



Capital Improvement Project

Lakeville: Lake Marion Nutrient and Sediment Reduction Project



The storm sewer and three stormwater basins south of Lake Marion were reconfigured and one was updated with an iron-enhanced sand filter by the City of Lakeville to keep sediments, phosphorus, and nitrogen from draining to Lake Marion.

Completed cooperatively by:

- City of Lakeville
- Vermillion River Watershed Joint Powers Organization
- Dakota Soil and Water Conservation District

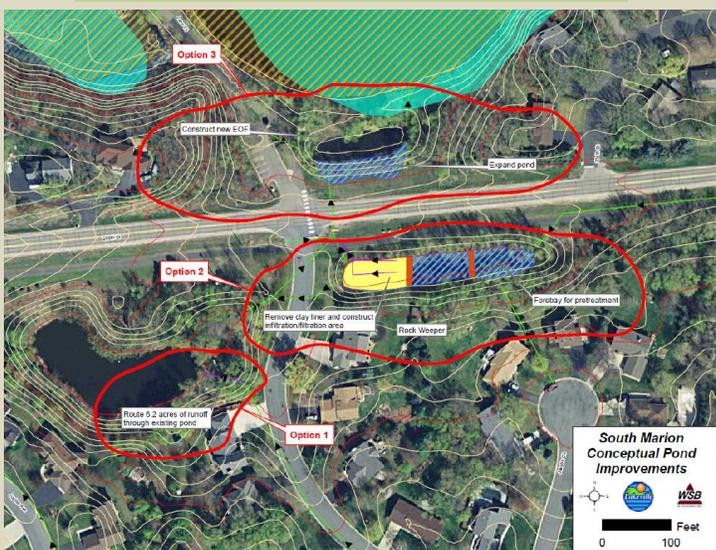
Preserving water quality in Lake Marion

The City of Lakeville has been monitoring and implementing projects on Lake Marion for 15 years, and the water quality has been stable since 1994. To maintain this important natural resource, the city proposed a project to modify the storm sewer system and retrofit three stormwater ponds to reduce stormwater runoff and remove pollutants before they discharge into Lake Marion.

The three stormwater basins were installed with developments built in the 1980s and 1990s to handle runoff from a 73-acre residential area. The northern-most of the three basins discharges directly to Lake Marion.

The City proposed projects to improve stormwater runoff quality or quantity in all three ponds. These included:

- Redirecting 6.5 acres of stormwater runoff to the southwest pond. This oversized pond can retain and treat more stormwater than it currently receives.
- Reshaping the southeast pond into three cells and installing an iron-enhanced filtration area (shown in the yellow area in the aerial photo at left) in the one closest to Lake Marion. The iron-enhanced sand filter effectively removes dissolved phosphorus from stormwater, unlike traditional phosphorus treatments.
- Expanding the undersized north pond, reconfiguring its outlets to Lake Marion, and changing the emergency overflow. These changes prevent high water flows from scouring sediments and pollutants into the lake and allow for better treatment of pollutants.



The iron-enhanced sand filter is an effective way to remove dissolved phosphorus from runoff.



City of Lakeville, MN within the Vermillion River Watershed.



Vermillion River Watershed Joint Powers Organization

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The Vermillion River is a vital natural resource that is important to public health and recreation, as well as preserving unique wildlife habitats. It flows from New Market Township in Scott County, through residential and agricultural areas in central Dakota County, and cascades into a 100-foot ravine before it enters the Mississippi River near the Cities of Hastings and Red Wing, Minnesota. Throughout its journey, the river reflects urban and rural life within its 335-square mile watershed.

Problem:

- Nutrients (phosphorus and nitrogen) in stormwater runoff pose a risk to the health of shallow lakes. Nutrients promote growth of algae and invasive plants, which then consume dissolved oxygen as plants and algae decompose.
- Lake Marion is not impaired for nutrients and has stable water quality. Preventing nutrients in runoff to Lake Marion protects existing water quality and will improve water quality over time.
- Stormwater basins south of Lake Marion provide some treatment of runoff, but substantial water-quality improvement is possible by re-routing stormwater, re-shaping the ponds, and installing new iron-enhanced sand filter technology.

Actions:

- Route additional runoff through the southwest pond.
- Expand the north pond, which is undersized, and re-configure its outlets and emergency overflow to prevent sediment and pollutant discharging into Lake Marion during high-flow events.
- Install an iron-enhanced sand filter in the southeast pond to remove phosphorus from runoff going into the lake.

Benefits:

- Improve water quality by reducing stormwater pollutants and runoff volume to Lake Marion.
- Reduce an estimated 1 million gallons of runoff volume, 1.5 tons of sediment, 10 pounds of phosphorus, and 32 pounds of nitrogen from entering Lake Marion each year.
- Implement the most cost-effective design that reduces the most pollutants per dollar spent.
- Provide a demonstration site to showcase water quality practices that reduce stormwater impacts to lakes.

Costs and contributions:

- City of Lakeville: \$3,656 and in-kind planning, design, contracting, site preparation, installation.
- Vermillion River Watershed Joint Powers Organization: \$59,860 – cost share
- Dakota SWCD: technical assistance
- Clean Water Fund: \$50,000

Project completed December 2013