



# EPA REGION 7 HEADQUARTERS STORMWATER



Lenexa Regional Office Facility Educational Material





RENNER BOULEVARD

COLLEGE BOULEVARD

Integrated Perimeter Systems

Sedimentary Forebay

Wetlands

Retention Lakes

Parking

Sand Filter






EPA Region 7 Headquarters

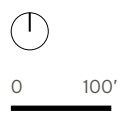
Rain Garden

Parking

Integrated Perimeter Systems

113TH STREET

-  Roof Collection Area
-  Underground Pipe Flow
-  Roof Drainage Direction
-  Public Row Pipe to Wetland
-  Overland Flow Direction



**STORMWATER MANAGEMENT**

## **STORMWATER**

The stormwater management design goals for the EPA Region 7 Headquarters includes continuing stormwater runoff at or below pre-development levels; maintaining and improving the quality of the water leaving the site; and ensuring the office park stormwater detention ponds continue to be a valuable amenity to the occupants of the park and the public.

The existing site topography generally slopes from west to the east with an elevation change of approximately 60 feet from Renner Boulevard to the existing storm retention ponds. The site is bordered on the three sides by public streets: Renner Boulevard to the west, College Boulevard to the north, and 113th Street to the south.

The stormwater design utilizes a series of stormwater Best Management Practices (BMPs) to create a treatment-train, which filters and cleans the runoff in multiple stages. The majority of the on-site water, as well as a percentage of off-site water, is either absorbed or is routed and cleaned, removing suspended solids, oils and phosphates using the BMPs. As rainwater flows across and through the site, pollutants are filtered by a combination of native grass zones, vegetated swales, rain gardens, sediment traps, sand filters and constructed wetlands. This process slows the water, allowing solids to settle out and more time for absorption into the soil and uptake by the plants. The cleaned water that is not absorbed on site eventually makes its way to the office park storm retention ponds.

During a storm event, the initial (first flush) heavy flows from Renner Boulevard and the property to the west are diverted into the wetlands for filtering by means of a below-ground diverter structure. This intervention corrected an off-site condition that was previously sending high flows with contaminants directly into the office park retention ponds.

Rainwater from the building roof areas is accommodated through gutters, downspouts and internal roof drains. Water from the west side of the building is routed through internal drains underground and finally to the wetland for filtering. Water from the roof areas of the building wings is collected from gutters and downspouts and routed to three exterior courtyards - each having a unique design character - on the east side of the building. Within each courtyard is a series of planted rain gardens that are used to slow and filter the stormwater received from the roof down spouts before the cleaned water is directed into underground drainage pipes to the office park retention ponds.

The number of treatment processes that each area of runoff receives is dependent on the site location. For example, the visitor parking areas are treated by a vegetated swale and rain garden before continuing on to treatment train located north of the building; whereas other portions of the site are treated with other sequences of infiltration and filtration. The buffalograss and native prairie stands keep the fat clay soils loose, encouraging infiltration throughout the site.

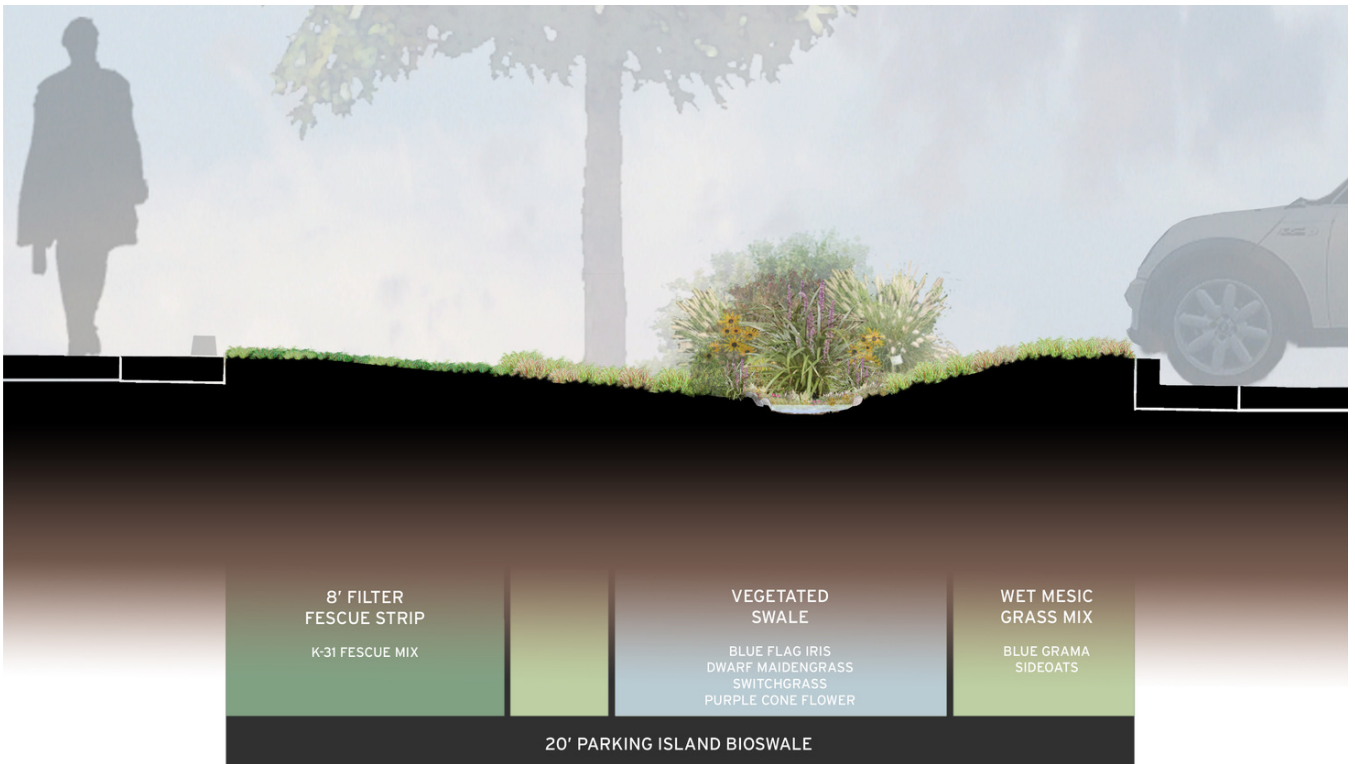


Wetlands

## INTEGRATED PERIMETER AND CONTROLLED IMPERVIOUS DESIGN

The EPA Headquarters is protected by a unique perimeter security system of limestone boulders and effective stormwater management design. Portions of this perimeter system feature deep vegetated swales that, in addition to creating a security barrier, provide stormwater control, filtering and absorption. These swales include a series of limestone check dams designed to lower the stormwater peak flow rate within each swale as well as promote infiltration. Swales are located on the north side of the site and one on the south side between the south entrance drive and the service drive. This perimeter system of control helps to offset increased pavement areas as part of the improved site.

Impervious pavement areas are minimized, and divided by landscaping into different parking areas, main drive, the south entrance drive, service drive and handicap accessible parking spaces adjacent to the building. In cooperation with the City of Lenexa, the original deferred parking reduction agreement, based on use, has been granted to the EPA allowing a total parking space count well below the zoning requirement of 4 spaces per 1,000 GSF. This understanding of right-sizing the requirements based on actual use greatly reduces stormwater runoff and unnecessary pavement.





## DESIGN PERFORMANCE METRICS

### SITE AREA

30.72 acres  
or  
1,338,161 sq.ft.

The vegetated space equals

888,984 sq.ft.  
which equals

66%  
of the site.

The sizing of the nearly

1/2 acre  
wetland was designed for

15 acres  
of impervious area using the local rainfall  
data. (Sizing includes capacity for 5.2  
acres of off-site land.)

90%  
of the  
annual rainfall for  
Lenexa, Kansas falls in average  
increments of

1.37"  
per Rain Event

### SITE RUNOFF PRE-DEVELOPMENT

Two-Year, 24-Hour Design Storm  
Rate

53.52 (cfs)

Quantity

266,030 (cf/storm)

### SITE RUNOFF POST-DEVELOPMENT

Two-Year, 24-Hour Design Storm  
Rate

51.89 (cfs)

Quantity

263,699 (cf/storm)

### RESULTS

Improved runoff design for the  
development property

IS LESS  
THAN

the runoff for the former

UNDEVELOPED

grass-covered field.

### STORMWATER QUALITY

More than

90%

of the site stormwater is filtered through  
the best management practices (BMP's).

The combination of systems will  
remove more than

80%

of the total suspended solids (TSS). The  
total weighted average for TSS removal  
(based on the treatment series, percent  
of site treated and efficiency of removal  
type) equals more than

99%

Note: To understand the approximate  
magnitude of the site runoff:

An Olympic sized pool measuring  
50 meters x 25 meters x 2 meters (d)  
holds

88,287  
cubic feet of water.

Registered with the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, the EPA's Region 7 Headquarters is on track to achieve LEED 2009 Gold level certification for New Construction and LEED 2009 Platinum level certification for Existing Building Operations and Maintenance.

Scan the QR code  
or visit [bit.ly/13yiSYe](https://bit.ly/13yiSYe)

