



## Memorandum

**To:** Bassett Creek Watershed Management Commission  
**From:** Barr Engineering Co.  
**Subject:** Item 5A – Consider Conditional Approval of Southwest Light Rail Transit (SWLRT) Project Plans and Extension of Approval Expiration Date  
BCWMC June 16, 2016 Meeting Agenda  
**Date:** June 8, 2016  
**Project:** 23270051 2016 2083

### 5A Consider Conditional Approval of Southwest Light Rail Transit (SWLRT) Project Plans and Extension of Approval Expiration Date – Minneapolis

#### Summary:

**Proposed Work:** Construction of a new LRT project along a corridor from Minneapolis to Eden Prairie, including stations, tracks, and park & ride features

**Basis for Commission Review:** Linear (tracks and stations) construction project disturbing over 5 acres

**Impervious Surface Area:** Increase in impervious area by approximately 1.1 acres

#### **Recommendation:**

- (1) Conditional approval
- (2) Upon final BCWMC approval, extend approval expiration date (of approved plans) through December 2020

### General Background & Comments

*(Note: As described later in this memo, the Commission approved SWLRT's requested connection to the new Bassett Creek tunnel at their March 17, 2016 meeting. A condition of that approval was that "drawings and supporting information must be submitted to the BCWMC Engineer for separate review as part of the BCWMC project review program.")*

The proposed SWLRT project is a 16-mile extension of the Green Line/Central Corridor LRT. The SWLRT drawings and reports submitted to the BCWMC are currently under review by the Federal Transit Authority (FTA) and approval of the Record of Decision (ROD) is anticipated for Q3 2016. Additionally, due to revenue service being projected to begin in 2020, the SWLRT project is requesting the BCWMC extend the review approval through December 31, 2020, longer than the 2 years allowed for with the issuance of a BCWMC approval, per the September 2015 BCWMC Requirements for Improvements and Development Proposals (Requirements) document.

Additionally, due to recent inaction at the State Legislature, funding for the SWLRT project was put on hold and much of the SWLRT project team, including the consultants, are not currently working on the

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project. As a result, the BCWMC Engineer could not clarify any of our review comments with the project water resources staff prior to development of this review memo.

Approximately two miles of the proposed SWLRT project corridor falls within the boundaries of the Bassett Creek watershed, in the City of Minneapolis. Within the Bassett Creek watershed, the project includes freight rail, light rail, paved trails, associated support facilities, and two stations. The three project segments within the Bassett Creek watershed are Segments E4-1A, E4-1B, and E4-2 (see attached map). The SWLRT project team submitted a separate stormwater management plan for each segment; they also provided project-wide construction plans and Stormwater Pollution Prevention Plan (SWPPP).

The entire project will disturb approximately 485 acres and will increase the imperviousness by 37.9 acres, from 196.1 acres to 234 acres (19.3% increase). For the segments within the Bassett Creek watershed, the following table summarizes the project segment, the general scope of the work, the watershed area, and the existing and proposed imperviousness. In the Bassett Creek watershed, the proposed project would result in a net increase of 1.1 acres in impervious area over existing conditions.

<b><i>Project Segment</i></b>	<b><i>General Scope</i></b>	<b><i>Existing Total Watershed Area (ac)</i></b>	<b><i>Existing Impervious Area (ac)</i></b>	<b><i>Proposed Total Watershed Area (ac)</i></b>	<b><i>Proposed Impervious Area (ac) (Change from Existing)</i></b>
E4-1A	Reconstruction of bike/ped trail, LRT tracks, Bryn Mawr Station and ped bridge, passenger drop off lane, side walk additions and safety improvements at Wayzata Blvd and Penn Ave	58.8	12.2	58.8	14.4 (+2.2)
E4-1B	Construction of rec trails, ped bridge from Luce Line Trail to Bassett Creek Valley (BCV) Station, LRT tracks, BCV station, and passenger drop off lane	37.4	25.3	37.5	23.0 (-2.3)
E4-2	Conversion of existing corridor to a combined parallel freight rail, ped trail, LRT guideway section, Glenwood LRT Bridge, replacement of adjoining Glenwood Ave bridge decks	9.7	3.8	9.6	5.0 (+1.2)

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## Floodplain

The project does not involve work in the Bassett Creek 100-year floodplain.

## Wetlands

The City of Minneapolis is the LGU for administering the Minnesota Wetland Conservation Act (WCA). According to the application, the SWLRT project within the Bassett Creek watershed will not impact any wetlands. No wetlands were identified within Segment E4-1B or Segment E4-2. Segment E4-1A contains DOT-MPL-11, a PEMC Type 3 shallow marsh that is part of the highway drainage system per the SWLRT project team's 10-02-2014 Wetland Delineation Report. This wetland is a regional MnDOT-owned treatment pond and is located south of the proposed drop-off lane for access to Bryn Mawr Station southeast of Penn Ave. S and I-394. According to the segment E4-1A stormwater management plan, it is the SWLRT project team's understanding that the pond is not subject to WCA regulation because it was created incidentally as part of the I-394 construction in the 1980's. This needs to be confirmed by the City of Minneapolis.

## Stormwater Management

The BCWMC Requirements document requires that projects containing more than 1 acre of new or redeveloped impervious area must be managed such that proposed peak flows leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events based on Atlas 14 precipitation depths, using the 24-hour nested distribution.

Under existing conditions, the watersheds within Segments E4-1A and E4-1B ultimately drain to Bassett Creek (and the new Bassett Creek tunnel). The existing watersheds within Segment E4-2 are technically within the jurisdiction of the Mississippi Watershed Management Organization (MWMO) and ultimately drain to the old Bassett Creek tunnel; however under proposed conditions, the watersheds within Segment E4-2 will be connected to the new Bassett Creek tunnel (see additional discussion below).

For the proposed stormwater management system within the Segment E4-1A, the following table summarizes the existing and proposed peak discharges from the project area to Bassett Creek:

<b><i>Storm Event</i></b>	<b><i>Existing Peak Discharge (cfs)</i></b>	<b><i>Proposed Peak Discharge (cfs)</i></b>
2-year	21.16	20.20
10-year	47.13	47.54
100-year	115.32	117.52

In this segment, there is a slight increase in the peak discharge from the 10- and 100-year design storm events.

For the proposed stormwater management system for Segment E4-1B, the following table summarizes the existing and proposed peak discharges from the project area to Bassett Creek:

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<b>Storm Event</b>	<b>Existing Peak Discharge (cfs)</b>	<b>Proposed Peak Discharge (cfs)</b>
2-year	19.91	5.07
10-year	32.82	10.36
100-year	68.59	36.69

For the proposed stormwater management system for Segment E4-2, the following table summarizes the existing peak discharge to the old Bassett Creek tunnel and proposed peak discharges to the new Bassett Creek tunnel. *(As part of this project, the SWLRT requested connection of the drainage from the proposed stormwater BMPs in Segment E4-2 to the new Bassett Creek tunnel near Glenwood Avenue. This tunnel connection was evaluated in December 2015-January 2016 and approved by the Commission at their March 17, 2016 meeting.)*

<b>Storm Event</b>	<b>Existing Peak Discharge (cfs) (to Old Bassett Creek Tunnel)</b>	<b>Proposed Peak Discharge (cfs) (to New Bassett Creek Tunnel)</b>
2-year	8.63	8.42
10-year	19.43	19.31
100-year	46.29	42.66

## Water Quality Management

Within the Bassett Creek watershed, the SWLRT project is a linear project that will create one acre or greater of new and/or fully reconstructed impervious surfaces. Per the BCWMC Requirements document, the project must capture and retain the larger of 1) 0.55 inches of runoff from the new and fully reconstructed impervious surfaces, or 2) 1.1 inches of runoff from the net increase in impervious area. Per the MIDS design sequence flow chart, the volume reduction techniques considered to “capture and retain” runoff are to include infiltration, rainwater harvesting and reuse, bioretention, permeable pavement, tree boxes, grass swales and/or additional techniques included in the MIDS calculator or the Minnesota Stormwater Manual (i.e., infiltration practices). If the applicant is unable to meet the performance goal due to site restrictions, the Requirements document requires that the applicant use the MIDS flexible treatment options approach, following the MIDS design sequence flow chart.

Under existing conditions, there is limited water quality treatment within the watersheds in the BCMWC that are included with SWLRT project segments E4-1A, E4-1B, and E4-2.

Per the stormwater management plan for segment E4-1A, 0.55 inches of runoff from the new and fully reconstructed impervious surfaces is the larger volume, resulting in a required “capture and retain” (infiltration) volume of 0.356 acre-feet (15,491 cubic feet). Several different BMPs are proposed within segment E4-1A, including three (3) infiltration basins and six (6) filtration basins. Because of extensive areas of contamination and shallow groundwater, infiltration was not possible at many sites. There are also several other BMPs included to provide pretreatment and/or rate control. The following summarizes the estimated filtration and infiltration volumes provided by the BMPs in segment E4-1A:

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<b><i>BMP Type</i></b>	<b><i>Volume Provided (cubic feet)</i></b>
Infiltration	2,457
Filtration	32,158

Per the stormwater management plan for segment E4-1B, 0.55 inches of runoff from the new and fully reconstructed impervious surfaces is the larger volume, resulting in a required “capture and retain” (infiltration) volume of 0.264 acre-feet (11,497 cubic feet). Several different BMPs are proposed within segment E4-1B including four (4) infiltration basins and four (4) filtration basins. Because of extensive areas of contamination, infiltration was not possible at many sites. The following summarizes the estimated filtration and infiltration volumes provided by the BMPs in segment E4-1B:

<b><i>BMP Type</i></b>	<b><i>Volume Provided (cubic feet)</i></b>
Infiltration	4,766
Filtration	37,004

Per the stormwater management plan for segment E4-2, 0.55 inches of runoff from the new and fully reconstructed impervious surfaces is the larger volume, resulting in a required “capture and retain” (infiltration) volume of 0.139 acre-feet (6,073 cubic feet). Several different BMPs are proposed within segment E4-2 including two (2) infiltration basins and one (1) filtration basin. Because of contamination, infiltration was not possible at all sites. The following summarizes the estimated filtration and infiltration volumes provided by the BMPs in segment E4-2:

<b><i>BMP Type</i></b>	<b><i>Volume Provided (cubic feet)</i></b>
Infiltration	5,823
Filtration	2,515

The MIDS calculator was used to evaluate the proposed stormwater BMPs intended to improve water quality and the results were summarized in the storm water management plans submitted for each segment within the Bassett Creek watershed.

For segment E4-1A, because of the lack of space within the right-of-way, extensive contamination, and areas of high groundwater, the project is pursuing Flexible Treatment Option (FTO) Alternative Number 2 in accordance with the MIDS Design Flow Chart. FTO No. 2 includes achieving volume reduction to the maximum extent practical, removing 60 percent annual total phosphorus load, and considering relocation of project elements to address varying soil conditions and other constraints across the site. However, as summarized in the Stormwater Management Plan for Segment E4-1A (April 29, 2016), the proposed stormwater management system in segment E4-1A does not meet MIDS FTO No. 2. The Stormwater Management Plan also indicates that pursuing FTO No. 3, which includes additional offsite mitigation within segments E4-1B and E4-2 (the other segments within the Bassett Creek watershed) is not possible due to contamination in these area.

For segment E4-1B, because of the lack of space within the right-of-way, extensive contamination, and areas of high groundwater, the project is pursuing Flexible Treatment Option (FTO) Alternative Number 2, in accordance with the MIDS Design Flow Chart. FTO No. 2 includes achieving volume reduction to the maximum extent practical, removing 60 percent annual total phosphorus load, and considering relocation

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of project elements to address varying soil conditions and other constraints across the site. As summarized in the Stormwater Management Plan for Segment E4-1B (April 29, 2016), the proposed stormwater management system in segment E4-1A meets MIDS FTO No. 2.

For segment E4-2, because of contamination limiting infiltration in the area, the project is pursuing Flexible Treatment Option (FTO) Alternative Number 2, in accordance with the MIDS Design Flow Chart. FTO No. 2 includes achieving volume reduction to the maximum extent practical, removing 60 percent annual total phosphorus load, and considering relocation of project elements to address varying soil conditions and other constraints across the site. As summarized in the Stormwater Management Plan for Segment E4-2 (April 29, 2016), the proposed stormwater management system in segment E4-2 meets MIDS FTO No. 2.

<b><i>Segment</i></b>	<b><i>Average Annual TSS Removal (%)</i></b>	<b><i>Average Annual TP Removal (%)</i></b>
E4-1A	69	42
E4-1B	88	62
E4-2	76	61

## **Erosion and Sediment Control**

Since the area of land disturbance (for linear projects) is greater than one acre, the proposed project must meet the BCWMC construction erosion and sediment control requirements. Proposed temporary erosion control features include: silt fence, sediment control logs, floating silt fence, rock construction entrances, erosion control blanket, and inlet protection.

## **Review Process**

Section 3.1 (8) of the BCWMC Requirements document states that “application approvals expire two years from the date of approval.” Due to the revenue service being currently projected to begin in 2020, the SWLRT requests that the BCWMC extend the approval through December 2020.

## **Recommendation**

Conditional approval based on the following comments:

1. For segment E4-1A, if the applicant is unable to meet the peak rate control requirement for the 10- and 100-year design storm events, the applicant must request a variance from the BCWMC’s rate control requirements.
2. For segment E4-1A, if the applicant is unable to meet MIDS flexible treatment options, including FTO No. 3 (meeting treatment offsite within the watershed), the applicant must request a variance from the MIDS requirements.
3. To assist in the review of the project, the applicant should provide a single table that expands on the BMP design parameters tables included in the stormwater management plans for each

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segment, including information summarized in several other tables within the documents provided. For example, including the proposed BMP type, assumed infiltration/filtration rate, depth of BMP, if it has been included in the HydroCAD model, and if it is evaluated in the MIDS calculator (if it is intended for water quality treatment). There were several places where the tables in the reports and model summary files conflicted with each other and with the tables and labels within the plan set.

4. For segment E4-1A, the BMPs listed in Table 4 in the stormwater management plan and in Table 11 of the SWPPP document do not appear to match (BMPs appear to be missing between the two tables). Additionally, the BMPs included in the HydroCAD model and the MIDS calculator do not appear to be complete (see comments 3 & 4 below). The applicant must clarify the BMPs included in segment E4-1A.
5. For segment E4-1A, the total area and imperviousness entered in the proposed conditions HydroCAD model do not match the total area and imperviousness as summarized in the stormwater management plan narrative and watershed tables provided. It appears that BMP 724 is not included in the HydroCAD model. The applicant must revise the model or clarify the difference in watershed areas and number of BMPs.
6. For segment E4-1A, the total area and imperviousness included in the MIDS calculator is significantly less than those summarized in the stormwater management plan narrative and watershed tables provided. Additionally, per the stormwater management plan narrative, there are three (3) infiltration basins and six (6) filtration basins in this segment to provide water quality treatment. However the MIDS model inputs include only five (5) BMPs. The applicant must revise the MIDS calculator or clarify the difference in the areas and imperviousness and number of BMPs included in the MIDS calculator.
7. For segment E4-1B, the BMPs listed in Table 5 in the stormwater management plan and in Table 11 of the SWPPP document do not appear to match (there appears to be missing BMPs between the two tables). The applicant must clarify the BMPs included in segment E4-1B.
8. For segment E4-1B, the imperviousness entered in the existing conditions HydroCAD model does not match the imperviousness as summarized in the stormwater management plan narrative and watershed tables provided. The applicant must revise the model or clarify the difference in watershed areas.
9. For segment E4-1B, the total area and imperviousness included in the MIDS calculator is significantly less than those summarized in the stormwater management plan narrative and watershed tables provided. Additionally, per the stormwater management plan narrative, there are four (4) infiltration basins and four (4) filtration basins in this segment to provide water quality treatment. However the MIDS calculator BMP inputs include only inputs for five (5) of the BMPs. The applicant must revise the MIDS calculator or clarify the difference in the areas and imperviousness and BMPs included in the MIDS calculator.

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10. For segment E4-2, the total area and imperviousness included in the MIDS calculator is less than those summarized in the stormwater management plan narrative and watershed tables provided. Additionally, per the stormwater management plan narrative, there are two (2) infiltration basins and one (1) filtration basins in this segment to provide water quality treatment. However in the MIDS model inputs include only two (2) BMPs. The applicant must revise the MIDS calculator or clarify the difference in the areas and imperviousness and number of BMPs included in the MIDS calculator.
11. Review of the Filtration Basin with Liner and Filtration Basin sections on sheet 330 of 663 in Volume 8B indicates that the filtration media is a combination of 70% sand and 30% organic matter meeting the Mix B blend. For the MIDS calculator evaluation of filtration practices, the applicant should use soil mix B for all filtration BMPs, which is a soil amendment used to attenuate phosphorus.
12. Review of the Filtration Basin with Liner and Filtration Basin sections on sheet 330 of 663 in Volume 8B indicates that the thickness of the filter media is 36" but indicates that the media depth will vary depending on the drintile invert elevation. It appears that for many of the filtration basins, 36" of media will be provided between the bottom of the basin and the invert of the drintile. However, there appears to be a conflict between the table summarizing filtration basins with liners on Sheet 330 or 663 of Volume 8B and the labels of the BMP on the drainage plans and profiles of Volume 8B. For example, BMP 711A is listed as a filtration basin with a liner, but on the drainage plans, this BMP is listed as an infiltration basin. The applicant must clarify the types of BMPs as summarized in the tables (for filtration basins, dry basins, and infiltration basins) and as labeled on the plan sheets. The applicant should verify that those filtration practices provide 36" of filter media.
13. Three feet of separation is typically required between the bottom of a filtration or infiltration system and the seasonally high groundwater table. It appears that there are numerous BMPs within the project area that will not meet this requirements. The applicant should demonstrate that their BMPs are appropriate given the site conditions (see suggestion in comment 1 above).
14. The Filtration Basin with Liner, Filtration Basin, Dry Basin with liner, and Infiltration Basin sections on sheet 330 and 331 of 663 in Volume 8B do not show typical side slopes for these BMPs. It is recommended that the maximum side slopes for these practice is 3:1 (h:v). The applicant should include the typical side slopes as proposed for these practices.
15. The Filtration Basin with Liner, Filtration Basin, and Infiltration Basin sections on sheet 330 and 331 of 663 in Volume 8B do not show typical depths for these BMPs. These BMPs must completely draw down within 48 hours. Based on the stormwater management plan narratives, it appears that an infiltration rate of 1.63 inches per hour is being used for filtration practices and a rate of 0.8 or 0.45 inches per hour are used for infiltration basins, depending on the local soil types. The applicant should include the typical depths for the specific practices and ensure that the proposed practices as designed achieve the required drawdown within 48 hours.



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16. Pretreatment should be provided prior to all infiltration and filtration BMPs. This can include filter strips, use of a sump manhole and/or SAFL baffle with a 3' minimum sump. The applicant must verify that pretreatment has been provided prior to all infiltration and filtration BMPs.
17. Based on review of the drainage plans and profiles, it is not clear if emergency overflows at the surface are required at some of the BMPs. If a surface emergency overflow is required from some of these storage areas, the applicant must show the location of these overflow features on the plans and provide a typical section for the proposed emergency overflow.
18. Section 8.2 of the SWPPP document calls out the use of Type 3 Mulch as a temporary stabilization measure. Per the BCWMC requirements document, all temporary or permanent mulch must be applied by mechanical or hydraulic means and stabilized by disc-anchoring or use of hydraulic soil stabilizers. The SWPPP document should be revised to reflect these application and stabilization measures.
19. Inlet protection should be shown on all proposed catch basins or manholes with grates. Confirm that inlet protection is specified where required, including at the following locations:
  - Existing CB on sheet 530 of Volume 8B
  - Existing CB on sheet 535 of Volume 8B (appears that this structure will be removed)
  - Existing CB within limits of disturbance on sheet 536 of Volume 8B
  - Existing CBs just outside limits of disturbance on sheet 536 of Volume 8B
  - Existing CBs on sheet 537 of Volume 8B
  - Existing CBs on sheet 538 of Volume 8B
  - Existing CBs within limits of disturbance on sheet 539 of Volume 8B
  - Existing CB on sheet 540 of Volume 8B
  - Existing CB just outside limits of disturbance on sheet 541 of Volume 8B
  - 69285-CB (Proposed) on sheet 545 of Volume 8B
  - Existing CBs outside limits of disturbance on sheet 549 of Volume 8B
  - Existing CB just outside limits of disturbance on sheet 551 of Volume 8B
20. Confirm that all flared end sections have appropriate energy dissipation, including the following locations:
  - 6761-FES, 6750-FES, 6751-FES on sheet 534 of Volume 8B
  - 6880-FES on sheet 552 of Volume 8B

BCWMC requires that energy dissipation be used at all stormwater outfalls, specifically:

- Outfalls with outlet velocities less than 4 feet per second (fps) that project flows downstream in a direction 30 degrees or less from the normal flow direction generally shall not require energy dissipaters or stilling basins, but may need some riprap protection.
- Energy dissipaters shall be sized to provide an average outlet velocity of no more than 6 fps. If riprap is also used, the average outlet velocity may be increased to 8 fps.

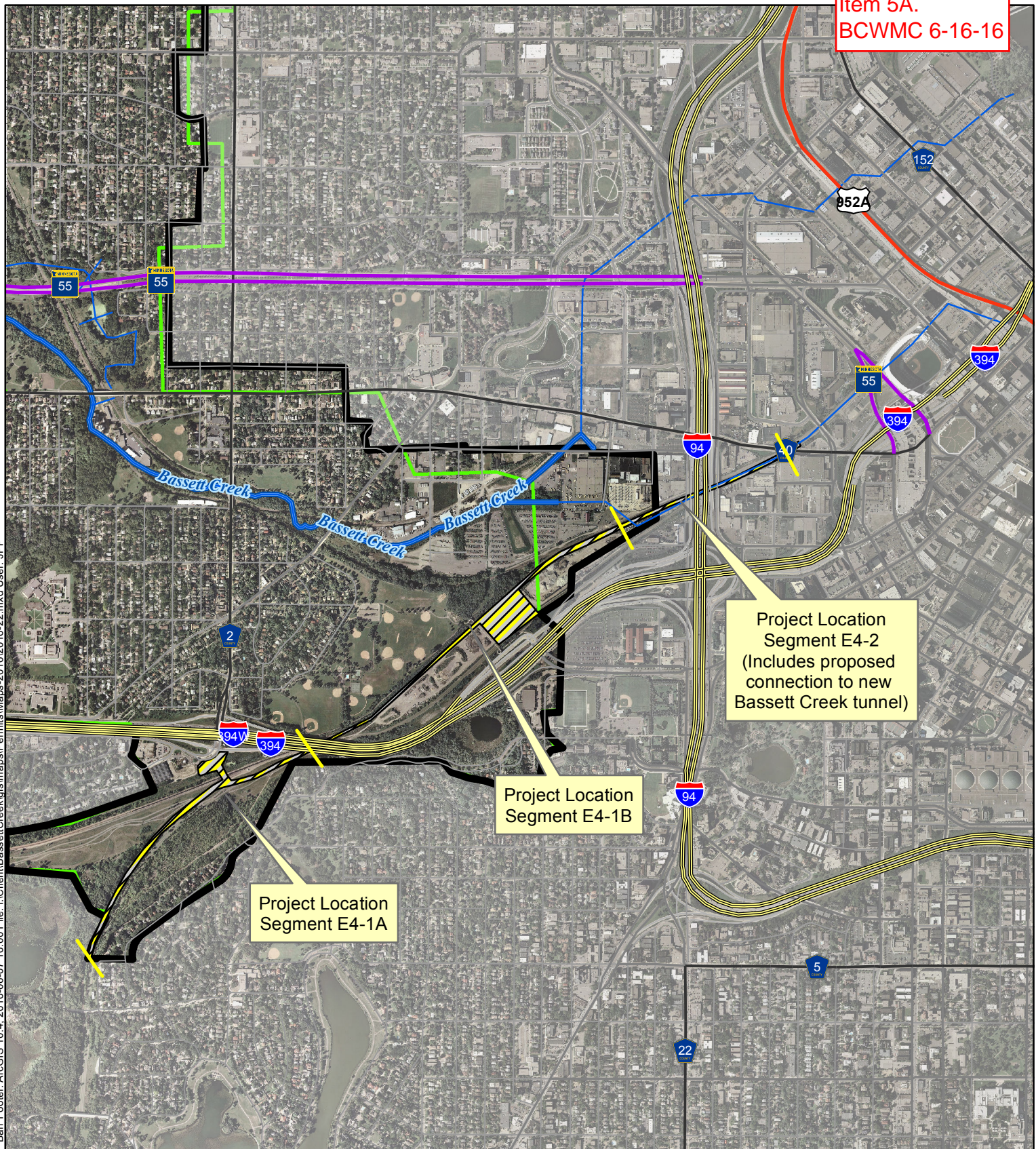
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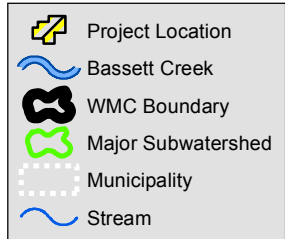
21. Ensure proper alignment of erosion control blanket; erosion control blanket appears misaligned from basin on sheet 545 of Volume 8B
22. Confirm silt fence is specified where necessary and use appropriate symbology to depict the silt fence, including in the following locations:
  - Northeast basin on sheet 545 of Volume 8B
  - Eastern basin on sheet 552 of Volume 8B
  - Two basins on sheet 534 of Volume 8B
  - Basins on sheet 553 of Volume 8B
  - Basins on sheet 554 of Volume 8B
23. Add the following erosion control notes to the erosion control note plan sheet or SWPPP document:

A temporary vegetative cover must be provided consisting of a suitable, fast-growing, dense grass-seed mix spread at a minimum at the MnDOT-specified rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.
24. For plan sheets including segments E4-1A, E4-1B, and E4-2, there appear to be no construction entrances/exits. The applicant must show the construction entrances/exits on the erosion control plans (if applicable) and provide the construction entrance detail.
25. Revised drawings and supporting information (paper copy and final electronic files) must be provided to the BCWMC Engineer for final review and administrative approval.

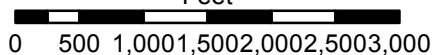




Imagery Source: Aerial Express (2009)



Feet



**LOCATION MAP  
APPLICATION 2016-17  
Southwest LRT  
Minneapolis, MN**