

Firestone

GEO PROFILES

WATER FEATURE SERIES

Project Profile #3

Project
Profiles
Featuring
PondGard
EPDM
Rubber
Liners



**Pacific Corporate Center
Portland, Oregon**



FROM CORPORATE WIND TUNNEL TO WOODLAND ENVIRONMENT

Spectacular water features transform a corporate environment through a combination of innovative design, expert installation and the durability of PondGard EPDM Rubber Liners.



EPDM Liner Solves Design Challenges

Blending the technology of water features with the beauty and simplicity of nature helped transform an otherwise ordinary space between two office buildings into a miniature woodland at Pacific Corporate Center in Portland, Oregon.

Water features with an indigenous woodland appearance, including ponds and two gently tumbling waterfalls, were created to meet the objectives of PacTrust, the developer of Pacific Corporate Center. Critical to the project's success was the selection of a high-quality liner material that would allow a high degree of control over water quality. This balance of functionality and natural beauty was achieved through innovative design and expert installation of PondGard EPDM Rubber Liners from Firestone Building Products, Carmel, Indiana.

"Using PondGard EPDM is an advantage," said Eamonn Hughes, owner of Hughes Water Gardens, a Portland-based landscape design and contracting company specializing in water features. "The geomembrane is extremely durable. Plus, PondGard requires minimal maintenance. The material resists microbial attack and algae growth and helps control overall water quality."

Flourishing Water Features are Specified From the Bottom Up

Hughes Water Gardens is known for naturalistic landscape design, making the Pacific Corporate Center site itself a significant challenge. "The water features we create are designed to mirror natural environments," said Hughes. "For this project, we started with a space about 50 feet wide by 120 feet long that was bordered by office buildings and parking lots. It was a design challenge to block out enough of the man-made structural elements to create a natural ecosystem between the two buildings."

Hughes' project specifications for the woodland environment at Pacific Corporate Center included 9,000 square feet of 45-mil PondGard EPDM. Firestone's PondGard EPDM Rubber Liner has a proven performance record in exposed applications, where it shows outstanding resistance to ultraviolet (UV) radiation and weathering along the waterline. The material also remains flexible in temperatures from -40°F to 175°F, and is available in widths of 20 to 50 feet and lengths up to 200 feet.

"We wanted to balance the efficiency and productivity of the workplace environment with peace and privacy. Our company was also looking for a unique alternative to conventional corporate landscaping," explained Leon Hartvickson, vice president of development for PacTrust.

According to Hughes, PondGard's large roll size and outstanding physical properties were key factors in the material selection. "From our experience with PondGard, we know it has the flexibility to conform to naturally curving ponds, and it maintains its flexibility year round for easy installation," said Hughes. "I also prefer working with PondGard EPDM because the material remains flexible and doesn't embrittle with age. And, its large roll size makes the liner easier to install."

Creating Water Features Using PondGard EPDM

After marking and excavating the Pacific Corporate Center sites, the soil was graded and compacted in preparation for EPDM rubber liner installation.

"It is critical to grade the soil and to install a liner capable of conforming to objects in the subgrade," said Hughes. "Throughout the life of a water feature, temperature changes and the settling of the soil can cause roots, rocks and other objects to dislodge in the soil beneath the liner. PondGard's flexibility and expansion and contraction characteristics enable the material to elongate around objects in the subgrade, resisting punctures."

According to Hughes, the EPDM liners used are easy to install. The liners were pre-cut off site based on measurements taken of the excavated area, shipped to the job site, positioned in place and anchored around the water feature perimeters.

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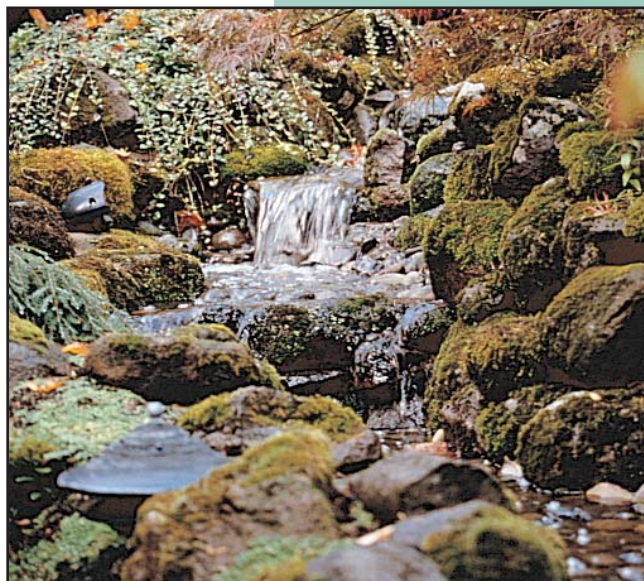
THE INSTALLATION PROCESS



A site inspection was performed to survey the soil condition and type, establish the depth of the groundwater, assess the risk of erosion or differential settling, and determine the presence of cavities or gases.

Following excavation, the excess soil was used to create berms on either end of the pond, each with a slope of 2.8:1. A series of small, angled steps were carved out of the berms to form waterfalls. Next, the support soil was smoothed and compacted in preparation for the PondGard EPDM Rubber Liner installation.

Site Inspection and Excavation



Installing the PondGard EPDM Rubber Liner was a quick and easy process. The liner was pre-cut out of a single sheet of material, transported to the site, unrolled and smoothed into place. Moss-covered rocks, positioned directly over the durable rubber liner, secured the PondGard EPDM in place and added natural beauty to the water feature.

A combination of conifers and deciduous trees, marginal aquatic plants, natural rhododendrons, ferns, large hemlock and other plants were used to naturalize the ecosystem.

Natural Beauty Created With PondGard EPDM

PROJECT DETAILS FOR PACIFIC CORPORATE CENTER

Woodland Environment

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| Pond Dimensions: | Three feet deep, 80' long, with widths varying from 10' to 25' |
| Pond Side Slope: | Ranges from .6:1 to .2:1 |
| Waterfall Dimensions: | Each waterfall is 15' wide and 30' long |
| Waterfall Slope: | 2.8:1 |
| Liner Material: | 45-mil unreinforced PondGard EPDM |
| Liner Size: | 9,000 square feet |

Crashing Waterfall and Reservoir System

In another area of Pacific Corporate Center, Hughes Water Gardens installed a powerful, crashing waterfall using PondGard EPDM from Firestone. The waterfall appears to emerge from beneath a bridge and drop into a creek bed below. The water flows between several large rocks in the creek bed and returns to an underground tank for recirculation.

The overall construction process and basic design principles used for this waterfall were similar to the creation of the features in the woodland environment. Compared to the tumbling waterfalls in the woodland ecosystem, this waterfall has a steeper slope and higher water volume.

The crashing waterfall recirculates 1,300 gallons of water per minute from a 1,500-gallon underground reservoir system. Its turbulent water flow demands peak performance from the lining material to withstand high water pressure and potential sediment recirculation. PondGard EPDM Rubber Liner was selected for its durability and dependable long-term performance under these tough conditions.

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| Dimensions: | 40' wide by 40' long |
| Slope: | 1.2:1 |
| Liner Material: | 45-mil unreinforced PondGard EPDM |
| Liner size: | 3,000 square feet |

Adding the Finishing Touches

More than 100 tons of river rock and weathered basalt rock, including boulders ranging in weight from 500 to 6,000 pounds, were used to create the water features at Pacific Corporate Center. Moss-covered basalt rock was used to anchor the PondGard EPDM Rubber Liner around the pond perimeter and basin.

Stones were carefully selected to provide a natural variation of size and shape, then positioned in horizontal layers. Thick mortar was applied to anchor the decorative rock to the PondGard liner. Basalt boulders and smaller stones were used to form the waterfall spillways. For an added layer of protection, a geotextile mat was placed between the larger boulders and the liner. Smooth river rock was loose-laid at the bottom of the pond, directly over the liner.

In the final stages of the project, pumps and water delivery systems were installed and plants were added to complete the natural appearance of the features.

Thriving Water Features Begin with PondGard

"We're very pleased with the performance and beauty of the lined water features," said Hartvickson. "This project demonstrates how a lined pond can be incorporated into a corporate setting with wonderful results."

"The ability to keep customers satisfied is a reflection of the quality of the material we specify, design technique and installation expertise. I specify PondGard EPDM exclusively. It's my lining material of choice," Hughes said.



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