

PRESS CONTACTS:

Krysten D'Amato
Melissa Lo Parco
Catalyst Marketing Communications, Inc.
(203) 348-7541

**TORONTO PREMIUM OUTLETS™ FIND STORMWATER MANAGEMENT SOLUTION
IN CULTEC CHAMBERS**

BROOKFIELD, CT/Toronto Premium Outlets™ is the first Premium Outlet Center in Canada. The unenclosed Center sits on a 45-acre site approximately 20 minutes west of Toronto in Halton Hills. Four entrances invite shoppers into a single-level, village-style setting with outdoor pedestrian courtyards that provide sufficient coverage for all-weather shopping.

During the planning stages, engineers from The Odan/Detech Group Inc. collaborated with site owners Simon Property Group and Calloway REIT as well architects from The Collaborative Inc. to develop the layout for the mall and surrounding parking lots and a stormwater management system that would primarily provide detention, but would also allow a portion of the runoff to infiltrate back into the ground after a rainwater event.

In order to best manage the runoff, project managers determined that a unique combination of underground plastic chambers and an open detention pond would provide the best stormwater solution, as it would allow the property owners to efficiently control stormwater while maximizing the amount of leasable space on the site.

“Integrating a pond and CULTEC’s chambers on the same site was quite unusual, but it was an innovative way of getting the job done,” said Mark Harris with The Odan/Detech Group, Inc.

Untreated stormwater initially enters the first section of the detention pond through the forebay, where the silt sediment settles out of the water to the bottom of the pond. The clean stormwater remains in the forebay until there is sufficient volume to flow over into a micro-pool. Finally, the water slowly drains through a headwall into a natural creek. With just over 236,000

cubic feet of volume provided by the pond, this process helps to slow the flow of water as much as possible before it outlets into the creek in order to avoid an overflow or erosion problem.

Given the space restrictions of the shallow site and the additional storage requirement of 272,000 cubic feet, Odan/Detech Group engineers chose to install CULTEC's Recharger® V8HD chambers to detain stormwater onsite. The Recharger V8HD provides a balance of maximizing storage in a small footprint that best satisfies the requirements of the Toronto Premium Outlets site. Each chamber measures 32 inches high and 60 inches wide and has a bare chamber capacity of 8.68 cubic feet per linear foot. The large bed consists of 2,782 chambers installed in 125 rows and provides a total of 272,254 cubic feet of storage. In addition, the V8HD model is able to withstand traffic loading with minimal cover – a major site requirement.

One major issue engineers faced during the project was determining how to remove sediment that enters the chambers and how the chambers themselves would be maintained. Ultimately, engineers decided to install a number of CULTEC Separator™ Rows as part of the stormwater chamber system to function as pre-treatment as well as infiltration.

Non-woven geotextile was wrapped around a complete row of chambers and a polyethylene woven geotextile was placed below them, creating a Separator Row. The Separator Row pre-treats runoff by capturing silts and fine particles in a single row of chambers prior to runoff overflowing into the rest of the CULTEC infiltration basin. To help maintain the stormwater system, debris can be easily vacuumed out using a water jet, which backflushes sediment and other debris toward a manhole and sump. A hydro-excavator/vac truck removes the sediment for disposal off-site. In addition, each Separator Row in this system features two access ports so regular inspection may occur from either end.

A second design concern was the possibility of erosion. Releasing water too quickly can alter a water course, affecting the natural wild and amphibious life that make their home along the creek. Creating a detention pond consisting of a forebay and micro-pool, and using CULTEC's

chambers for additional quantity control, helped to slow the progression of the water flow, thus minimizing any potential erosion or disturbance to the water course.

“We really enjoyed working with CULTEC and the distributor, Vaughn, Ontario-based GeoStorm Inc., who supplied the product, assisted in design and oversaw the installation,” recalled Harris. “Everyone was very prompt, accurate and always willing to help us work through the process.”

“GeoStorm Inc. was an excellent supplier and had been very helpful and supportive throughout the entire construction process,” said Rob Bowder with Metric Group, the installing subcontractor for PCL Constructors.

For more information about CULTEC stormwater management chambers and other products, please call (203) 775-4416 or visit www.cultec.com.

About CULTEC

In 1986, CULTEC introduced its Contactor[®] and Recharger[®] HDPE septic and stormwater chambers and helped begin a revolution toward the use of plastic construction products. Since then, several product developments and strategic alliances have made CULTEC a cutting-edge R&D-based manufacturer. CULTEC chambers can be used as subsurface retention or detention systems and as replacements for ponds, concrete structures or pipe and stone installations.

CULTEC manufactures several chamber sizes ranging from 8.5” – 48” to accommodate almost any site parameter. The chambers’ perforated sidewalls and fully open bottoms promote maximum infiltration capability and allow for the transfer of high volumes of water at a low velocity.

In addition, CULTEC developed its own in-line side portal manifold system, which eliminates the need for a conventional pipe header system, and water quality unit for maintaining CULTEC chamber systems. CULTEC products are currently modeled in HydroCAD[®], Bentley Systems, Inc.’s PondPack[®] V8i, Autodesk’s Storm & Sanitary Analysis in Civil 3D, and Streamline Technologies’ ICPR[®].

CULTEC’s technical staff offers free design assistance including preliminary calculations and job-specific CAD details. A free CULTEC StormGenie[®] -- AutoCAD[®] Plug-In for designing CULTEC systems and a free HydroCAD CULTEC custom edition are also available from the company. In addition, CULTEC products can contribute to the U.S. Green Building Council’s credits, under the LEED rating system, when the project is designed per LEED requirements.

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