PUMPER & CLEANER
ENVIRONMENTAL EXPO
INTERNATIONAL

Indy
2013
Feb. 25-28

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BRINGING IT ALL TOGETHER
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St. Louis tightens up its collections system with major improvements and continuous maintenance

STORMWATER MANAGEMENT MAGIC

StormGenie Version 2.0 provides fast and accurate designs for systems using CULTEC-manufactured components

By Erik Gunn

PHOTOS COURTESY OF CULTEC

StormGenie creates its designs based on calculations from information provided through the data entry screen.

D esigning drainage systems to collect, hold and disperse stormwater, whether on private property or as part of a larger municipal stormwater sewer system, can be a complicated task. A system may have a variety of different components, each with specific sizes that must be arranged in a particular configuration suitable for the volume of water and the shape of the site to be developed.

CULTEC, Inc., a manufacturer of stormwater system components based in Brookfield, Conn., offers

sina, CULTEC technical department supervisor, demonstrated the newest edition, Version 2.0, released in September, over the Internet on Sept. 26, 2012.

For simplicity, the demonstration focused on a storm drainage system for a single private home. A larger commercial use was also shown to demonstrate the application's additional capabilities. The same design procedures and operations, however, could be used for developing systems on sites or for developing individual segments of a municipal stormwater system, Carolan said.

> "It's good for preliminary design, but if they wanted to, the user could then take those preliminary designs and make them more site specific. It's fully able to be modified once the drawing is created."
>
> **Gina Carolan**

StormGenie for contractors and other customers who design and sell the company's systems. The free AutoCAD plug-in quickly and accurately creates detailed stormwater system designs using CULTEC components.

Gina Carolan, CULTEC chief operations officer, and Alicia Mes-

Walk-around

A StormGenie user begins with the calculator, a customized spreadsheet program that includes specs for various CULTEC storm drainage chamber product lines. The user enters data pertaining to the proposed stormwater bed, and the calculator generates a complete set

of specifications and a materials list based on the product line chosen for the site. The spreadsheet employs a user-friendly form that is easy to read and follow. Users have the option of entering data in English units (distance in feet and inches; volumes of water runoff in cubic feet) or metric units (meters, centimeters, liters of water, and so on). All information is saved in a Microsoft Excel file.

The StormGenie plug-in then allows the user to bring the resulting bed design into AutoCAD so it can be integrated with the overall building site design. The user can make adjustments to the bed design to suit specific site dimensions.

For a stormwater system that includes more than one bed, each bed is created separately. For example, if a site plan calls for three separate stormwater beds on the property to handle the total projected volume of runoff from the entire site, each bed would be designed separately according to its desired and appropriate dimensions and volume.

The application uses conventional Microsoft Windows-based keyboard and mouse input techniques.

TECHNOLOGY TEST DRIVE

EQUIPMENT:
StormGenie v. 2.0 AutoCAD plug-in for stormwater management system design

MANUFACTURER:
CULTEC Inc.
800/428-5832
www.cultec.com

LOCATION OF DEMO:
Remote via GoToMeeting

DEMONSTRATED BY:
Gina Carolan, CULTEC chief operations officer and Alicia Messina, CULTEC technical department supervisor

LIST PRICE AS DEMONSTRATED:
Free to contractors and designers using CULTEC stormwater management products

Operation

The demonstration began with a basic review of the calculator's operations.

Carolan opened the program to the calculator's data entry screen and chose the Recharger 330XLHD as the CULTEC product to use in the design.

Fields lettered in red can be modified by the user. Fields in black generate a list of specific compo-

Input Given Parameters

Unit of Measure	English
Select Model	Recharger 330XLHD
Stone Porosity	40.0%
Number of Header Systems	1 Header
Stone Depth Above Chamber	6 inches
Stone Depth Below Chamber	6 inches
Workable Bed Depth	10.00 feet
Max. Bed Width	40.00 feet
Storage Volume Required	10000.00 cu. feet

Chamber Specifications

Height	30.5	inches
Width	52.00	inches
Length	8.50	feet
Installed Length	7.00	feet
Bare Chamber Volume	52.21	cu. feet
Installed Chamber Volume	79.26	cu. feet

Image for visual reference only. May not reflect selected model

Bed Depth	4.63	feet
Bed Width	35.33	feet
Storage Volume Provided	10478.13	cu. feet

Materials List

Recharger 330XLHD   Stormwater System by CULTEC, Inc.

Approx. Unit Count - not for construction	126	pieces	HVLV FC-24	6	pieces
Actual Number of Chambers Required	126	pieces	CULTEC 410™ Filter Fabric	1261.20	sq. yards
Starter Chambers	7	pieces	CULTEC No. 20L Polyethylene Liner	35.33	feet
Intermediate Chambers	112	pieces	Stone	353.54	cu. yards
End Chambers	7	pieces	Volume of Excavation	783.79	cu. yards

Bed Detail

Number of Rows Wide	7	pieces
Number of Chambers Long	18	pieces
Chamber Row Width	33.33	feet
Chamber Row Length	127.50	feet
Bed Width	35.33	feet
Bed Length	129.50	feet
Bed Area Required	4575.67	sq. feet

Bed detail for reference only. Not project specific. Not to scale. Use CULTEC StormGenie to output project specific detail.

Based on data entered for the stormwater bed specifications (product line, maximum bed width, and needed system capacity in cubic feet of water), the calculator creates a list of the number of chambers, details of the bed, and total materials list.

Recharger 330XLHD

Pavement	3	inches
95% Compacted Fill	10	inches
Stone Above	6	inches
Chamber Height	30.5	inches
Stone Below	6	inches
Effective Depth	42.5	inches
Bed Depth	55.5	inches
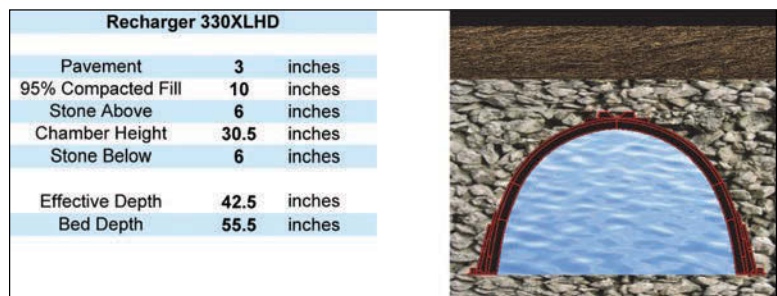
A stylized cross section of the chamber design embedded in stone gives a visual cue as to alternative depths of stone.

nent materials for the project based on calculations from user-entered information.

Carolan entered a series of site specifications to show the calculator's operation. She chose a configuration that included one header unit because the design was for a retention system instead of a detention system.

She chose a workable bed depth of 10 feet. Workable bed depth reflects the limitations of the land itself, such as bedrock or a high groundwater table that may limit how far down the bed can be installed. Each product line has minimum requirements for workable bed depth, and a bubble dialogue offered a general reminder on minimum workable bed depth information for the CULTEC product lines.

To show what happens when the user enters specifications outside the minimum requirements of the selected product, she changed the workable bed depth to 4 feet — too low for that particular chamber model. The materials list fields, which are automatically populated by the calculator, went blank, indicating that the product line was not suitable for the conditions. She changed the workable bed depth back to the 10-foot depth actually allowed by the site, and the materials list fields automatically repopulated.

Because the chambers are normally embedded in uniformly-sized stone that allows for additional stormwater capacity, Carolan also chose a desired stone porosity — in this case 40 percent, which she explained is the standard porosity used in such designs. She also elected to have a 6-inch depth of stone above and below each chamber. More stone depth above a chamber allows for greater storage volume in the bed.

After she selected a maximum bed width of 40 feet and a volume of water to be contained of 10,000 cubic feet, the StormGenie spreadsheet populated fields showing dimension specifications for each chamber, the details of the total bed and the total materials list. "The actual bed width specified will always be below the maximum bed width you enter," Carolan explained.

Fields indicated the volume of water to be contained in each chamber by itself (bare chamber volume) and when combined with the stone surrounding the chamber (installed chamber volume).
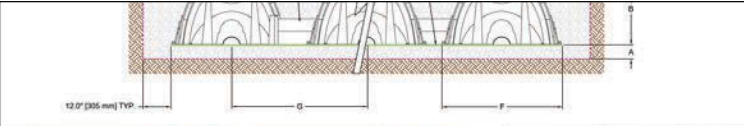
A graphic feature allows the user to visualize how the chamber's position and other specifications of the unit bed will change depending on the depth of stone. When Carolan changed the stone depth, a stylized cross section image of the design reflected the adjustment. The installed chamber volume also changed accordingly.

The calculator also showed a table that specified how storage was allocated among the chambers, the stone and connectors in the system. Hyperlinks below that take the user to downloadable PDF and CAD files for each individual CULTEC drainage product or product line. That feature allows the designer to attach those files to the final plan, Carolan explained, although a live Internet connection is required.

The entire series of tables, sub-tables and other information fields produced by the calculator appear in a single comprehensive screen view, so each item can be easily found by scrolling up or down rather than having to open different windows or pages.

Having shown the details of the calculator program, Carolan changed some of the inputs to reflect a simple bed design for a single-family home site. For this design, the bed was to be located under a patio and could be no wider than 16 feet and would have to accommodate a total volume of 1,000 cubic feet of stormwater. Once those and other specifications were changed, the calculator generated a new basic array and materials list, creating a bed plan that was three chambers wide by four chambers long — dictated by the combination of the product line chosen and the depth, width and desired volume for the system. She saved the completed data sheet as an Excel file that would become a template for StormGenie in AutoCAD.

A	Depth of Stone Base	6.0	inches	**Breakdown of Storage Provided by Recharger 330XLHD Stormwater System**		
B	Chamber Height	30.5	inches	Chambers	6657.16	cu. feet
C	Depth of Stone Above Units	6.0	inches	Feed Connectors	2.73	cu. feet
D	Depth of 95% Compacted Fill	10.0	inches	Stone	3818.24	cu. feet
E	Max. Depth of Cover Allowed Above Crown of Chamber	12.0	feet	Total Storage Provided	10478.13	cu. feet
F	Chamber Width	52.0	inches			
G	Center to Center Spacing	4.83	feet			

Additional Information

Other models are available if products above do not meet your requirements. Contact CULTEC for further design assistance.
Model "S" Starter is available on Recharger models only. Contactor models use Model "R" Starters.
Call CULTEC at 203-775-4416 for pricing information.

Hyperlinks to product specific webpages:
Please visit our website for more information such as CAD details, spec information, brochures, installation instructions, and other design tools on certain models.

Recharger 900HD	Recharger 330XLHD	Contactor 100HD	HVLV F-110x4 Feed Connector
Recharger V8IHD (Intermediate)	Recharger 280HD	CULTEC No. 410 Filter Fabric	HVLV FC-24 Feed Connector
Recharger V8SHD (Starter)	Recharger 150XLHD	CULTEC No. 20L Polyethylene Liner	HVLV SFCx2 Feed Connector

A table shows how storage is allocated among the chambers, the stone, and the system connectors when a particular stormwater bed is designed. Hyperlinks below that take the user to downloadable PDF and CAD files for each individual CULTEC drainage product or product line.
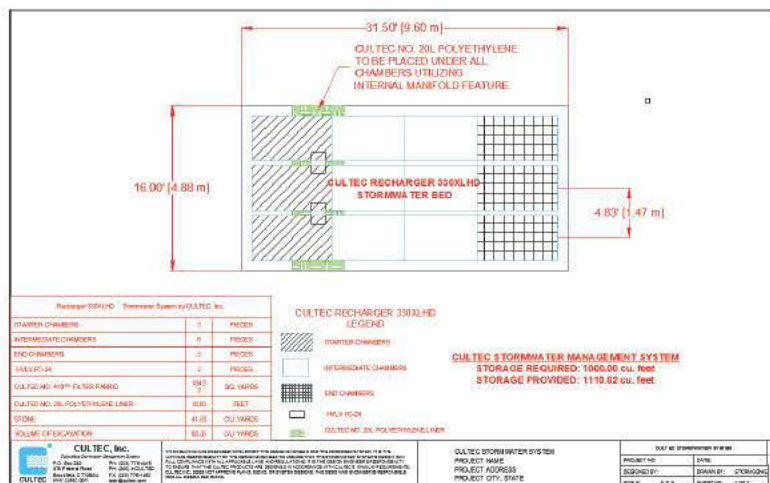
Once the calculator has completed its work, the data is imported into the StormGenie plug-in in AutoCAD. First a basic sketch is created and cleaned up; it includes the materials list in the lower left corner of the image.

The sketch is then copied and pasted into the home site plan, where it is resized to match the plan's scale.

Carolan opened up a home site plan drawing in AutoCAD. She browsed to the template she had just saved and clicked on it. StormGenie imported the data into a blank screen, creating a basic sketch of the bed that included the materials list in the lower left corner. After resizing and moving text boxes pertaining to the sketch for a neater appearance, she used the mouse to select and copy the sketch, then paste it into the site plan, where she resized it to match the plan's scale. She then quickly maneuvered it into place on the plan.

The resulting drawing, Carolan pointed out, showed the individual chambers in proper proportion and size for the site, and provided a contractor with far more details on the entire stormwater bed.

Carolan said the StormGenie sketch drawn from the calculator data always defaults to a rectangular shape. She opened another file to show a stormwater bed that had been designed to fit a triangular parking area for a commercial retail store. After the system created the bed in the standard rectangular shape and she copied the sketch into the site plan and brought it to scale, the elements of the proposed system could be quickly pulled apart in AutoCAD and reconfigured like building blocks or toy bricks to fit the system to the site, she said.

Observer's comments

The StormGenie Version 2.0 looks very simple to use for anyone familiar with the AutoCAD software it supplements. The graphics are clear and easy to read, and the process of creating a particular bed was quick. For the demonstration — which included numerous pauses to explain steps and details, the total time from first data entry to finished drawing with the proposed stormwater bed in place took less than 30 minutes.

Manufacturer's comments

Although the demonstration focused on a very simple project for an individual home site, Carolan said the same principles apply to larger and more complex projects and in designing catch-basin areas or other segments of a municipal stormwater system.

"It's good for preliminary design, but if they wanted to, the user could then take those preliminary designs and make them more site specific," she said. "It's fully able to be modified once the drawing is created."

Carolan said CULTEC offers StormGenie free to its immediate clients — contractors and designers of systems that use the company's products — as a value-added feature that enables them to work more quickly with their customers in preparing designs and installing the CULTEC product line.

It also offers much more detail and precision in measuring components than can be easily created by a designer working without it, she said.

"We're trying to help the designer create systems that are accurate, are easy for takeoff, and let them have a very easy starting point," said Carolan. "We're creating something that is fully engineered and able to be modified." ✦
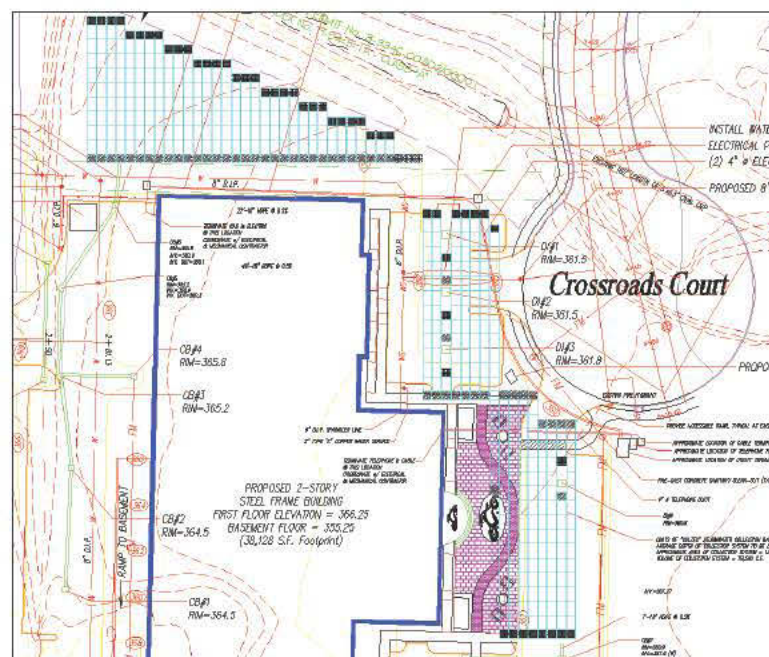
This screenshot shows three stormwater beds created for a commercial retail store using the StormGenie software. The beds are located in front of the store, to the side of the entryway, and under a triangular section of the landscape between the store and the drive leading to the entryway.