



OFD “Education Station” Pervious Concrete and Bioretention

South 50th and Pine Street, Omaha , NE

City of Omaha Stormwater Program & Omaha Fire Department

SITE AND PROJECT SUMMARY

In 2013, the Omaha Fire Department (OFD) renovated a historic Fire Station at 50th and Pine Street that serves as a fire safety educational facility and a museum on the history of fire fighting in Omaha. As a part of the renovation, a pervious concrete parking lot was installed for staff and visitor parking. Stormwater from the parking lot is stored beneath the pervious pavement in an aggregate layer, when full, excess water is directed to a bioretention garden on the west side of the building.

In order to better understand pervious concrete and bioretention systems, several real-time monitoring sensors were installed, including: soil moisture, temperature, rain gauges, and water level sensors for the parking lot. Real-time controls were also installed to actively manage the water stored under the parking lot. The system can be programmed to pull in National Weather Service forecasts while simultaneously looking at current water levels within the aggregate storage layer, allowing for the outlet control valve to be opened or closed and thus increasing stormwater retention times. The valve can also be manually operated.

The soil moisture sensors have been installed in groups of three at varying depths adjacent to the permeable parking lot, bioretention, and a control location at the southwest corner of the lot. These sensors look at lateral moisture migration in the soils near these practices. Temperature sensors are installed at varying depths in the pervious concrete parking lot and examines the temporal depths of the freeze/ thaw lines throughout the aggregate system.



PROJECT DETAILS

	BIORETENTION SYSTEM	PERMEABLE PAVEMENT
System Footprint	500 ft ²	3,500 ft ² of porous concrete
Underdrain	4" PVC & washed limestone	4" PVC & washed limestone for lower & upper underdrain
Pre-Treatment System	Permeable Pavement & Bioswale	None
Outlet Control	2" Brass Curb-Stop Valve	Real-time controlled 4" slide-gate valve
Contributing Area	0.25 acres + overflow from parking lot	0.25 acres
Percent Impervious (%)	50%	95%
Predominant Soil Types	Classic Urban Complex, Silty Clay	Classic Urban Complex, Silty Clay

COSTS		MONITORING	METHOD
Design	\$18,678.00	Rainfall	HOBO rain gauge
Construction	\$116,400.00	Water Depth	Ultra-sonic level sensors (2)
Material Testing	\$5,471.00	Outflow	Calculated: Thel-Mar Weir w/level sensor
Total	\$140,549.00	Soil Moisture	HOBO Soil moisture sensors
		Temperature	HOBO Temperature sensors
		Real-Time Controls	Opti-RTC

DESIGNED BY	CONSTRUCTED BY	MONITORING/ ASSESSMENT BY	MAINTENANCE BY
Lamp, Ryerson & Associates, GeoSyntec, Opti-RTC	Dostal's Construction	City of Omaha Stormwater Program	City of Omaha Stormwater Program

SITE LOCATION – S 50th St & Pine St



PERMEABLE PAVEMENT INSTALLATION



PHOTOS



PROJECT LAYOUT AND SENSORS

