

Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5A – Four Season Mall Area Water Quality Project (CIP NL-2)
50% Plan Set Review – Plymouth
BCWMC August 15, 2013 Meeting Agenda
Date: August 6, 2012
Project: 23270051 2013 623

5A. Four Seasons Mall Area Water Quality Project, (CIP NL-2) 50% Plan Set Review

Summary

Proposed Work: Four Seasons Mall Area Water Quality Project (CIP NL-2)

Basis for Commission Review: 50% plan review

Change in Impervious Surface: N.A.

Recommendation: Conditional Approval

The Four Seasons Mall Area water quality project (CIP NL-2) is being funded by the BCWMC's ad valorem levy (via Hennepin County). The plans for the improvements are at the 50% stage, and were provided to the BCWMC for review and comment, as set forth in the BCWMC CIP project flow chart developed by the TAC.

Feasibility Study Summary

The Four Seasons Mall Water Quality Improvement Feasibility Report (Wenck, July 2012) was completed by the City of Plymouth and the BCWMC to select an approach for the water quality improvements for the North Branch of Bassett Creek. The goal of the project is to reduce the phosphorus loading to the North Branch of Bassett Creek, upstream of Northwood Lake, by 73 pounds per year. Seven potential projects were identified in this study; however four were eliminated from further study because of land use surrounding the potential project location, required wetland mitigation costs, and unsuitable soils in the area for infiltration.

The remaining three potential projects were grouped into two scenarios for further evaluation:

- Scenario 1 – Watershed ponding at 40th Avenue and Four Seasons Mall, and channel stabilization and restoration west of Lancaster Lane.
- Scenario 2 – Stormwater collection and alum injection in an underground vault at the Four Seasons Mall site.

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5A – Four Seasons Mall Water Quality Treatment (CIP NL-2)
Date: August 6, 2013
Page: 2
Project: 23270051 2012 286

The feasibility study determined that both scenarios would meet the goal of removing 73 pounds of total phosphorus per year to the North Branch of Bassett Creek.

Selected Project

Scenario 1, with minor modifications, was selected by the City of Plymouth to be constructed because the mall site is not yet under redevelopment. The 50-percent plans for the Four Seasons Mall Area Water Quality Improvement Project include a proposed pond located east of 40th Avenue, and channel stabilization and restoration west of Lancaster Lane. According to the feasibility study, the proposed pond will remove 75 pounds of total phosphorus per year and the stream restoration will remove 25 pounds of total phosphorus per year. Review of the 50% submittal indicates the project is generally consistent with the feasibility study.

Primary design features of the proposed pond, as recommended in the feasibility study include:

- A 42-inch pipe will intercept runoff from the existing storm sewer and direct runoff through the proposed pond.
- A 10-foot wide iron-enhanced sand filter will be placed at elevation 920.0 ft. in the proposed pond to provide enhanced water quality treatment.
- Discharge from the pond will be controlled by a weir at elevation 921.0 ft., with an overflow elevation of 922.5ft.

Key design features of the stabilization and restoration of the channels through the park, as recommended in the feasibility study include:

- Approximately 2,600 linear feet of channel are proposed to be stabilized. The feasibility study considered stabilization of approximately 2,400 linear feet of channel.
- A 30-foot wide buffer of tree removal will be implemented along the channel, and the buffer will be restored with compost seed and native woody vegetation.
- Approximately twenty rock vanes, located at every 2-3 feet of elevation change, would be installed to reduce head-cutting in the channels.
- Riprap will be placed along the outer edges of bends throughout the stabilization and restoration areas.

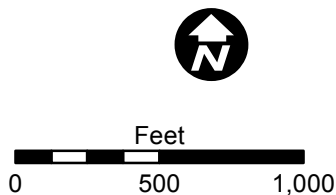
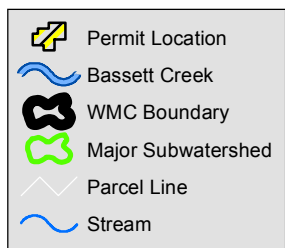
Recommendations

Conditional approval of 50% drawings and authorize the City of Plymouth to proceed with final plans and contract documents. Although we understand these drawings are still preliminary, note the following initial review comments.

1. The proposed pond dead storage volume should be compared to the dead storage assumed in the feasibility study to ensure that the removal rates calculated with the P8 model are still applicable to the current design review.

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5A – Four Seasons Mall Water Quality Treatment (CIP NL-2)
Date: August 6, 2013
Page: 3
Project: 23270051 2012 286

2. All storm sewer inlets should be extended so the flared end section (APR 1, APR 7) discharges at or below the normal water level of the receiving pond.
3. We recommend using STMH 2 as a drop manhole and reducing velocities at the outlet.
4. Discharge velocities exceed 15 fps at several outlet structures. We recommend reducing velocities by decreasing pipe slopes and adding drop manholes, as appropriate.
5. Confirm the new the elevation of the proposed Lancaster Lane crossing is consistent with the existing crossing.
6. The Top of Weir Elevation on Detail D: Rock Weir should be revised. The embedment depth of HDPE sheets should be confirmed.
7. The following design modifications should be considered to further stabilize the channel:
 - Decreasing channel slopes to 1-percent by adding more rock vanes or constructed riffles will further reduce the likelihood of head-cutting. A hydraulic model of the channel could be developed to better understand the shear stresses during extreme events.
 - Connectivity to the floodplain is an important component of stable streams. Raising the stream bed to allow the channel water surface elevation to be closer to the floodplain at bankfull level will provide this connectivity to the floodplain.
 - The channel dimensions should be checked to ensure the channel width is appropriate for the watershed size and flow rate.
 - A meeting with the BCWMC Engineer is recommended to discuss these comments.
8. Revised plans must be submitted to the BCWMC engineer for review



LOCATION MAP
Four Seasons Mall
Water Quality Improvements
50-percent Plan Review
Plymouth, MN