

# Ford Dearborn Truck Plant Green Roof at Ten Years

**Buildings, October 7, 2013**



Constructed between 1917 and 1928 at the confluence of the Rouge and Detroit Rivers in Dearborn, MI, the massive Ford River Rouge Plant was the largest industrial complex in the world. It spanned a mile-and-a-half in width and more than a mile in length, sprawling across 93 buildings with more than 15.7 million square feet of total floor space.

At its height, the Rouge symbolized the power and promise of America's industrial might. After 80 years, however, it came to symbolize the ecological perils of highly centralized manufacturing undertaken without an understanding of the environmental consequences.

William Clay "Bill" Ford, Jr. (great-grandson of Henry Ford and the executive chairman of Ford Motor Company) made a commitment in the 1990s to transform the Rouge from an outmoded brownfield into a model of industrial-scale sustainability. A key element in the project's innovative landscaped system for stormwater management, the Ford Dearborn Truck Plant's green roof is 454,000 square feet. This makes it the largest green roof on a single building in North America and one of the five largest in the world.

The Rouge green roof marked its official tenth anniversary in April 2013. In this interview, Roger Gaudette, Director of Asset Management for Ford Land Corporation, discusses the history and performance of the green roof.

***Managing storm water was essential for the renovation of the Rouge to proceed. What was the challenge?***

When Henry Ford selected the site, one of its main advantages was access to the rivers for shipping. But it is low-lying land and the Rouge was built on multitudes of wooden pilings. Over the years, it was covered over with impervious surfaces. The two main box culverts running through the complex also drain part of the City of Dearborn to the Rouge River. As the city and the complex both grew, as in many urban areas, more of the area was paved over, and runoff increased. The infrastructure just did not have enough capacity.

***The result?***

Flooding, including in the buildings during especially heavy rain events. If manufacturing was going to be maintained at the Rouge, we needed to control and treat the stormwater.



***What are its main elements of the landscaped stormwater management system conceived by William McDonough, the architect chosen to oversee the renovation of the Rouge?***

The system encompasses 100 acres of sustainable landscaping. It includes the 10.4-acre green roof atop the truck plant, a 16-acre porous pavement storage lot for trucks coming off the assembly line, more than a dozen hedgerows and bio-swales, stormwater ponds and treatment wetlands at several locations, and native and sustainable plantings along the roadways.

***What did the landscaped system cost?***

The budget was \$5 million for the entire 100-acre green system. Conventional stormwater infrastructure for that area would have cost three times that amount.

***Why was a green roof included?***

Bill McDonough suggested it, and it is a vital part of the overall plan. The other components at ground level, such as the stormwater ponds, would have had to be much larger without it. We wanted the green roof not just for stormwater mitigation, but also to green up the site and protect the new roof membrane on the truck plant.

***Back in 2000, what was the basic problem in finding a green roof system?***

The various measures Bill McDonough suggested to the project team did not have that much of a track record at the time – especially at the scale we were planning to apply them. That was certainly the case with the green roof. There was no green roof industry to speak of, or even very many studies on green roofs, in the U.S. That is why we ended up going to Germany.

Most of what we saw were build-in-place systems with four to six inches of growing medium planted with plugs that fill in over time. However, because of the vast area to be covered, we were looking for a lighter weight alternative to reduce the structural loading. There was also concern with a build-in-place system about the risk of leaving so large a surface

area of soil, more than ten acres, exposed to erosion and weed encroachment while the plants grew in over several years.

***What were the most important requirements in choosing a green roof system?***

The attributes we were looking for include the basic considerations that go into evaluating alternatives for many green roof projects today: light weight, ease of installation, an instant green roof with full-grown plants, proven performance, and minimal long-term maintenance.



***What system was selected and why?***

We used the Xero Flor Green Roof System because its pre-vegetated Sedum mats are thin and light. The system option we selected is installed with just 1.25 inches of growing medium integrated into the mats. They are pre-grown on the ground so they go up on the roof with mature plants and 90%-plus plant coverage for an instant green roof. It was the available system at the time we thought would work best, and it had been in use at that point for about 30 years, which was reassuring.



***How has the overall landscaped system performed?***

It works. It takes 48 hours for a drop of stormwater to flow through the system. The landscaped system captures and treats stormwater for a once-in-ten-year, 24-hour storm (about three to four inches of rain). It reduces total suspended solids in the stormwater by 85%.

***And the green roof itself?***

With the region’s average yearly rainfall of 31 inches, the green roof retains more than 4.3 million gallons of runoff annually. The insulation it provides reduces the building’s energy use by 5%. We have inspected and tested the waterproof membrane under the green roof and on unprotected sections. The membrane under the green roof evidences very little change compared to the expected degradation of the exposed membrane..

***What are the Dearborn Truck Plant green roof’s maintenance requirements?***

We have had the same maintenance routine in place for a decade. The roof gets fertilized each spring. It does not require routine inspection for weeds. That is one of the advantages of the thin vegetative mats installed without several additional inches of growing medium. It resists weed encroachment.

***Does the green roof require supplemental irrigation?***

When we installed the roof, as a sort of insurance policy, we put in a commercial irrigation system. It uses the industrial mill water system that exists throughout the site for manufacturing process cooling. We irrigated regularly during the first growing season. It has been used in subsequent summers only about once a month during especially hot, dry spells.

***What is the condition of the green roof today?***

Excellent. Overall, the original mats retain a very healthy appearance with a dynamic mix of plant varieties. The most recent plant coverage study, conducted in 2010, found that 13 of the 15 original

species were thriving with 93% to 98% coverage of hearty vegetation thriving across the roof.

***After a decade, is there anything about the green roof that surprises you?***

I continue to be surprised by the variety of wildlife that has found a home up there. Killdeers and other birds nest on the roof. Butterflies, dragonflies and bees are there in abundance. So, we have a habitat for wildlife right in the middle of an industrial complex.



***What key lessons learned do you consider most important?***

The Dearborn Truck Plant green roof proved that a thin mat system, weighing only eight to nine pounds per square foot when fully saturated with rainwater, is practical and effective for a large-scale installation. We learned that a mat system with a thin layer of growing medium can be maintained without a great deal of routine attention. We demonstrated that a landscaped alternative for stormwater management including a green roof is cost-effective.



***More than 100,000 visitors annually take the Ford Rouge Tour, which includes a walk out onto the 80-foot-high observation deck that overlooks the green roof. Do you still go out there yourself?***

I do every few months. Most of the people who were part of the project team a decade ago have moved on. Some have left Ford or retired. Some like me have taken on new assignments. When I look out on the green roof, it still gives me a feeling of pride in what we accomplished.

*Published on the Buildings Buzz Blog by Buildings Magazine (October 7, 2013)*



**SIMPLY. SMARTER. GREEN ROOFS.**

**Xero Flor America ([xeroflora.com](http://xeroflora.com))  
is the official U.S. distributor for  
the Xero Flor Green Roof System**