

## Memorandum

**To:** Bassett Creek Watershed Management Commission (BCWMC)  
**From:** Barr Engineering Co.  
**Subject:** Item 5C. Consider Request from City of Minneapolis to Allow Southwest LRT Project to Make a New Connection to Bassett Creek Tunnel  
BCWMC March 17, 2016 Meeting Agenda  
**Date:** March 9, 2016  
**Project:** 23270051 2016 3005

### 5C. Consider Request from City of Minneapolis to Allow Southwest LRT Project to Make a New Connection to Bassett Creek Tunnel

#### Recommendations:

- i. Conditional approval of the proposed connection of Southwest LRT Glenwood Station area

#### Background and comments

The City of Minneapolis requests that the Bassett Creek Watershed Management Commission (BCWMC) consider approval of a new direct connection to the new Bassett Creek storm water tunnel associated with the Southwest LRT Project (see attached March 9, 2016 letter). This new connection to the tunnel would modify the watersheds that are tributary to the Bassett Creek storm water tunnel and the Minnesota Department of Transportation (MnDOT) Interstate 94 storm water tunnels. The proposed changes are associated with the Southwest LRT drainage in the Glenwood Avenue area.

The new Bassett Creek tunnel, completed in 1992, was built in three phases and conveys Bassett Creek to the Mississippi River. The old Bassett Creek tunnel accepts local discharge from Minneapolis and is required to maintain capacity to convey 50 cfs overflow from the new tunnel.

This is only the second request for a direct connection to the new tunnel since its completion. The first request was in 2007, when the BCWMC approved a request from the City of Minneapolis to connect the Twins Stadium and City of Minneapolis combined sewer overflow (CSO) areas to the tunnel.

Figure 1 shows the following:

- The location of the Bassett Creek and I-94 tunnels, shown as a yellow dashed line. The location of the old Bassett Creek tunnel is shown as an orange dashed line.
- Watershed areas outlined in red are the watersheds currently tributary to the new Bassett Creek and I-94 tunnels, as determined by work completed in 2007 to evaluate the connection of the Twins Stadium and City of Minneapolis combined sewer overflow (CSO) areas to the tunnel.
- The proposed subwatersheds of the Southwest LRT at Glenwood Avenue are outlined in yellow. This area is partially landlocked (not served by any storm sewer), but during larger storms, flows will overtop the existing surface storage and drain to the old Bassett Creek tunnel. It is proposed that this

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area connect/drain directly to the new Bassett Creek and I-94 tunnel after passing through water quality treatment BMPs. This would add 9.61 acres (52.5% impervious) to the new tunnel watershed.

MnDOT completed the I-94 tunnel (including the Bassett Creek tunnel) downstream of Point A in 1979. The Corps of Engineers completed the Bassett Creek tunnel from point A to point B (see Figure 1) in 1992.

The BCWMC requirements that apply to the proposed connection include:

1. Policy 38 in the 2015-2025 BCWMC Watershed Management Plan (Plan), which requires that projects maintain no increase in flood level at any point along the trunk system. The BCWMC Requirements for Improvements and Development Proposals (Requirements) document requires "no increase in flood level" to be managed to a precision of 0.00 feet. This precision is based on directives from the Minnesota Department of Natural Resources (MnDNR) pertaining to no-rise certificates in Federal Emergency Management Agency (FEMA) floodplain "AE" zones (zones where there are published flood elevations). The BCWMC has applied this "no increase in flood level" standard to other recent projects along the Bassett Creek trunk system.
2. Policy 31 of the BCWMC Plan requires "cities to manage stormwater runoff so that future peak flow rates leaving development and redevelopment sites are equal to or less than existing rates for the 2-year, 10-year, and 100-year events."
3. Section VI of the 2000 Joint and Cooperative Agreement (JCA) between BCWMC, the City of Minneapolis, and the Middle Mississippi River WMO (now the Mississippi WMO) requires the written approval of the BCWMC to allow increases in tributary area, add connections or outlets to the new tunnel, and allow projects that change the rate of runoff to the new tunnel.
4. Section VI of the 2000 JCA also states that the BCWMC will only approve projects that will not increase either the first peak flow (specified as 1,030 cfs in the JCA) or the second peak flow (flow rate not specified in the JCA) to the new tunnel.

In January 2016, the BCWMC Engineer used a combination of the approved BCWMC HEC-1 model (to establish -year flows at the tunnel inlet (point B)) and the BCWMC Phase 1 (2012) XP-SWMM model (to model the portion of the watershed that drains directly to the new tunnel) to evaluate the impact of the proposed connection on the flows and flood elevations in the tunnel. The XP-SWMM model used the TP-40 100-year, 24-hour design storm event to estimate runoff and flows to the tunnel from the direct watersheds. The BCWMC Engineer used the combined HEC-1 and XP-SWMM model to evaluate the relative change in the 100-year elevations and peak flows at the following locations:

1. peak elevation at the tunnel inlet (point B) and at key points along the tunnel system
2. peak flows at three points in the tunnel that correspond with the locations outlined in the 2000 Joint and Cooperative Agreement (JCA) for Boundary Change between the BCWMC, the City of Minneapolis, and the Mississippi Watershed Management Organization (MWMO).

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The BCWMC Engineer evaluated the following alternatives:

- Existing Conditions: Evaluate the XP-SWMM model with no modifications for the TP-40 100-year, 24-hour design storm event to serve as the existing conditions reference.
- Proposed connection: Evaluate the impact of the proposed Southwest LRT connection for the TP-40 100-year, 24-hour design storm event.

The BCWMC Engineer's January 2016 evaluation indicated that the connection would result in a 0.01-foot increase in the 100-year flood elevation at the tunnel inlet. The BCWMC Engineer provided the models to the Southwest LRT consultant to evaluate alternatives to mitigate the increase in flood elevation.

The Southwest LRT consultant used the entire BCWMC XP-SWMM Phase I model to evaluate the Glenwood Avenue connection to the tunnel, and the impact of the proposed best management practices (BMPs) at the Bassett Creek Valley (Van White Avenue) station, just upstream of the tunnel inlet. The reductions in peak flow provided by the proposed Bassett Creek Valley station BMPs mitigate the increases in peak flow caused by the proposed Glenwood Avenue connection.

Following is a summary of key findings of the tunnel connection modeling analysis:

- Based on the model results, with the upstream peak flow mitigation at the Bassett Creek Valley Station, the relative impact of the connection of the proposed Southwest LRT watersheds to the tunnel at Glenwood Avenue results in no increase (i.e., less than 0.00-ft increase) in the flood elevation at the inlet to the tunnel.
- Under proposed Southwest LRT connection conditions, the model results show no increases in the expected peak discharge at the tunnel inlet and immediately downstream of the proposed Glenwood Avenue connection, when compared to existing conditions.
- Under existing and proposed conditions, the tunnel is pressurized (i.e., the water level/hydraulic grade line is above the top of the tunnel) during the 100-year event, beginning at a point approximately 1,600 feet upstream of point A and continuing downstream to the river. Based on the modeling results, there is no increase in the pressurization.
- Based on the HydroCAD modeling provided by the Southwest LRT project office, the proposed conditions peak discharges leaving the site are less than the existing conditions peak discharges for the 2-yr, 10-yr, and 100-year design storm events. However, under proposed conditions, the flows would be redirected to the new tunnel system, which requires BCWMC approval and MnDOT approval (based on the 1977 agreement between MnDOT and the City of Minneapolis).

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## Recommendation

Conditional approval of the connection of the area around the Southwest LRT at Glenwood Avenue to the BCWMC tunnel system, based on the following comments:

1. Mitigating storage at the Bassett Creek Valley Station must be provided prior to completion of the direct connection to the Bassett Creek storm water tunnel. If additional mitigation is needed upon final evaluation (100% design plans), the City of Minneapolis will work with the SWLRT and the BCWMC Engineer to achieve the necessary mitigation.
2. Approval for the connection and/or change in tributary area must be obtained from MnDOT.
3. Final plans and documentation must be submitted to the BCWMC Engineer for administrative review and approval. These submittals should include the 100% design plans, updated XP-SWMM modeling, and the digital watershed divides.
4. Drawings and supporting information must be submitted to the BCWMC Engineer for separate review as part of the BCWMC project review program.

March 9, 2016

Mr. James de Lambert, Chair  
Bassett Creek Watershed Management Commission  
c/o Keystone Waters, LLC  
16145 Hillcrest lane  
Eden Prairie MN 55346

Dear Mr. de Lambert,

The City of Minneapolis requests the Commission's consideration of the following item:

- A direct connection to the new Bassett Creek Tunnel associated with the Southwest Light Rail Transit (SWLRT) project.

The SWLRT project has submitted preliminary plans, modeling, and other required information needed to review the effect of this proposal to Barr Engineering, the Commission's engineer. Barr is performing analysis to ensure there will be no adverse effects on the discharge capacity of the tunnel or the flood level at the inlet to the tunnel.

We understand that the approval is conditional on meeting the requirements of the review by the Commission's engineer for consistency with the September 28, 2000 JOINT AND COOPERATIVE AGREEMENT FOR BOUNDARY CHANGE made by and between the City of Minneapolis, the Bassett Creek Watershed Management Commission, and the Middle Mississippi river Watershed Management Organization.

The City of Minneapolis appreciates the Commission's consideration of this item, and looks forward to working with the Commission to address any concerns this item may raise.

Sincerely,

Steven A. Kotke  
City Engineer, Director of Public Works

Cc: Karen Chandler, Barr Engineering  
Kelly Moriarity, Public Works Surface Water & Sewers Division  
Lois Eberhart, Public Works Surface Water & Sewers Division