calculator is available for download on www.ContechES.com. This information can simply be inserted into common hydrology/hydraulic software such as HydroCAD, HydroFlow, PondPack or TR20. This makes a flow routing design with ChamberMaxx just as simple as an aboveground pond design.

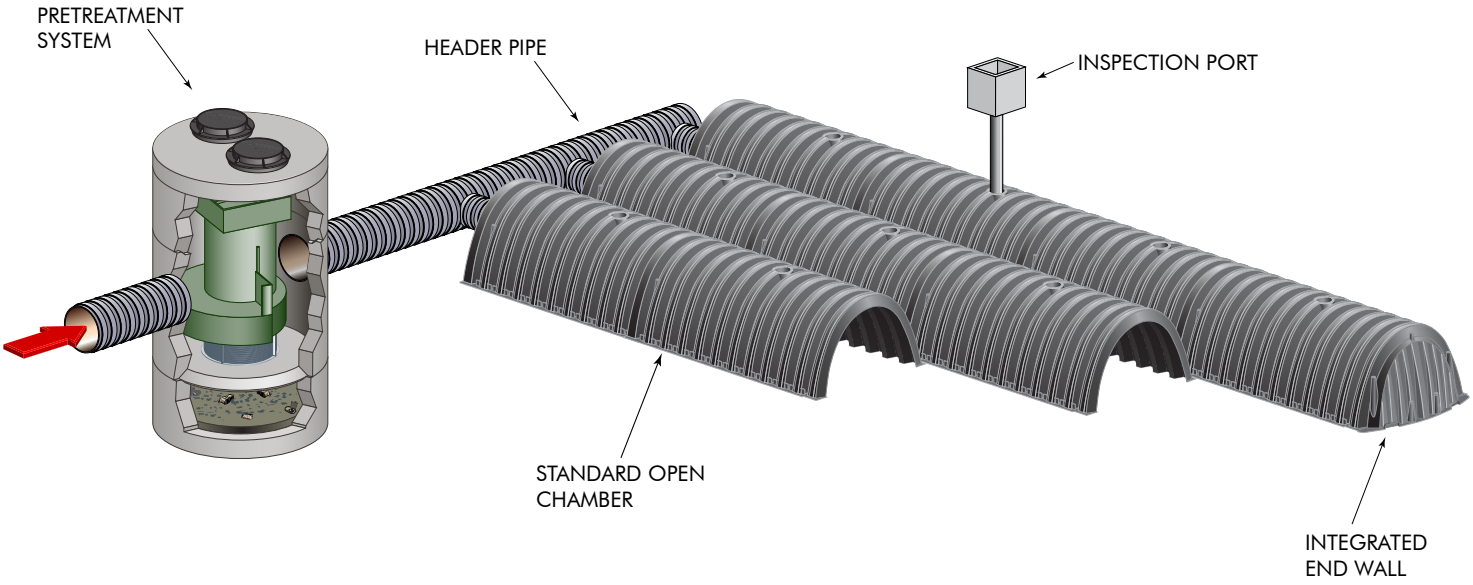


ChamberMaxx® Configuration Option

Optional Containment Row

Hydrodynamic separators and filtration devices provide the most efficient sediment removal and extended maintenance interval, and are recommended as pretreatment for ChamberMaxx systems. The ChamberMaxx Containment Row should be considered as basic, low cost treatment strategy and should only be considered where sediment loading to the ChamberMaxx system is assumed to be minimal. The Containment Row is designed to provide TSS removal by direct screening.

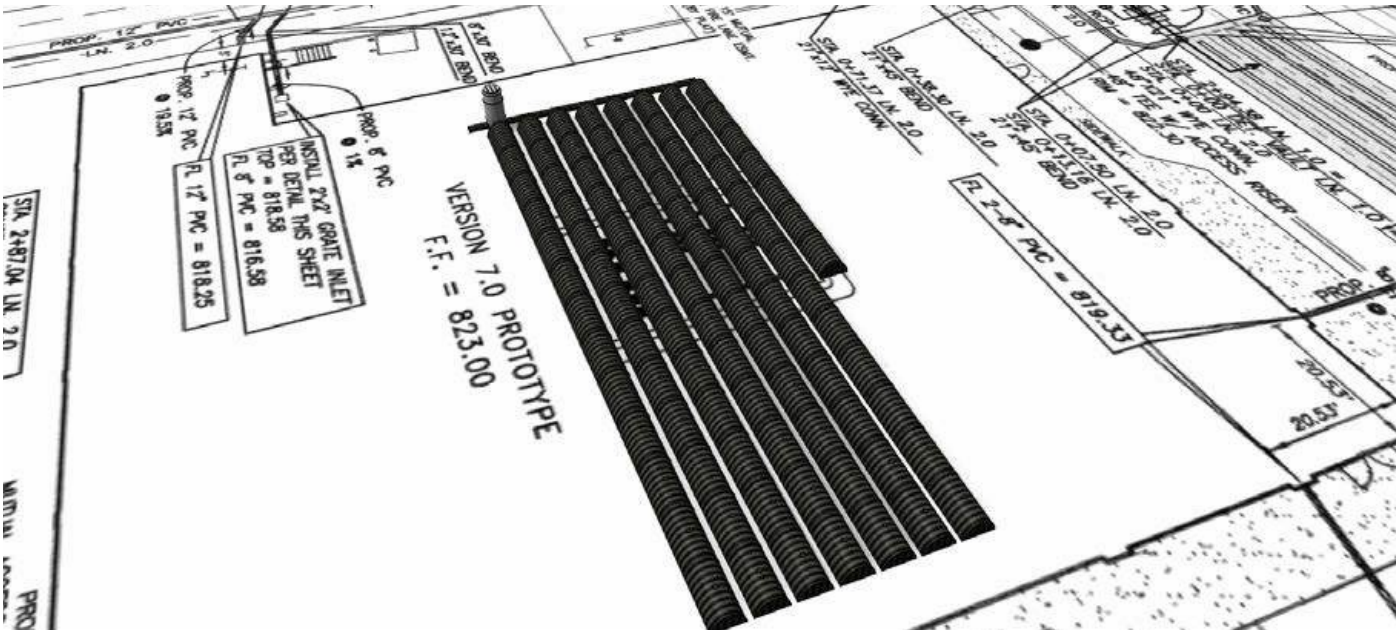




The open-bottom chamber system allows for runoff reduction and economic infiltration.

Include pretreatment for your best practice designs

Design Your Own Detention System (DYODS®)



Learn More:
www.ContechES.com/designcenter

Quickly prepare designs for estimates and project meetings ...

Engineers are always looking for new ways to quickly prepare designs for estimates and project meetings. We have a tool that does just that… the Design Your Own Detention System (DYODS®) tool.

Part of the Contech Design Center, this free, online tool fully automates the layout process for stormwater detention and infiltration systems. The tool allows you to design systems using corrugated metal pipe (CMP), ChamberMaxx® plastic chambers, or DuroMaxx® steel reinforced polyethylene (SRPE). You can also create multiple systems for each project while saving all project information for future use.

- "Drag and drop" feature allows users to customize layout
- A 2D/3D design environment with high-resolution graphics including BIM model output
- Optimize designs for the storage requirement or maximize storage for a given footprint
- Import a PDF site plan, scale and design a system over the plan and view the overlay in 2D
- Instant access to customized, project specific drawings, and CAD files
- Ability to co-workers or Contech design engineers to your project with the new Collaborator feature

CONTECH® DESIGNCENTER
DESIGN MADE EASY

A free, online tool that fully automates the layout process for stormwater detention systems.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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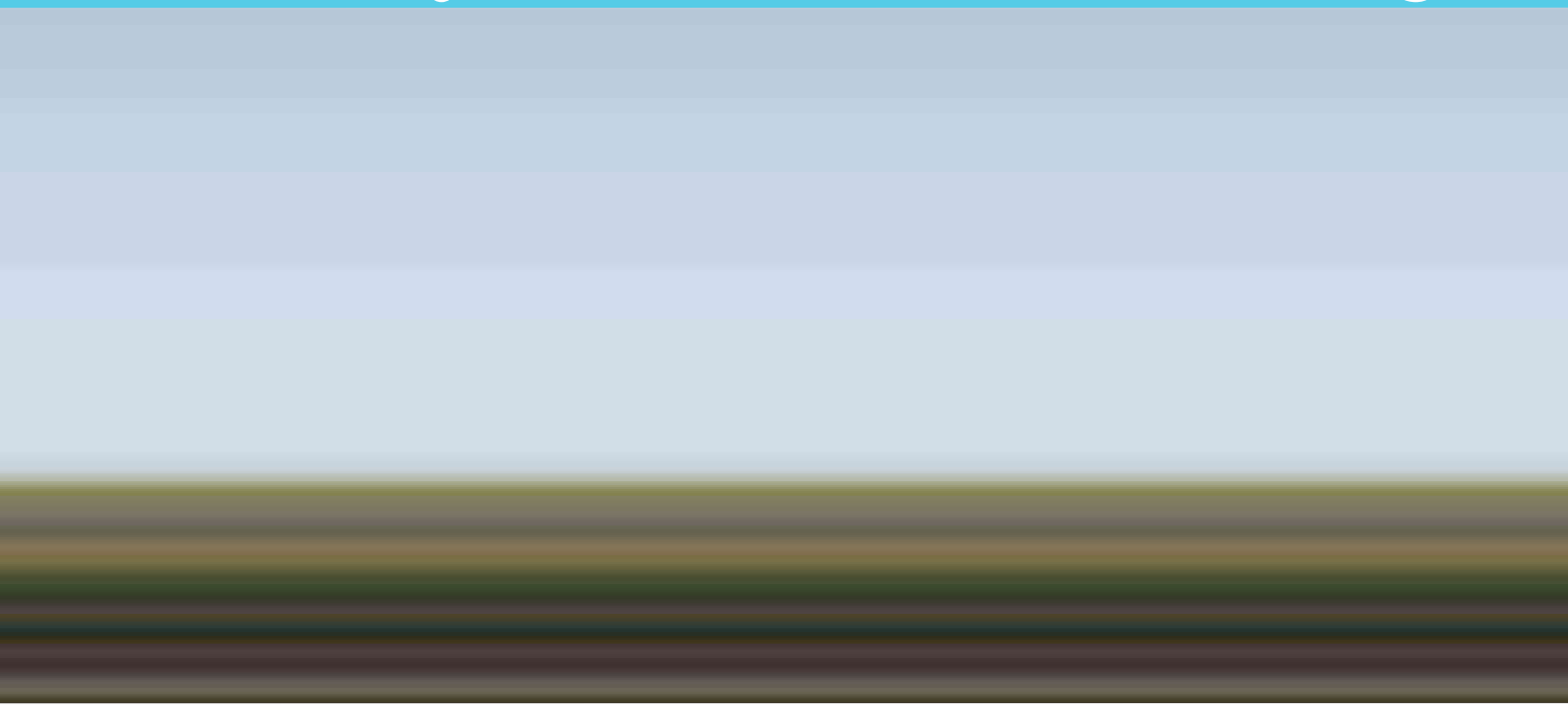
Underground Stormwater
Detention & Infiltration

The experts you need to solve your stormwater challenges



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Detention and Infiltration Solutions by Contech

One of the essential functions of a stormwater management system is to control the quantity of runoff leaving a site. There are various ways to do this. Common methods are detention ponds and other land based solutions.

The problem with ponds is that they take up valuable land space. This is not a major issue in rural areas, but in urban environments where land space is limited and expensive, the use of ponds is simply not an option.

Where there are competing demands for land, underground storage can provide many of the benefits of landscape-based systems but without requiring dedicated land area, thus maximizing the land value for the owner. In addition, subsurface infiltration in urban environments meets the objectives of Low Impact Development by reducing runoff and recharging groundwater.

Contech helps engineers and owners maximize land value by providing solutions for storing stormwater underground. Our underground systems offer you flexibility and customization to accommodate a variety of site conditions and storage volume requirements.

CMP Detention and Infiltration Solutions

DuroMaxx® SRPE Pipe for Stormwater Detention

ChamberMaxx® Stormwater Chamber System

UrbanPond® Concrete Stormwater Detention System

DuroMaxx® Steel Reinforced Polyethylene

Stormwater Detention for Deep Burial and Corrosive Soil Applications ...

DuroMaxx provides the lightweight and durability of traditional HDPE with the added structural strength of steel. The combination of materials results in an extraordinarily strong and durable pipe that makes it the perfect choice for stormwater detention and infiltration in deep burial and corrosive soil applications.

DuroMaxx detention and infiltration systems can be designed with gasketed bell and spigot joints or welded coupler joints for increased watertight reliability. DuroMaxx is available in diameters ranging from 30 to 120 inches and in standard lengths of 14 or 24 feet, with other lengths available upon request.

- Twice as stiff as traditional HDPE pipe - requires less structural backfill
- Corrosion resistant HDPE - can be used in applications with corrosive soils
- Several joint configurations - welded coupler (WC), 10.8 psi high performance (HP) bell and spigot and soil tight (ST) joints available
- Up to 48 foot pipe lengths - fewer joints to assemble on site, resulting in faster installation rates.
- Lightweight - easily handled and quickly installed

Learn More:
www.ContechES.com/duromaxx-det

System Sizing

NOM. PIPE DIA. (IN)	GALLONS PER FOOT (GPF) OF PIPE	MIN. COVER (FT)	MAX. COVER (FT)
30	35.51	1.0	50
36	51.13	1.0	50
42	69.59	1.0	50
48	90.9	1.0	30
54	115.47	1.0	30
60	142.51	1.0	30
66	172.38	1.5	30
72	205.09	1.5	30
84	279.04	2.0	30
96	364.35	2.0	30
108	475.89	2.5	25
120	569.06	3.0	25

The combination of materials results in an extraordinarily strong and durable pipe.

DuroMaxx is twice as stiff as traditional HDPE pipe

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

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Revised PDF - 09/2021

CONTECH®
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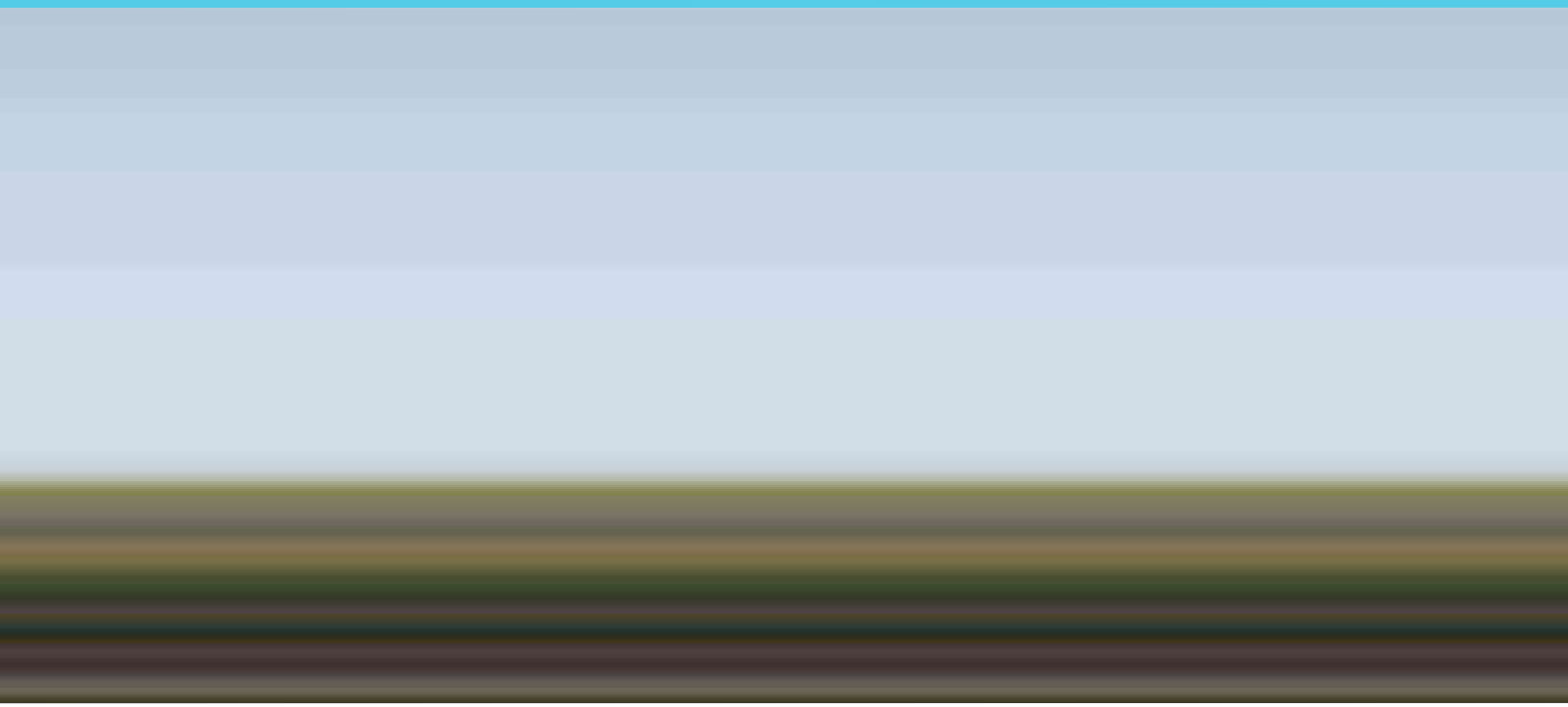
CDS®
Hydrodynamic Separator

The experts you need to solve your stormwater management challenges



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Unique screening technology for stormwater runoff – CDS®

The CDS hydrodynamic separator uses swirl concentration and continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff.

At the heart of the CDS system is a unique screening technology used to capture and retain trash and debris. The screen face is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder. This results in a screen that is self-cleaning and provides 100% removal of floatables and neutrally buoyant material debris 4.7 mm or larger, without blinding.

CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.

CDS® Features and Benefits

FEATURE	BENEFIT
Captures and retains 100% of floatables and neutrally buoyant debris 4.7mm or larger	Superior pollutant removal
Self-cleaning screen	Ease of maintenance
Isolated storage sump eliminates scour potential	Excellent pollutant retention
Internal bypass	Eliminates the need for additional structures
Multiple pipe inlets and 90-180º angles	Design flexibility
Clear access to sump and stored pollutants	Fast, easy maintenance

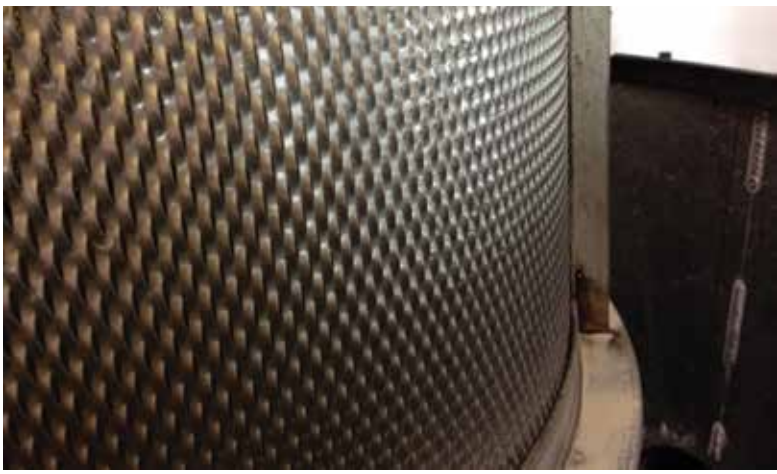
APPLICATION TIPS

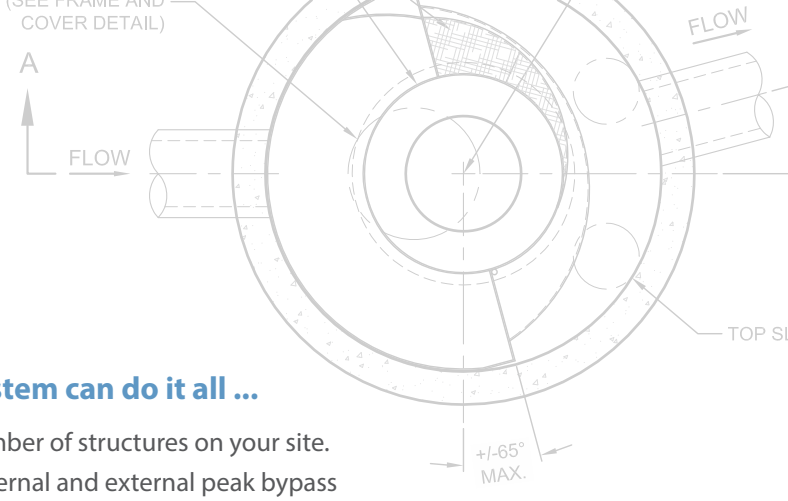
- Because of its internal peak bypass weirs, CDS systems can provide cost savings by eliminating the need for additional structures.
- Pretreating detention, infiltration, and green infrastructure practices with CDS can protect downstream structures and provide for easy maintenance.
- The CDS an ideal solution for retrofit applications due to its compact footprint and configuration flexibility.

The CDS® Screen

A fundamentally different approach to trash control ...

Traditional approaches to trash control typically involve "direct screening" that can easily become clogged, as trash is pinned to the screen as water passes through. Clogged screens can lead to flooding as water backs up. The design of the CDS screen is fundamentally different. Flow is introduced to the screen face which is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder.

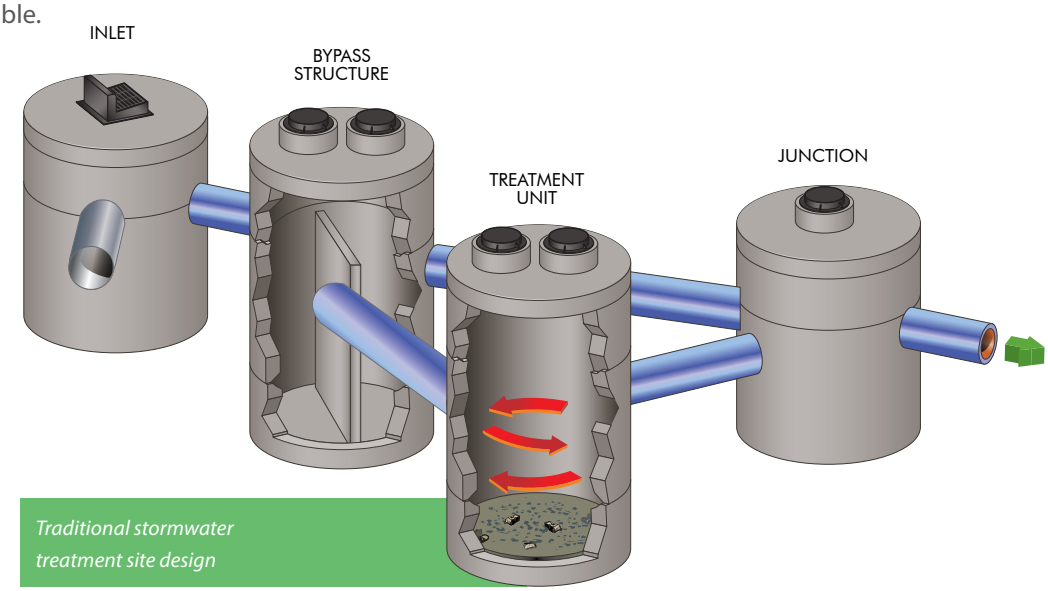




CDS® Design Configuration

Why use traditional stormwater design when ONE system can do it all ...

The CDS effectively treats stormwater runoff while reducing the number of structures on your site. Inline, offline, grate inlet, and drop inlet configurations available. Internal and external peak bypass options also available.

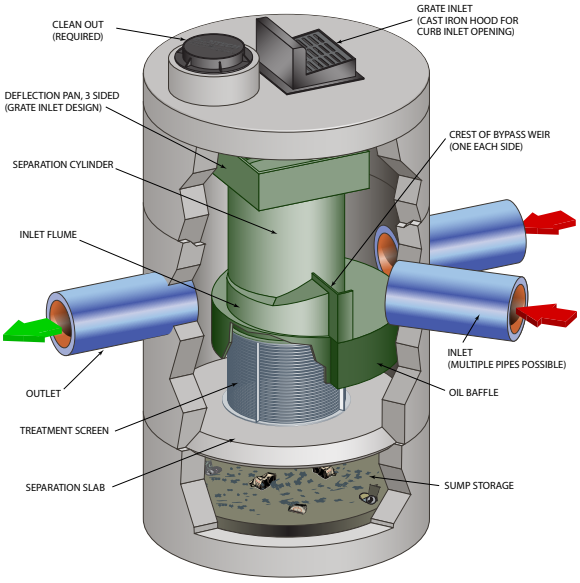


Traditional stormwater treatment site design

A Traditional Stormwater Treatment Site Design would require several structures on your site. With CDS, one system can do it all!

CDS® Advantages

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 4.7 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada



Learn More:
www.ContechES.com/cds

CDS® Applications

CDS is commonly used in the following stormwater applications:

- Stormwater quality control – trash, debris, sediment, and hydrocarbon removal
- Urban retrofit and redevelopment
- Inlet and outlet protection
- Pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and Low Impact Development designs

CDS® provides trash control

CDS® pretreats a bioswale

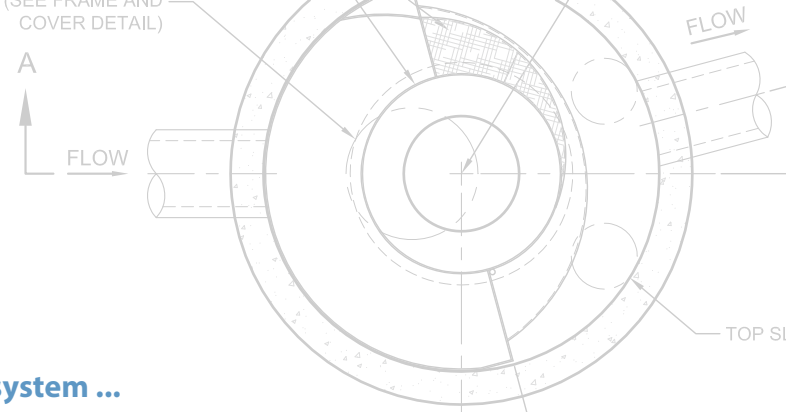
Select CDS® Certifications and Verifications

CDS has been verified by some of the most stringent stormwater technology evaluation organizations in North America, including:

- Washington State Department of Ecology (GULD) - Pretreatment
- Canadian Environmental Technology Verification (ETV)
- California Statewide Trash Amendments Full Capture System Certified*

**The CDS System has been certified by the California State Water Resources Control Board as a Full Capture System provided that it is sized to treat the peak flow rate from the region specific 1-year, 1-hour design storm, or the peak flow capacity of the corresponding storm drain, whichever is less.*

Save time, space and money with CDS



CDS® Maintenance

Select a cost-effective and easy-to-access treatment system ...

Systems vary in their maintenance needs, and the selection of a cost-effective and easy-to-access treatment system can mean a huge difference in maintenance expenses for years to come.

A CDS unit is designed to minimize maintenance and make it as easy and inexpensive as possible to keep our systems working properly.

Most CDS® units can easily be cleaned within thirty minutes.

INSPECTION

Inspection is the key to effective maintenance. Pollutant deposition and transport may vary from year to year and site to site. Semi-annual inspections will help ensure that the system is cleaned out at the appropriate time. Inspections should be performed more frequently where site conditions may cause rapid accumulation of pollutants.

RECOMMENDATIONS FOR CDS MAINTENANCE

The recommended cleanout of solids within the CDS unit's sump should occur at 75% of the sump capacity. Access to the CDS unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber and sump, and another allows inspection and cleanout of sediment captured and retained behind the screen. A vacuum truck is recommended for cleanout of the CDS unit and can be easily accomplished in less than 30 minutes for most installations.

Hydrodynamic Separator Selection & Sizing Tool

Quickly prepare designs for estimates and project meetings ...

Part of the Contech Design Center, this free, online tool fully automates the layout process for identifying the proper hydrodynamic separator for your site.

- Multiple sizing methods available.
- Site-specific questions ensure the selected unit will comply with site constraints.
- Multiple treatment options may be available based on regulations and site parameters.
- Follow up reports contain a site-specific design, sizing summary, standard detail, and specification.

Learn More:
www.ContechES.com/designcenter

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CONTECH®
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StormGate®
Design Guide

Designing the StormGate

The StormGate is a high flow bypass used to address high-energy flows, in excess of design flows, that may occur. High flows can reduce the effectiveness of water quality facilities by re-suspending sediments and flushing captured floatables, causing a concentrated pulse of pollutants to be sent to downstream waterways.

To minimize the occurrence of pulsing, a high flow bypass can be installed upstream of water quality or pretreatment facilities to direct the high flow away from the treatment system. The StormGate uses a field-adjustable weir and an orifice in combination to direct polluted low flows to stormwater quality facilities, while allowing extreme flows to bypass the facilities.

This use of a field-adjustable weir and orifice in combination allows the StormGate to offer tighter control over system hydraulics than other high flow bypass methods. The field-adjustable weir also allows for changes to be made to the weir elevation once actual field elevations are established or if future design flows change.

Determining the need for a high flow bypass

A high flow bypass is needed when the peak conveyance flow for your site exceeds the treatment capacity or inline bypass capacity of your stormwater quality facility. You may have already discovered a need for a high flow bypass during the design of your stormwater treatment system. However, if you aren't sure if a high flow bypass is required, contact your Contech Stormwater Design Engineered, and they will help you to determine if a high flow bypass is needed for your system. Your Contech Stormwater Design Engineer will need to know the peak conveyance flow and water quality flow for your site. You should have already calculated these flows when you sized your stormwater treatment facility.

If you haven't determined the peak conveyance flow and water quality flow for your site: Calculate the water quality flow (Qtreat) and peak conveyance flow (Q_{peak}) using the approved hydrologic models established by your local agency. If your agency specifies a water quality volume rather than a peak flow, water quality volume requirements can be translated into a flow rate. If there are no agency guidelines, we recommend using the Santa Barbara Urban Hydrograph method.

If you have or are installing a StormFilter system, the StormFilter may be used online if the peak conveyance flow does not exceed the internal bypass capability. A high flow bypass is recommended for use in conjunction with the StormFilter when:

- The flow through a Precast StormFilter exceeds 1.8 cfs
- The flow through a Linear StormFilter exceeds 1.0 cfs
- The flow through a Manhole StormFilter exceeds 1.0 cfs
- The StormFilter is a Precast Panel, Precast Box Culvert, or Cast-In-Place system

Note: Since flow discharges directly to the CatchBasin StormFilter, an upstream high flow bypass cannot be used. However, the CatchBasin StormFilter does have an internal bypass capacity of 1 cfs for standard units and 1.8 cfs for deep units.

The use of a high flow bypass is also recommended when pretreatment is needed.

Configurations

The StormGate is provided as a complete manhole or vault unit and is used in conjunction with other stormwater quality facilities such as the StormFilter, , swales, oil/water separators, ponds, and settling manholes.

An additional advantage of using the StormGate high flow bypass in conjunction with these stormwater quality facilities is that the water quality device is offline, which allows for the bypassing of all flows in the event of facility maintenance or spill containment.

Determining system orientation and weir location

Contech Engineered Solutions offers technical assistance at no additional cost and can help you determine the required system orientation and weir location.

To determine the orientation of the StormGate and the proper placement of the weir and inlet and outflow pipes:

1. Set the low flow pipe diameter and invert elevation so that the pipe flows full from the StormGate to the treatment system during the design storm.

   If the pipe is not set to flow full during the design storm, excessive flow could be directed to the treatment system during peak storm events. This will reduce the treatment system's effectiveness and negate the purpose of the StormGate. Rather than setting the pipe to flow full, an orifice plate may be used to restrict the flow to the treatment system; however, setting the pipe so that it flows full during the design storm simplifies the system and system installation.

Contech can assist you with determining the pipe diameter and invert elevation. Contact your Contech Stormwater Design Engineer for assistance.

2. Using the pipe diameter and invert elevation that you determined in Step 1, determine the hydraulic grade line in the StormGate when the design storm flow (Q_{treat}) is being directed to the treatment system.

   Note: You may need to consider backwater effects on the system.

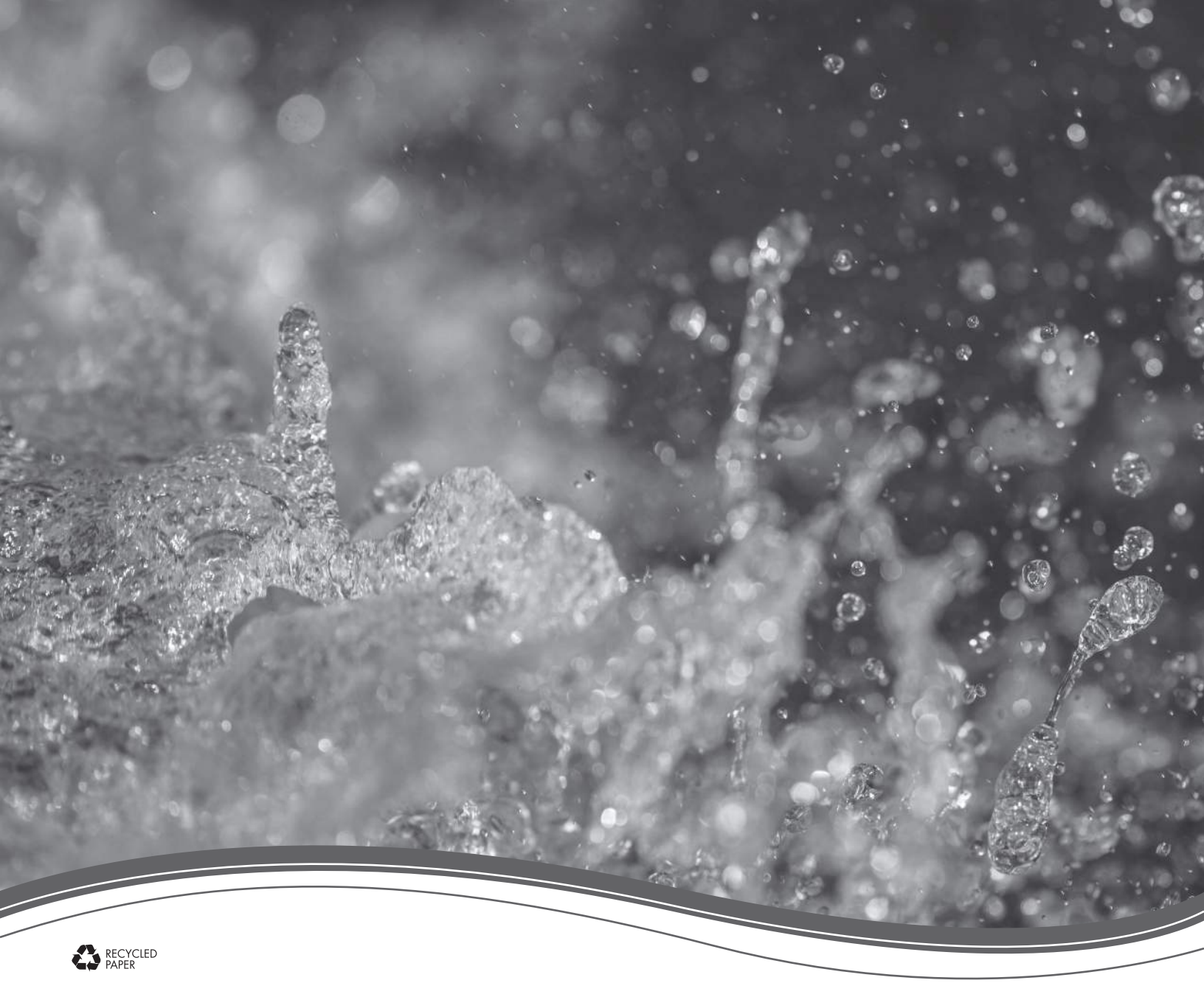
3. Specify the location of the weir in the StormGate manhole so that the weir is at the same elevation as the hydraulic grade line at Q_{treat}.

4. Calculate the hydraulic grade line in the StormGate at the peak hydraulic flow. (For example, the flow resulting from the 10-year storm event.) Verify that the peak hydraulic grade line does not cause operational problems in the collection system upstream of the StormGate.

5. Determine the size of the manhole or vault required to accommodate all flow lines entering and exiting the structure.

   If the StormGate is used in a manhole rather than a vault, the StormGate weir should be placed in the center of the manhole for ease of construction. In certain cases, it is possible to offset the weir in the manhole. Please contact your Contech Stormwater Design Engineer to determine the most practical and economical configuration for your StormGate.

If you have any questions or if you need assistance with designing the StormGate, contact your Contech Stormwater Design Engineer or call 1-800-338-1122.



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CONTECH ENGINEERED SOLUTIONS

800-338-1122
www.ContechES.com

SUPPORT

- Drawings and specifications are available at contechstormwater.com.
- Site-specific design support is available from our engineers.

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Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other product offerings, visit www.conteches.com or call 800.338.1122

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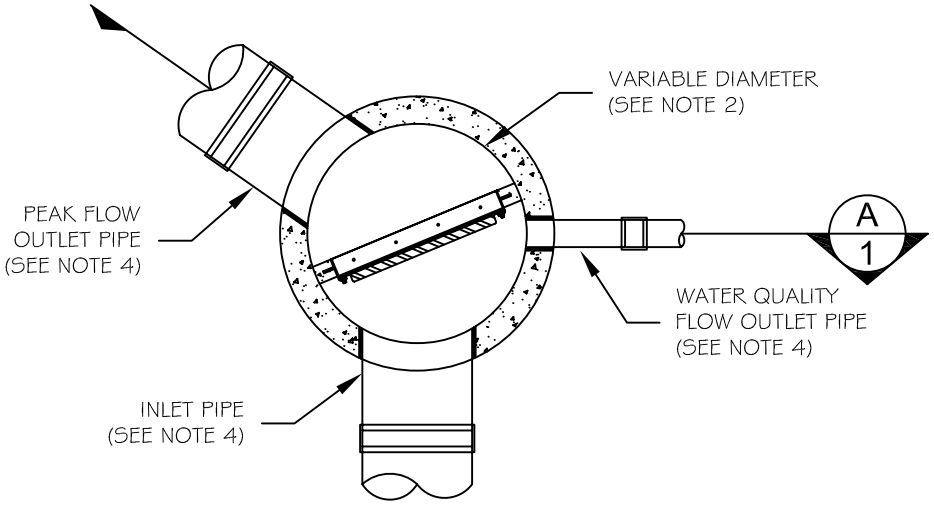
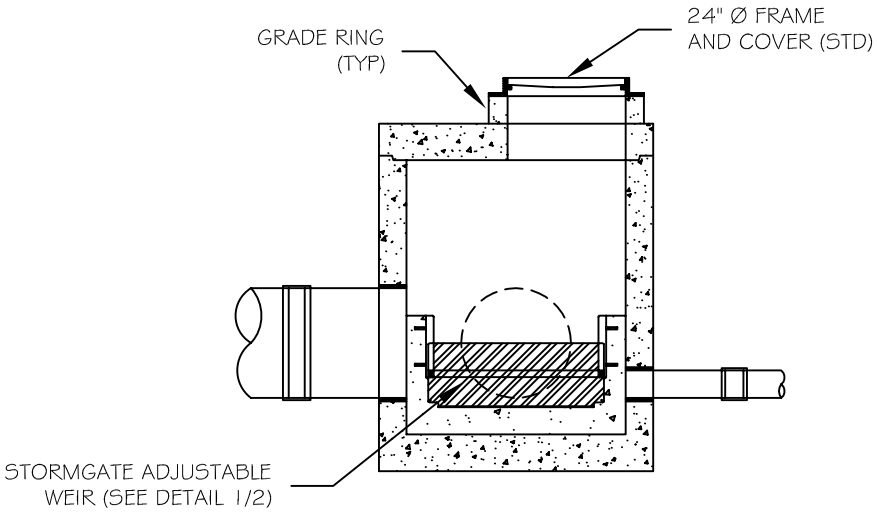


STORMGATE MANHOLE - PLAN VIEW 1/1



STORMGATE MANHOLE - SECTION VIEW A/1

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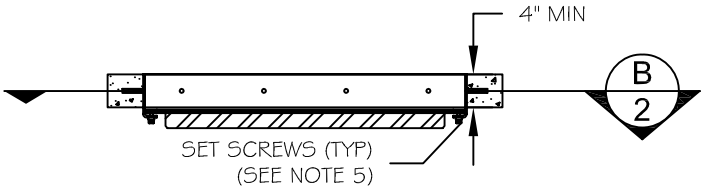
STORMGATE MANHOLE HIGH FLOW BYPASS
PLAN AND SECTION VIEWS
STANDARD DETAIL

DRAWING 1

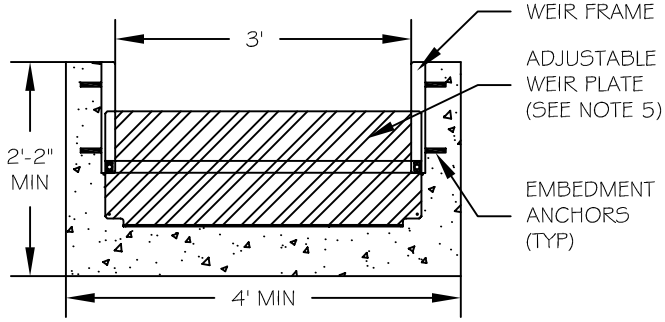
DATE: 04/04/06	SCALE: NONE	FILE NAME: SG-MH-DTL	DRAWN: MJW	CHECKED: ARG

GENERAL NOTES

1) STORMGATE BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800) 548-4667; SCARBOROUGH, ME (877) 907-8676; LINTHICUM, MD (866) 740-3318.
2) PRECAST MANHOLE TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C478. DETAIL DRAWING REFLECTS DESIGN INTENT ONLY. ACTUAL DIMENSIONS AND CONFIGURATION OF STRUCTURE WILL BE SHOWN ON PRODUCTION SHOP DRAWING.
3) STRUCTURE AND ACCESS COVERS TO MEET AASHTO H-20 LOAD RATING.
4) INLET AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR. PRECAST STORMGATE MANHOLE EQUIPPED WITH EITHER CORED OPENINGS OR KNOCKOUTS AT INLET AND OUTLET LOCATIONS.
5) CONTRACTOR TO ADJUST WEIR TO DESIGN ELEVATION SPECIFIED IN DATA TABLE BELOW. DO NOT EXCEED 5.0 FT-LBS TORQUE WHEN TIGHTENING SCREWS ON WEIR FRAME. SEAL WEIR TO FRAME WITH RTV SILICONE SEALANT AFTER FINAL ADJUSTMENT.



WEIR DETAIL - PLAN VIEW 1/2



WEIR DETAIL - SECTION VIEW B/2

STORMGATE MANHOLE DATA

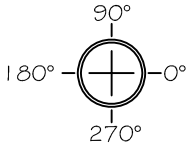
STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (cfs)	X.XX
PEAK FLOW RATE, Qpeak (cfs)	X.XX
MANHOLE DIAMETER (48", 60", 72")	XX"
RIM ELEVATION	XXX.XX'

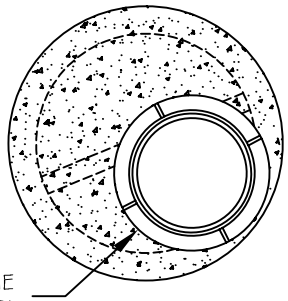
PIPE DATA:	I.E.	ORIENTATION	MATERIAL	DIAMETER
INLET PIPE	XXX.XX'	XX°	XXX	XX"
WATER QUALITY FLOW OUTLET PIPE	XXX.XX'	XX°	XXX	XX"
PEAK FLOW OUTLET PIPE	XXX.XX'	XX°	XXX	XX"

ORIFICE TYPE (PIPE, CAP, PLATE)	XXXXX
ORIFICE DIAMETER (in)	XX"
WEIR CREST ELEVATION	XXX.XX'
WEIR WALL ELEVATION	XXX.XX'
HEAD OVER WEIR, H (ft)	X.XX'
WSE at Qpeak	XXX.XX'
WEIR ORIENTATION	XX°
FLOOR ELEVATION	XXX.XX'

NOTES/SPECIAL REQUIREMENTS:

PIPE ORIENTATION KEY:





STORMGATE MANHOLE- TOP VIEW 2/2

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STORMGATE MANHOLE HIGH FLOW BYPASS TOP VIEW, WEIR DETAIL, DATA AND NOTES STANDARD DETAIL

DRAWING 2

2/2

DATE: 04/04/06 | SCALE: NONE | FILE NAME: SG-MH-DTL | DRAWN: MJW | CHECKED: ARG

StormGate™ Specifications

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Precast *StormGate™*

1.2 RELATED SECTIONS

A. Section [ ]:

1.3 SUBMITTALS

A. Contech Engineered Solutions, LLC or authorized precast supplier to submit shop drawing to contractor for engineer's approval.

B. Contech Engineered Solutions, LLC to submit Operation and Maintenance Manual to contractor upon request.

PART 2 PRODUCTS

2.1 INTERNAL COMPONENTS

A. All internal components are provided by Contech Engineered Solutions, LLC.

B. The *StormGate*™ weir: Shall be constructed of ASTM B209 5052 Aluminum sheet.

2.2 PRECAST CONCRETE COMPONENTS

A. Precast Concrete: Shall be provided according to ASTM C478.

B. Joint Sealant: Shall be Conseal CS-101 or Engineer approved.

C. Steps: Shall be steel reinforced polypropylene steps, if required.

2.3 CONTRACTOR PROVIDED COMPONENTS

A. Sub-base: Shall be six (6) inch minimum of ¾ inch minus rock, 95% compaction. Compact undisturbed sub-grade materials to 95% of

maximum density at +/- 2% of optimum moisture. Unsuitable material below sub-grade shall be replaced to site engineer' approval.

B. Concrete (for concrete not covered by pre-cast specification above): Shall be 3000 psi, 28 day strength, 3/4 inch round rock, 4 inch slump maximum, placed within 90 minutes of initial mixing.

C. Grout: Shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 6,200 psi. Grout shall not exhibit visible bleeding.

D. Backfill: Shall be 3/4 inch minus rock (95% compaction), or as otherwise specified in the projects general technical specifications.

E. Silicone Sealant: Shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

PART 3 EXECUTION

3.1 PRECAST CONCRETE VAULT

A. Contractor to grout all inlet and outlet pipes flush with interior wall. Contractor to grout interior walls.

B. Sanded PVC fittings shall be used on all PVC inlet and outlet pipes.

3.2 WEIRS: At project completion, weirs shall be set to specified elevation, leave and sealed at all joints with silicone sealant. Sealant shall be worked into joints from both sides.

3.3 PVC PIPING: Shall be joined in accordance with ASTM D2564.

3.4 CLEANUP: Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the Engineer. All PVC and fiberglass filter components shall be free of any foreign materials including concrete and excess sealant.

END OF SECTION