# **UrbanGreen**<sup>™</sup>



### low impact development application guide





# URBANGREEN

### Lower Your Impact with Contech.

Our flexible, customizable systems can be easily integrated onto your site to meet Low Impact Development (LID) requirements. Read on to browse our solutions.

### Visit www.ContechES.com/lid

You will find many resources on our website to make your job easier, including:

- Project profiles
- Design tools
  - Articles
- Opportunities to earn continuing education credits
  - at no cost while learning more about LID

2



Stormwater Regulations continue to evolve – and Contech® is here to provide you with the most innovative solutions each step of the way. If your local regulations require Low Impact Development (LID), Total Maximum Daily Load (TMDL) or traditional stormwater management techniques, Contech can speed your design process, save land space and help you get your plans approved.

### Your LID guide to optimize land use and maximize development value

Conventional stormwater management practices (that collect, convey, treat and then discharge runoff off-site) are quickly evolving to LID requirements that strive to maintain a site's natural hydrology (reducing runoff and managing on-site). To simplify these new rules and to help you choose the right best management practice (BMP) that will meet LID and conventional requirements, we have developed a systematic design approach – the UrbanGreen<sup>™</sup> Solutions Staircase.

3

## **URBANGREEN<sup>™</sup> Solutions Staircase**

Low impact development regulations direct us to manage stormwater close

to the source and mimic predevelopment hydrology to the maximum extent

practicable. It is easy to meet those

goals by taking a systematic approach to selecting which BMP is right for your site. First, select the runoff reduction practices that are most appropriate for your site, paying particular attention to pretreatment needs. If the entire design storm cannot be infiltrated on-site, select a treatment BMP for the balance. Finally, select a detention system to address any outstanding downstream



erosion issues.



#### Surface Infiltration

Surface infiltration is the first option in many LID strategies. Infiltrating runoff through engineered soils cleans the water and slowly recharges groundwater systems that supply aquifers, streams and lakes. Where viable, infiltration is an effective means of managing stormwater runoff because it often allows you to address both water quality and water quantity concerns. Practices include minimizing impervious surfaces (and using porous hardscape), rain gardens and bioswales.



#### **Subsurface Infiltration**

For dense developments or sites with lower infiltration rates, aboveground practices may not be a viable

solution. The next step to consider is underground infiltration practices such as vaults, chambers and pipes with open bottoms or perforations. Belowground practices provide a significant storage volume and infiltration footprint without using land that could otherwise be developed or preserved.



#### **Rainwater Harvesting**

Harvesting runoff and using it on-site provides many benefits beyond stormwater management. Not only

does harvesting reduce runoff from the site, it preserves municipal fresh water supplies, eliminates the energy required to move water long distances and eliminates CO<sub>2</sub> emissions associated with that energy consumption.

Storing runoff, treating it and using it for irrigation, toilet flushing, wash water, cooling make-up or other applications turns stormwater into a valuable resource.

#### **Biofiltration**



Biofiltration is a compromise between LID practices and traditional flow through BMPs. Filtration through a deep media bed provides a high level of treatment and some runoff reduction. Incorporating plants and organic material into the mix further enhances performance. Because biofiltration is a flowthrough treatment process and does not eliminate runoff completely, it is preferred when options higher on the staircase are not practical.

#### **Traditional Design – Treatment Trains**







Traditional stormwater criteria require both improving the quality and managing the quantity of runoff. One of the best practices is to incorporate pretreatment, detention and treatment into an integrated system. The use of detention and treatment systems in a conventional design continues to provide significant environmental benefits and is acceptable in many jurisdictions. This approach can meet TMDL requirements by providing a high level of pollutant removal and preventing erosion damage from peak flows.

### bioretention

In many cases, the infiltration rate of the engineered soil in bioinfiltration systems exceeds the infiltration rate of the underlying soil. By adding storage underneath the bioretention system, you can shrink the footprint on the surface while maximizing annual infiltration and annual runoff reduction. This design practice can make bioinfiltration feasible for sites with marginal soils.



surface infiltration





### **BIORETENTION** with Perforated CMP

- Make bioretention practical for sites with marginal soils
- Pipe networks can be configured to meet any size facility
- Reduce the footprint and depth of the bioretention cells

surface infiltration



### BIORETENTION PRETREATMENT with CDS®

- Reduce maintenance by capturing pollutants upstream
- Reduce surface loading of oil and other pollutants to prevent clogging
- Improve runoff reduction over time by reduced surface loading to bioretention



9

### porous pavers

Replacing impervious surfaces with porous pavers reduces runoff and provides treatment by allowing water to infiltrate into the soil. Many impervious surfaces receive light or intermittent use. In these areas, alternative paving practices provide the infiltration and runoff reduction in addition to their intended use as a parking lot, walkway or courtyard.





surface infiltration



### POROUS PAVERS with UrbanGreen<sup>™</sup> Grass Pavers

- Provide overflow parking capacity for large facilities with intermittent use
- Reduce impervious area and significantly reduce runoff
- Meet H-20 loading with lower cost per square foot



Construction of the second se Second seco

TTTT

POROUS PAVERS with UrbanGreen<sup>™</sup> Grass Pavers

- Provide additional parking capacity for retail and commercial facilities without adding impervious area
- Provide valuable parking spaces and significantly reduce runoff
- Meet H-20 loading with lower cost per square foot

ALL R. L. L.



www.ContechES.com/lid

MARKAGA



### POROUS PAVERS with UrbanGreen<sup>™</sup> Grass Pavers

- Provide H-20 access roads without adding impervious surface
- Utilize on fire lanes, access roads, and maintenance roads that see limited use
- Meet H-20 loading with lower cost per square foot



## subsurface infiltration

Many urban developments have limited space for bioretention facilities, even when soils have high infiltration rates. For sites with limited area at the surface, and for sites with less than ideal soils, subsurface infiltration may be the best option.

By utilizing subsurface infiltration, space is preserved for development, runoff is reduced or eliminated and groundwater recharge can occur.

Best practice designs for subsurface infiltration include pretreatment to reduce cost and frequency of maintenance while ensuring the infiltration capacity of the facility.



subsurface infiltration





### SUBSURFACE INFILTRATION with ChamberMaxx® and CDS®

- Reduce or eliminate runoff with an underground infiltration system
- Provide storage capacity in shallow footprint
- Open bottom plastic chamber allows infiltration into surrounding soil
- CDS<sup>®</sup> pretreatment captures solids before they enter the infiltration system for easy maintenance





### SUBSURFACE INFILTRATION with Infiltration StormFilter

- Reduce or eliminate runoff with an underground infiltration system
- Provide treatment and infiltration in one structure
- Small footprint for tight sites or sites with crowded utilities
- Easily adapts to multiple drainages for a modular design



## rainwater harvesting

Historically, the primary motivation for rainwater harvesting has been conservation of drinking water supplies. With the advent of LID requirements, rainwater harvesting is becoming a leading tool for engineers to meet the new stormwater rules.

Rainwater can be economically harvested for many non-potable applications beyond irrigation. Toilet flushing, process water, cooling make-up and wash water are just some of the common applications for harvested rainwater. These systems require balancing supply, storage size and reuse demand to maximize runoff reduction.

Contech provides turnkey systems that include storage, treatment, pressurization, disinfection and programmable controls to reduce or eliminate runoff from your site.



rainwater harvesting



### RAINWATER HARVESTING with UrbanGreen<sup>TT</sup> RWH

- Store harvested rainwater and use for site irrigation
- UrbanGreen<sup>®</sup> Steel-Reinforced Polyethylene Cistern can provide water tight storage to 15 psi
- Diameters to 8 ft. and any length. This system is highly adaptable to any site
- CDS<sup>®</sup> pretreatment improves water quality and reduces maintenance
- Packages typically include pumps, controls and disinfection (not shown)

rainwater harvesting





### RAINWATER HARVESTING with UrbanGreen<sup>™</sup> RWH

- Collect roof runoff, store and reuse for site irrigation
- UrbanGreen<sup>™</sup> Steel-**Reinforced Polyethylene** Cistern provides water tight storage to 15 psi
- Adaptable to any site with diameters to 8 ft. and any length
- Downspout or inground pretreatment devices can be added to improve water quality
- Packages typically include pumps, controls and disinfection (not shown)





### RAINWATER HARVESTING with UrbanGreen<sup>™</sup> RWH

- Utilize harvested runoff for school and town athletic field irrigation systems
- UrbanGreen<sup>™</sup> Steel-Reinforced Polyethylene Cisterns can provide water tight storage to 15 psi
- Adaptable to any site with diameters to 8 ft. and any length
- Downspout or inground pretreatment devices can be added to improve water quality
- Packages typically include pumps, controls and disinfection



When large scale infiltration and harvesting are not practical, biofiltration can provide a high level of treatment and partial runoff reduction capability above and beyond tradition designs. Many regulators may favor biofiltration before traditional designs are considered.

The UrbanGreen<sup>™</sup> BioFilter incorporates four levels of treatment:

Infiltration — where the site condition allows, small storms are biofiltered and infiltrated into the surrounding soil.

Biofiltration — medium size storms are biofiltered and released downstream.

Media Filtration — to expand the capacity in a small footprint, media filtration is reserved for larger storm events.

Overflow — overflow is segregated from the treatment areas and combined into the system.

### **biofiltration**









### **BIOFILTRATION** with UrbanGreen<sup>™</sup> BioFilter

Courthouse

24

- Create small drainage areas along roadways and use multiple units
- Open top systems with trees or shrubs provide options for the landscape architects
- Infiltration can be added if site conditions allow
- Biofiltration for small storms with media filtration for expanded capacity
- Integrated "off-line" bypass included with each structure





### **BIOFILTRATION** with UrbanGreen<sup>™</sup> BioFilter

- •Combine biofiltration with subsurface infiltration
- Expand the infiltration capacity to significantly reduce or eliminate runoff
- Choose from DuroMaxx<sup>®</sup>, ChamberMaxx<sup>®</sup>, Corrugated Metal Pipe or concrete infiltration systems





### treatment train

hydrodynamic separation





Traditional stormwater criteria require both improving the quality and managing the quantity of runoff. A best practice is to incorporate pretreatment, detention and treatment into an integrated system. The use of detention and treatment systems in a conventional design provides significant environmental benefits and is acceptable in many jurisdictions. This approach can meet TMDL requirements by providing a high level of pollutant removal and preventing erosion damage from peak flows. Many areas may require only some of these processes, while some areas may require all of them.

HDS — Swirl concentration and screening devices are effective at removing trash, debris and solids from runoff, even at high flows. Contech HDS systems include CDS<sup>®</sup>, Vortechs<sup>®</sup> and VortSentry<sup>®</sup> HS.

**Detention** — Store and discharge stormwater over time when runoff inflow exceeds the allowable discharge rate. Underground systems maximize property usage. Contech offers a full line of Corrugated Metal Pipe (CMP), Concrete and Plastic solutions.

Filtration — Scalable cartridge-based system removes the most challenging pollutants from runoff - including fine solids, heavy metals and total nutrients. Contech filtration systems include the Stormwater Management StormFilter<sup>®</sup> and MFS<sup>®</sup> system.

### PRETREATMENT, DETENTION AND FILTRATION

28

- Pretreatment with a CDS<sup>®</sup> system reduces downstream loading to reduce maintenance
- Use CMP detention to slow rate of runoff to match predevelopment flow rates
- Provide detention upstream of filtration to reduce flow rates
- Extend maintenance intervals by removing sediment before filtration
- Remove fine pollutants including heavy metals and nutrients with the Stormwater Management StormFilter®





### HYDRODYNAMIC SEPARATION PRODUCTS

- Pretreat runoff to protect stone infiltration bed from solids occlusion
- Remove trash and debris to protect small diameter outlet control structures
- Isolate sediment in a single structure with easy maintenance access

hydrodynamic separation





### THE STORMWATER MANAGEMENT STORM FILTER

- High performance treatment of fine silt particles, oil and grease, nutrients and metals
- Integrated treatment and infiltration configurations available
- Isolate contaminants in a single structure with easy maintenance access



### The Right Partner Can Make All the Difference

Regardless of your project's objectives and constraints, our team of Stormwater Design Engineers, Regulatory Managers and local Stormwater Consultants are here to provide you with expert advice and assistance. If your goal is to eliminate or detain runoff, you can rely on Contech for a wide range of subsurface infiltration, detention and rainwater harvesting solutions. If treatment is needed, our landscape-based biofiltration or subsurface filtration designs can fit into virtually any site and can be tailored to address specific pollutants.

At every stage of your project, count on Contech to provide engineering services including:

- Regulatory guidance and permitting assistance
- Preliminary standard details and/or site specific final CAD drawings and specifications
- Low Impact Development design assistance
- Engineering calculations for hydraulics / hydrology, rainwater harvesting and detention /
  retention
- Online "Design Your Own" tools
- Review of preliminary site design, feasibility screening and layout assistance
- Value Engineering cost estimates and options analysis
- Pre-construction support, project scheduling, contractor coordination
- Installation and construction support
- Maintenance support:
  - o Guidance manuals
  - o Demonstrations
  - o Qualified contractor identification

The result – an efficient design process, the right product, more land space savings and faster permitting. The entire Contech stormwater team welcomes the opportunity to work with you on your stormwater projects.

To get started, please visit www.conteches.com/localresources or call us at 800-338-1122.



low impact development application guide



www.ContechES.com • 800-338-1122

©2013 Contech Engineered Solutions LLC

All rights reserved. Printed in USA.

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS AN EXPRESSED WARRANTY OR AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SEE THE CONTECH STANDARD CONDITIONS OF SALE (VIEWABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

> We print our brochures entirely on Forest Stewardship Council certified paper. FSC certification ensures that the paper in our brochures contain fiber from well-managed and responsibly harvested forests that meet strict environmental and socioeconomic standards.

FSC

BRO-LID PDF 11/13 MC

Printed with soy inks