



Real People. Real Solutions.

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August 17, 2021

Permitting
Minnehaha Creek Watershed District
15320 Minnetonka BLVD
Minnetonka, MN 55345

RE: Waterbody Crossings & Structure Analysis
MCWD Permit #21-113
Smithtown Pond Project

Dear MCWD Permitting,

As part of the City of Shorewood's Smithtown Road Ponds project, the City proposes to construct two stormwater ponds east of Strawberry Lane, between the Lake Minnetonka LRT Regional Trail and Smithtown Road. The City also plans to regrade the Freeman Park basin located along the Lake Minnetonka LRT Regional Trail and replace the existing outlet control structure with two outlet control structures. Construction of the storm ponds and regrading the Freeman Park basin includes stormwater infrastructure improvements that contact the bed or bank of a waterbody, thus requiring an analysis showing the effect on hydraulic capacity and water quality. Following is a list of the specific improvements:

1. **Smithtown Stormwater Ponds** – Due to erosion occurring along the Grant Lorenz, Pebble Creek, and Freeman Park channels, improvements are proposed to reduce discharge rates to these channels for large erosive storm events. The improvements will decrease the volume of water directed to the Pebble Creek and Freeman Park channels.
2. **Freeman Park Basin** – In addition to regrading Freeman Park basin, the City proposes to replace the existing Freeman Park outlet control structure with one that will limit the rate at which water is discharged to the Freeman Park Channel. Storm events larger than the 2-year event will discharge to the proposed Smithtown Stormwater Ponds. The existing outlet control structure clogs from sediment and debris buildup. The basin will be regraded to provide depth for the area to be utilized as a wet retention pond with submerged inlet pipes for the outlet control structures. Submerging the inlet pipes will reduce clogging potential while lowering the high-water level below existing conditions.

ANALYSIS – HYDRAULIC CAPACITY AND WATER QUALITY

1. **Smithtown Stormwater Ponds** – The proposed improvements will provide 519,852 CF of live storage between the two stormwater ponds, which will receive additional runoff from Strawberry Lane and the large storm event runoff from Freeman Park basin. There is no rate increase in any of the three channels that were experiencing erosion issues. The rate comparison between existing conditions and the proposed improvements is shown in Table 1, below.

The proposed improvements will not result in an increase in impervious surface, but two stormwater ponds are being added to the area. The change in phosphorus discharged from the

project area was analyzed for existing and proposed conditions using the MIDs calculator. The proposed design results in a 36% reduction in total phosphorus. If an iron enhanced sand filter is utilized, the reduction increases to 77%. Table 2 below, shows the phosphorus load comparison.

2. **Freeman Park Basin** – The proposed improvements will not result in an increase in impervious surface or change existing vegetation, so water quality would remain unaffected. All stormwater runoff from the project area will be directed to the north side of the Lake Minnetonka LRT Regional Trail through the two separate outlet control structures. The primary outlet control structure will route all stormwater, up to the 2-year storm event, to the existing Freeman Park Channel on the north side of the trail. Storm events larger than the 2-year event will be directed through the secondary outlet control structure to the Smithtown stormwater ponds. The improvements result in no increase in the rates discharged to the Freeman Park Channel. The rate comparisons are shown in Table 1, below.

The proposed improvements will not result in an increase in impervious surface. Therefore, water quality would remain unaffected.

Table 1. Rate Comparison

Location	Storm	Existing (cfs)	Proposed (cfs)	Rate Change (cfs)
Pebble Creek (Pebble Creek-4)	1-yr	5.86	3.98	-1.88
	10-yr	18.56	15.31	-3.25
	100-yr	45.01	38.90	-6.11
Freeman Park Channel (Freeman Channel-5)	1-yr	13.41	11.04	-2.37
	10-yr	32.24	17.90	-14.34
	100-yr	68.08	32.93	-35.15
Grant Lorenz Channel (Link-247)	1-yr	15.62	14.31	-1.31
	10-yr	45.75	36.51	-9.24
	100-yr	124.32	77.27	-47.05

Table2. Phosphorus Load Generation Comparison

	Particulate Phosphorus (lb/yr)		Dissolved Phosphorus (lb/yr)		Total Released (lb/yr)
	Generated	Removed	Generated	Removed	
Existing	105.67	26.49	86.46	0	165.64
Proposed	106.07	87.59	86.78	0	105.26
Proposed - IESF	106.07	94.79	86.78	60.41	37.65

ALTERNATIVE DESIGNS

Smithtown Stormwater Ponds

1. Alternative Design 1 – Do not construct the stormwater ponds. By not constructing the storm ponds the poor condition of Pebble Creek, Freeman Channel, and Grant Lorenz Channel will continue to degrade, and the banks will continue to erode. Therefore, this option is not recommended.
2. Alternative Design 2 – Remove Freeman Channel and direct all stormwater from Freeman Park basin through the constructed Smithtown stormwater ponds. This design would be more destructive to the existing channel and wetlands located in the area. The flow rates in Grant

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Lorenz Channel would be similar to those of the proposed design, but this option is not recommended due to the significant impact it would have on the existing natural resources.

Freeman Park Basin

1. Alternative Design 1 – Do not remove and replace the existing outlet control structure with submerged inlets. By leaving the existing outlet control structure in place, the repeated clogging issue will not be resolved. This would result in a continued maintenance burden on the City and deep, lengthy high-water levels at the basin contributing to flooding issues to the Shorewood Oaks neighborhood. Therefore, this option is not recommended.
2. Alternative Design 2 – Replace the outlet control structure, but do not provide a permanent pool for a submerged inlet. This design would still result in repeated clogging issues due to sediment and debris generated from the heavy tree cover in the area. Therefore, this option is not recommended.

If you have any questions or comments, please contact me to discuss at (952) 448-8838

Sincerely,

Bolton & Menk, Inc.



Anthony Adderley, P.E.
Water Resources Project Engineer

Attachments

Smithtown Pond Drainage Maps and Model Output