Owens Corning
3750 NW Yeon Avenue
Portland, Oregon 97210

PROJECT SUMMARY

Project Type:	Parking lot retrofit
Technologies:	Vegetated infiltration swale, flow-through planter, downspout disconnect
Major Benefits:	• Runoff from 31,000 square feet of impervious area is filtered and partially infiltrated, reducing pollutants entering the public stormwater system. • 3,010 square feet of impervious area was removed and replaced with a stormwater facility.
Cost:	• Stormwater elements $ 125,000. IWWP grant $ 96,398
Constructed:	Winter/Spring 2008

Overview of Stormwater System

The Owens Corning facility in Portland's Northwest Industrial District produces roofing materials. In 2006, the city's Bureau of Environmental Services (BES) and Owens Corning formed a partnership to construct sustainable stormwater facilities in the Owens Corning parking lot. The facilities manage stormwater runoff from the parking lot and the roof.

Five of the building's downspouts were disconnected and the runoff from the roof and parking lot was directed to vegetated planters and swales. In addition to stormwater management, Owens Corning constructed a facility to recycle water and sand, which are used in the roof manufacturing process. The project was funded by Owens Corning, BES's Innovative Wet Weather Program (IWWP) Grant Funds, and Metro's Nature in Neighborhood funds. Also, volunteers participated in planting the vegetation in the stormwater facilities.

STORMWATER CAPACITY AND SYSTEM COMPONENTS

The stormwater management goal was to provide onsite stormwater infiltration and treatment and reduce the volume of stormwater discharging to the Willamette River. The stormwater facilities were designed in accordance with the City of Portland's *Stormwater Management Manual.*

System Components

Total area of vegetated infiltration swales: 3,010 sq. ft.

Catchment area: 31,000 sq. ft.

Overflow: In a large storm event, runoff that does not infiltrate will flow from the loading dock facility through a runnel covered by a grate, and into the east facility. If the east facility fills, the runnel to the street will allow excess stormwater to flow into the street after being filtered through the vegetation. If the north facility overflows, some of the runoff will flow into the street and discharge directly into the Willamette River, and some will flow into the east facility.

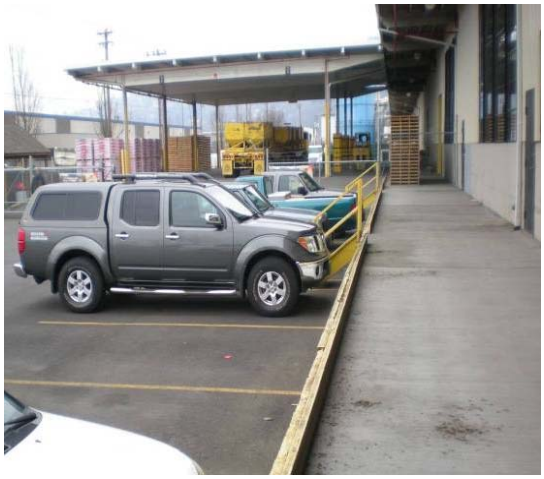
Vegetated Infiltration Planters: The planter at the loading dock collects runoff from three disconnected downspouts. Runoff from two of the disconnected downspouts flows through runnels cut into the loading dock to carry the runoff into the facility. The third downspout flows directly into the facility. The facility is 6 feet wide and 90 feet long.

The east facility runs parallel to a fence and a gate. Runoff from the parking lot and roof enters the vegetated swale by flowing between the wheel stops. The facility is 100 feet long and 8 feet wide.

The corner of the parking lot was excavated to create the north facility. Two downspouts were disconnected, and stormwater flows directly into these vegetated swales.

Soil Sampling and Infiltration Testing

Because the site is in a superfund area, BES sampled soil to determine the level of contamination. Soil samples were collected at four feet below surface level, which is the point where water from the facilities will infiltrate into the ground. In addition, soil percolation tests were conducted. The sampling found very little contamination. The results of the percolation test showed that water infiltrated into the ground very quickly. It was determined that infiltrating stormwater will not harm soil or groundwater.



Loading dock before construction

Loading dock after construction

Runnel on loading dock

Landscaping

The swales were planted with the following:

Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Ginkgo
Nyssa sylvatica	Tupelo
Pseudotsuga menzeisii	Douglas Fir
Mahonia aquifolium 'Compacta'	Compact Oregon Grape
Mahonia repens	Creeping Mahonia
Mahonia nervosa	Long leaf Mahonia
Polystichum munitum	Sword Fern
Nandina domestica 'Moon Bay'	Moon Bay Nandina
Nandina domestica 'Sienna Sunrise'	Sienna Sunrise Nandina
Arctostaphylos uva-ursi	Kinnikinnick
Carex morrowii 'Ice Dance'	Ice Dance Sedge
Carex testacaea	New Zealand Sedge
Carex obnupta	Slough Sedge
Liriope muscari 'Royal Purple'	Royal Purple Lilyturf
Juncus patens 'Elks Blue'	Elks Blue Rush

Partnership

Environmental Services was looking for a project to demonstrate that stormwater can be managed sustainably in a heavy industrial area. This project combined Owens Corning's goals to improve the exterior of the building and reduce waste, and BES's goal to manage stormwater sustainably. Through an agreement signed by Owens Corning and BES, Owens Corning took the lead on hiring contractors to design and construct stormwater management facilities and BES provided funding and technical assistance.

Design

Owens Corning hired the landscape design firm Nevue Ngan to design the facilities. The concept plan was made based on: amount of stormwater managed, current and future use of the parking lot, and cost. Once the final concept was accepted, Nevue Ngan initiated design. BES and Owens Corning reviewed the design before construction began. In addition to the stormwater planters, Owens Corning constructed a water reuse/sand recovery system. The roof manufacturing process requires considerable amounts of water for cooling. Owens Corning constructed a wastewater recovery system to filter and reuse a large portion of this water within the facility. Owens Corning staff designed the system, purchased the needed materials, and constructed the system.

North facility before construction

North facility after construction

Permitting

At 90 percent completion, an application for permits was submitted. Through the permit review, no changes to the design were required, but additional soil and groundwater sampling was required. The water reuse system did not require permits.

The second sampling event included collecting soil and groundwater samples at a depth of 15 feet below the surface. This depth was chosen because this is the lowest point that stormwater from the facility is expected to infiltrate. Results of this sampling were the same as the first sampling event—little contamination exists, and infiltrating stormwater was approved.

The City of Portland issued all permits for the project in fall 2007.

East facility before construction

Construction

Through a competitive process, Owens Corning hired a contractor to construct the facilities. Four firms were contacted, including one M/W/ESB firm. Owens Corning selected JP Contractors based on cost (JP's bid was the lowest). JP addressed all aspects of construction from procuring materials and services to excavating the site and constructing the facilities.

When JP first excavated the areas of the parking lot where the facilities would be constructed, additional material was found which resulted in a BES-approved change order. Fortunately, JP could recycle the material excavated from the parking lot.

JP constructed the concrete planters. Soil was placed in the planter and check dams were constructed with gravel, to slow the flow of water.

East facility after construction

Friends of Trees volunteers planted trees, and JP's crew installed herbaceous plants in the swales and planters.

After planting, some construction details remained. JP relocated a fence, installed an irrigation system and a new sensor in an automatic gate, and generally cleaned up the site.

The final step was to disconnect the downspouts. Owens Corning hired a contractor they had used in the past to do this work. The gutters needed to be moved, which was tricky because they are about 30 feet off the ground.

Nevue Ngan conducted several inspections during construction to ensure the facilities were constructed according to the drawings.

BUDGET

Final Project Budget

Activity	Cost	Funding Source
Stormwater planters		
Design	$18,000	Owens Corning
Construction	$107,277	Metro NIN and BES IWWP
Change Order	$4,500	BES IWWP
TOTAL COST	$125,000	
Volunteers	11	Friends of Trees
Volunteer hours	48.5	Friends of Trees
Water Reuse/Sand Recovery System		
Materials	$24,500	Owens Corning
Construction	$25,500	Owens Corning
TOTAL COST	$50,000	

MAINTENANCE AND MONITORING

Maintenance and Follow-Up Activities

Owens Corning is required to maintain the facilities. They have an ongoing contract with a landscape company which will do the maintenance. Nevue Ngan will provide Owens Corning with a long-term maintenance manual.

The facilities will also be monitored:

- Five years monitoring of vegetation
- Annual visual survey of presence or absence of wildlife
- Quarterly monitoring of water used in manufacturing
- Quarterly monitoring of sand recovered from the manufacturing process

BES anticipates using this site to showcase how stormwater can be managed sustainably in a heavy industrial setting.

PUBLIC INVOLVEMENT

Friends of Trees did an excellent job organizing the planting event, signing up volunteers, providing training, and overseeing the planting.

The project is used as an example of innovative stormwater management on the BES website and on tours of sustainable stormwater management facilities.

SUCCESSES AND LESSONS LEARNED

Project Evaluation

The second round of soil and groundwater testing was unexpected, but not unwelcome. BES and Owens Corning were concerned about potentially impacting existing contaminated soil and/or groundwater. The second series of tests confirmed that infiltration was an acceptable approach to managing stormwater, and the data assured the partners that the project would not negatively impact the environment.

Friends of Trees volunteers planting the north facility

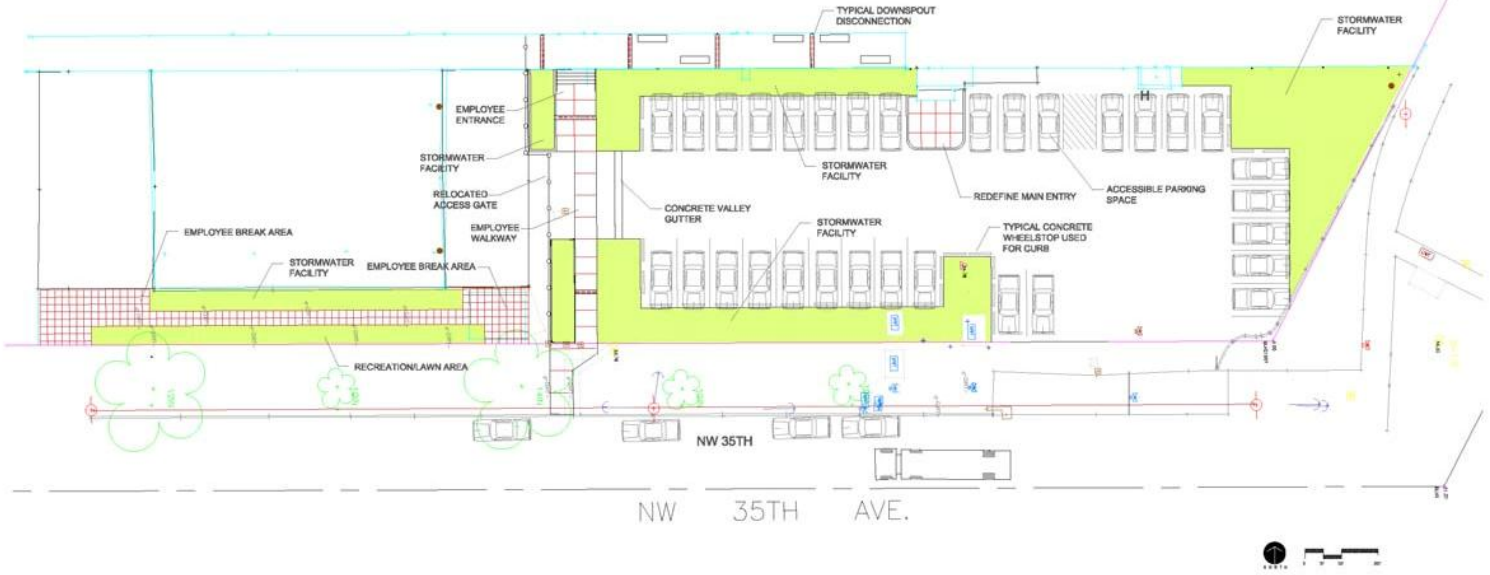
The excavation change order was anticipated. Because soil samples had been collected, BES had an idea of how thick the asphalt and concrete would be. BES could have done a complete characterization of the parking lot material, but this would have entailed considerable time and cost. Also, even with a full characterization of the material in the parking lot subsurface, something could have been missed and a change order would have been necessary. By anticipating a change order, BES and Owens Corning included contiguous budget and timeline.

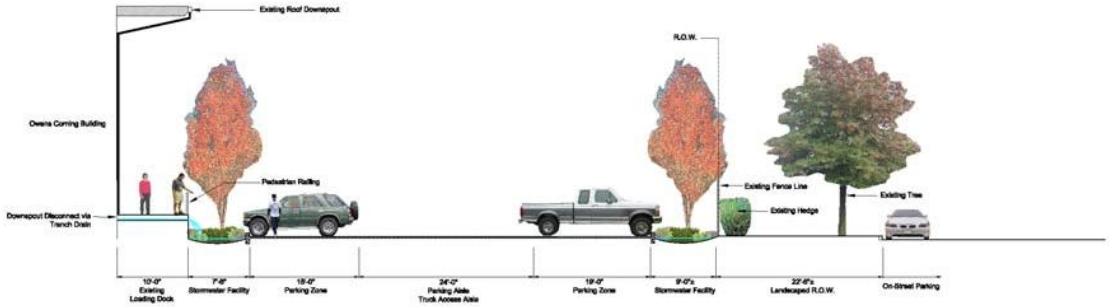
Positive project example:
The facilities got their first test in June 2008. Runoff from the roof and parking lot entered the facilities and infiltrated into the ground. There was no overflow. Success!

Public private partnership:
One of the most significant successes of the project was the positive partnership between BES and Owens Corning. Through all the decisions, hard work, and impacts to Owens Corning employees (their parking lot was torn up for two months), each partner worked cooperatively to resolve issues and get the project done.

Sustainable, creative, cost effective approach:
In addition to the stormwater planters and vegetated swales, Owens Corning constructed a water reuse and recovery system to filter and reuse a large portion of their water. Since the installation of the water reuse system, Owens Corning has been able to decrease average water use by approximately 25% or, 400 gallons/production hour.

Stormwater reduction rate: Under Portland's Clean River Rewards program, the onsite stormwater management measures will earn the property owner a stormwater management charge discount.





TYPICAL CROSS SECTION THROUGH PARKING LOT

FINAL CONCEPT PLAN

November 3, 2006

OWENS CORNING INNOVATIONS FOR LIVING™

Landscape Architecture
Nevue Ngan Associates