

University of MINNESOTA LANDSCAPE ARBORETUM

PARKING LOT RAIN GARDEN

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Construction of the Minnesota Landscape Arboretum (MLA) parking lot rain gardens began in August 2002 and was completed in June 2003. The rain gardens are located north of the Oswald Visitor Center. There are 5 basins located throughout the parking lot that serve as an alternative to traditional concrete medians.



DESIGN AND CONSTRUCTION:

The rain gardens or planted basins are 30'-40' feet wide, with side slopes of 4:1. The parking area varies from .5 to 2.5% slope, and includes minimal curbs so rainwater will readily flow into the planted areas. Thus stormwater runoff flows into the gardens and be contained where it can be infiltrated.

Due to the high clay content of the soils at the Arboretum, special drainage and soil were implemented in this design. First, 4" diameter drain tiles made of perforated PVC pipe were installed lengthwise down the middle of each planting bed. Water that reaches the drain tile is carried to an underground outlet pipe that discharges into an on-site treatment wetland. The drain tile is located approximately 2 feet below the soil surface. Six inches of coarse gravel

surrounds the drain tile, with 2 feet of coarse soil on top of the gravel, followed by 4 inches of topsoil at the surface of the planting bed. Additionally, each basin contains an overflow outlet. The outlets were placed so the top would be approximately one foot above the soil surface. In the unlikely event the gardens do not infiltrate water properly and flooding occurs, the water will spill into the overflow outlet rather than onto the parking lot. These overflow structures lead to the same outlet pipes that the drain tiles are connected to. To date, the overflows have not been used.

In lieu of traditional curbs, concrete ribbon curbs were installed around the inside edges of the rain gardens to allow runoff to flow freely into the basins. Curb cuts were installed on the side of the gardens that are adjacent to a road.

Finally, the rain gardens were planted with a diverse group of perennials, shrubs, and trees. (see attached list). Trees and shrubs were planted on the edges of the gardens, while grasses and perennials dominate the interior. Mulch was placed around the edges of the gardens to help retain moisture.

MAINTENANCE:

Typical recommendations for normal plant culture suggest regular watering for the first couple of years during plant establishment and during extremely dry periods. The Arboretum rain gardens were regularly irrigated for the first few years in order to assure good plant establishment. Today unless there is extreme drought, the plants do not receive supplemental

water. Regular weeding is conducted on the parking lot gardens by the MLA staff. This includes hand pulling unwanted plants that may have blown in from nearby gardens or thinning plants when necessary. With time, the prairie plants may need to be cut back and annually removed in the spring, if they become too thick and dense or if the plants need to be rejuvenated with division. To date, cutting back has not been necessary.

In an effort to eliminate the buildup of sediments and other particulates, regular street sweeping is performed on the parking lot. The MLA uses little or no salt during winter months for best plant and environmental health.



The Arboretum rain garden parking lot shortly after planting 2003.



The Arboretum rain garden parking lot July 2009.

Monitoring:

From 2003- 2008 the United States Geological Survey (USGS) monitored the water quality of stormwater flowing into and out of the MLA rain garden. Some preliminary results have been published: <http://pubs.usgs.gov/sir/2005/5189/>

The raw data can also be viewed on the USGS water quality database online at: <http://waterdata.usgs.gov/nwis>

Work is continuing to evaluate the effect of rain gardens on water quality.

Some of the plants used in the MLA parking lot rain gardens:

Swamp white oak	<i>Quercus bicolor</i>
Amur maackia	<i>Maackia amurensis</i>
Bush honeysuckle	<i>Diervilla lonicera</i>
Autumn magic chokeberry	<i>Aronia melanocarpa</i>
Prairie phlox	<i>Phlox pilosa</i>
Wild blue indigo	<i>Baptisia australis</i>
Black-eyed Susan	<i>Rudbeckia hirta</i>
Grey-headed coneflower	<i>Ratibida pinnata</i>
Bergamont	<i>Monarda fistula</i>
Prairie Blazingstar	<i>Liatris spicata</i>
Compass plant	<i>Silphium laciniatum</i>
Boltonia	<i>Boltonia asteroides</i>
Little bluestem	<i>Schizachyrium scoparium</i>
Switchgrass	<i>Panicum virgatum</i>

For more information about rain gardens, please visit:

- www.bluethumb.org
- www.raingardennetwork.com
- <http://minnesotaraingardens.net/>
- <http://dnr.wi.gov/runoff/rg/>

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