

# Feasibility Report for Bryn Mawr Meadows Water Quality Improvement Project

## Minneapolis, MN

January 2019



Prepared for  
Bassett Creek Watershed Management Commission



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Appendix B	Site Topographic Survey
Appendix C	Preliminary Geotechnical Report
Appendix D	Wetland Delineation Report
Appendix E	Opinion of Cost

## Certifications

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

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Michelle Kimble  
PE #: 42012

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date  
Date

# 1.0 Background

The Bassett Creek Watershed Management Commission's (BCWMC) 2015-2025 Watershed Management Plan (Plan, Reference (1)) addresses the need to improve the quality of stormwater runoff reaching the Mississippi River by reducing nonpoint source pollution, protecting and enhancing fish and wildlife habitat, reducing stormwater runoff volume to improve water quality, and taking into account aesthetics and recreational opportunities within the watershed. This project is consistent with the goals (Section 4.1) and policies (Sections 4.2.1 and 4.2.10) in the Plan. The Plan's 10-year Capital Improvement Program (CIP, Table 5-3 in the Plan) includes project BC-5 Bryn Mawr Meadows Water Quality Improvement Project. The BCWMC approved the 5-year (working) CIP at their March 16, 2017 meeting, which included implementation of the Bryn Mawr Meadows Water Quality Improvement Project in 2019.

The Bryn Mawr Meadows Water Quality Improvement Project was originally recommended as a 2016 CIP project, however it was decided to defer the project to 2020 to be more in line with the Minneapolis Park & Recreation Board's (MPRB) master plan process. MPRB's Bryn Mawr Meadows Park master plan is still in process, but they have selected two preferred master plan alternatives. Both alternatives include areas for water quality treatment and are attached in Appendix A. After the public comment period is over, one master plan will be chosen and presented to at the MPRB board. MPRB will design the park reconstruction in 2021 and start construction in 2022. MPRB will be responsible for meeting BCWMC water quality requirements for the site when the park is redeveloped. This CIP project will treat stormwater runoff above and beyond those requirements. This study examines the feasibility of constructing water quality improvements within the park to treat stormwater runoff from areas adjacent to Bryn Mawr and tributary to Bassett Creek.

## 1.1 Project Area Description

Bryn Mawr Meadows Park is a 51-acre park located in Minneapolis in the southeastern portion of the Bassett Creek watershed, southwest of the intersection of Interstate 394 and 94 (Figure 1-1). The park is bordered by Morgan Avenue S on the west, Interstate 394 on the east and south, and the Canadian Pacific rail line on the north. The city of Minneapolis impound lot and Bassett Creek are located north of the park and rail line. The park contains walking and biking paths, parking lot, broomball rink, cricket field, picnic area, playground, restroom, soccer fields, softball fields, tennis courts, basketball court, wading pool, and batting cages. The land use in the areas surrounding Bryn Mawr is low density residential, park, and industrial (Figure 1-2).

The MPRB master plan development is ongoing, but currently shows two preferred alternatives which include rearranging, adding and deleting some of the park's uses, including a new parking lot, and possibly an indoor/outdoor building. Both alternatives show areas in the north and central portion of the site to be used for "storm water enhancements". In general the park drains from the south to the north, with the north end being at the lowest elevation and most suitable to use for collecting and treating stormwater runoff. MPRB will need to meet BCWMC's water quality treatment requirements for the site, no matter which option is chosen. This feasibility study evaluates possible options that would go above

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and beyond BCWMC's water quality treatment requirements, with the intention of treating some of the untreated or undertreated runoff from upstream areas.

### **1.1.1 Subwatershed Draining Through Bryn Mawr Meadows Park**

The subwatershed tributary to the storm sewer through Bryn Mawr Meadows Park is approximately 267 acres (Figure 1-3); the storm sewer in the park discharges into Bassett Creek. Most of the subwatershed is located within Minneapolis, with a very small portion in Golden Valley. Land use is primarily comprised of low-density residential, park and recreational, and railroad (Figure 1-2).

One hundred eighty one (181) acres of the watershed drains into Penn Pond, owned by the Minnesota Department of Transportation (MnDOT), and located southwest of the Interstate 394 and Penn Avenue interchange. Penn Pond outlets via a 24-inch diameter storm sewer located below Interstate 394. The 24-inch storm sewer becomes a 42-inch storm sewer and continues along Morgan Avenue South, collecting additional drainage from surrounding park and residential areas. Near the north end of Bryn Mawr Meadows Park, the Morgan Avenue South storm sewer joins with park storm sewer. From that junction, a 66-inch reinforced concrete pipe continues under the railroad, under the city of Minneapolis impound lot, and outlets into Bassett Creek.

Existing information about Penn Pond is limited; based on the BCWMC engineer's observations during a site visit, the pond may not be functioning to its fullest potential. The BCWMC engineer held discussions with MnDOT staff; see Section 3.5 of this report for descriptions of these discussions. The BCWMC engineer used assumptions from the existing BCWMC water quality model as the basis for the water quality modeling for this feasibility study. The BCWMC model estimated the pond size based on aerial imagery and assumed a pond depth of approximately 6.5 feet deep from outlet invert to pond bottom (water quality storage). The actual water quality depth of the pond is important, as it impacts the sediment and phosphorus removal effectiveness for concepts 2 and 3. Therefore, the BCWMC engineer recommends that MnDOT survey and dredge accumulated sediments from the pond to maximize the pond's water quality treatment benefits. An additional dry storm basin located under Interstate 394, east of Penn Avenue, is a surge basin for Penn Pond. There is a piped outlet from Penn Pond to the surge basin, but no other outlet from the surge basin. When Penn Pond drains, the surge basin drains back into Penn Pond. It appears the surge basin overtops on occasion, and the overflow from the basin flows into the south end of Bryn Mawr Meadows Park.

### **1.1.2 Site Topographic Survey**

Barr completed a site topographic survey in 2017. The site topographic survey is included in Appendix B.

### **1.1.3 Soil Borings**

Barr completed four soil borings in April 2018. Soils are generally characterized as six to fourteen feet of fill, with organic or fat clays beneath the fill. Fat clays are very soft and are not conducive to supporting any type of structure. Any concrete pipe, concrete structures, or other structures will need to be installed on piles to prevent settlement. Plastic pipe is likely light enough to be installed without piles, but installation of all pipes and structures should be evaluated in final design. The feasibility study opinion of

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costs assume the pond outlet structure will be on piles, but all storm sewer will be plastic and not on piles. Groundwater was observed three to six feet below grade. The preliminary geotechnical engineering report with boring locations and logs is included in Appendix C.

#### 1.1.4 Cultural Resources

Barr completed a desktop Cultural Resources Review for the project area. A Minnesota State Historic Preservation Office (SHPO) database request resulted in several hundred residential structures in the area surrounding the park being identified as historic sites. The railroad bordering the north edge of the site is also considered historic. There were no historic sites identified within the park limits. The concepts discussed in this study would not disturb any of the historic sites identified in the area.

#### 1.1.5 Wetland Delineations

Barr completed wetland delineations within the park in 2017. Four wetlands were delineated, but are not located in the conceptual design areas of the site and therefore should not impact potential water quality work. The wetland delineation report can be is located in Appendix D.

#### 1.1.6 Bassett Creek Floodplain

BCWMC published their Phase II XP-SWMM model for Bassett Creek and its contributing watersheds in 2017. According to the model, the 100-year flood elevation for Bassett Creek, in the vicinity of Bryn Mawr Meadows Park, is 812.9 feet NAVD88. A portion of the northwest corner of the site is within the 100-year floodplain, however this area appears to be outside of the BCWMC jurisdictional floodplain, which means that the floodplain is managed by the City of Minneapolis, not the BCWMC. The water quality concepts developed as part of this study are not expected to result in fill in the floodplain and may even provide additional floodplain storage. Should any fill be placed within the 100-year floodplain, it must be mitigated and is subject to BCWMC and city approval.

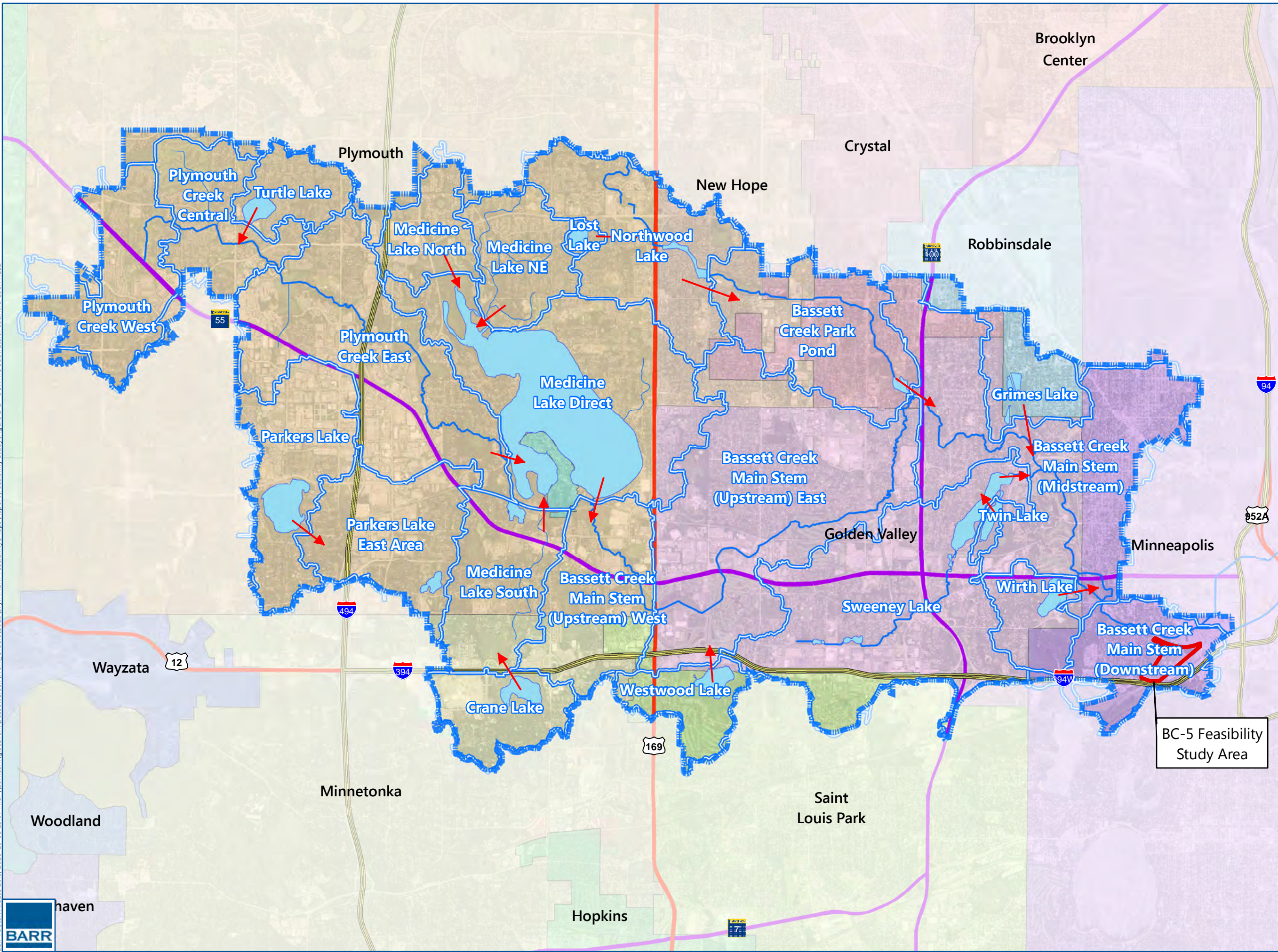
### 1.2 Hydrologic and Hydraulic Models







As part of this study, the water quality concepts were analyzed using the latest version of the BCWMC Phase II XP-SWMM model. The XP-SWMM model was clipped to the local drainage area and the proposed water quality concepts were built into the model to evaluate the proposed features' effect on the overall drainage system. This effort should be expanded and refined during final design when selecting BMP and pipe sizes.

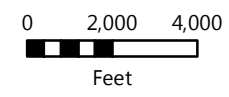
### 1.3 Water Quality Models

The BCWMC published their P8 water quality model for Bassett Creek and its contributing watersheds in 2012. As part of this study, Barr analyzed the water quality concepts using the latest version of the BCWMC P8 water quality model. Barr clipped the P8 model to the local drainage area and built the proposed water quality concepts into the model to evaluate the proposed features' effect on the overall treatment. Section **Error! Reference source not found.** summarizes the results of this analysis. Barr recommends refining this effort during final design and incorporating the constructed improvements into the BCWMC's P8 model after completion of the project.

Barr Footer: ArcGIS 10.6, 2018-10-08 15:07 File: \\barr.com\gis\client\BassettCreek\Work\_Orders\2018\Bryn Mawr Feasibility\Maps\Report\Figure 1-1 - BCWMC Subwatersheds.mxd User: RCS2



-  Flow Directions
-  BCWMC Priority Streams
-  BC-5 Feasibility Study Area
-  Major Subwatersheds
-  Lakes and Ponds
-  BCWMC Jurisdictional Boundary



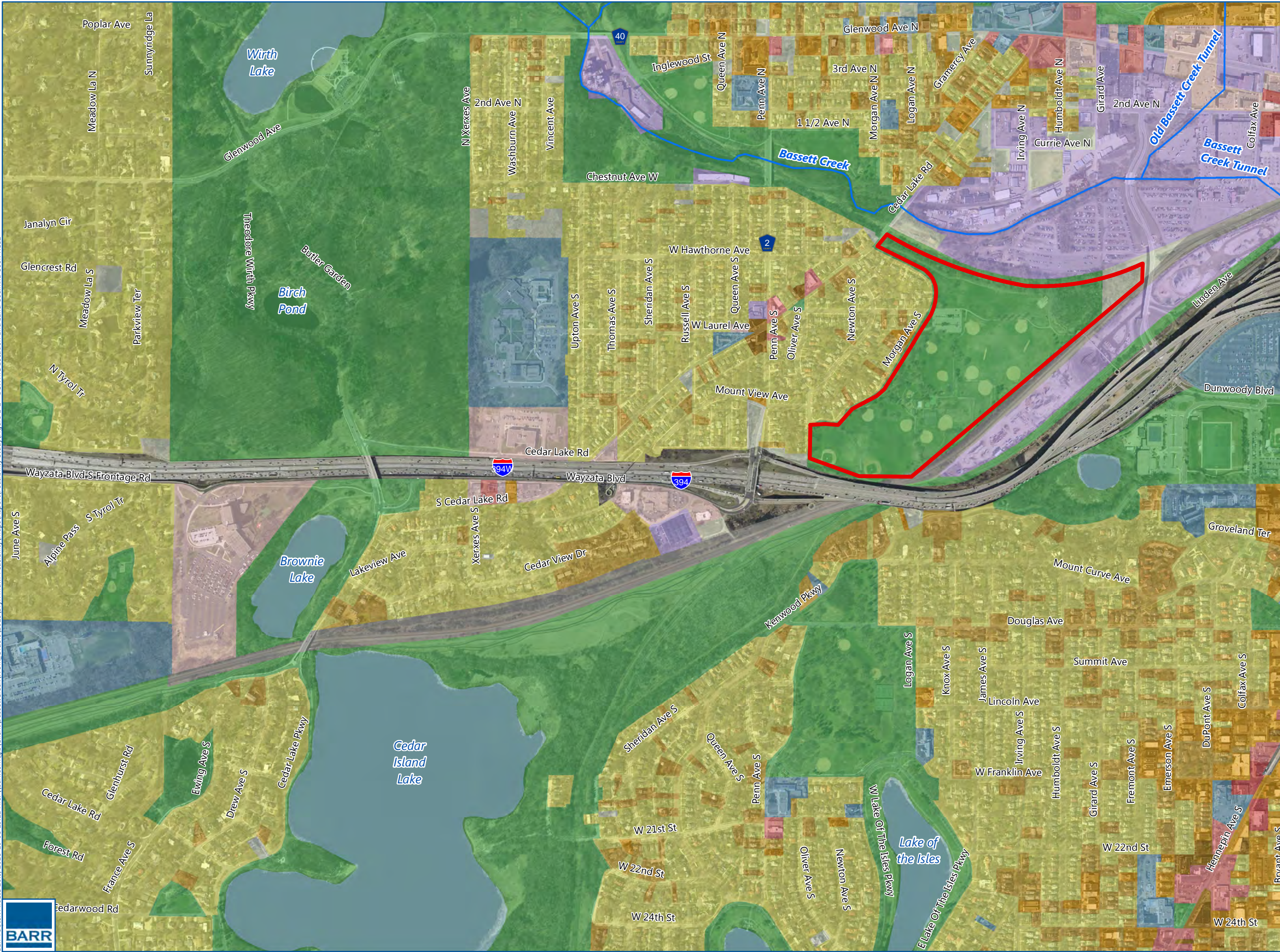
BC-5 Feasibility Study Area

















BCWMC  
 MAJOR SUBWATERSHEDS  
 AND DRAINAGE PATTERNS  
 Bryn Mawr Meadows Park  
 Water Quality Project BC-5

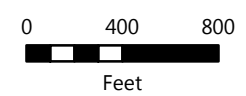
FIGURE 1-1







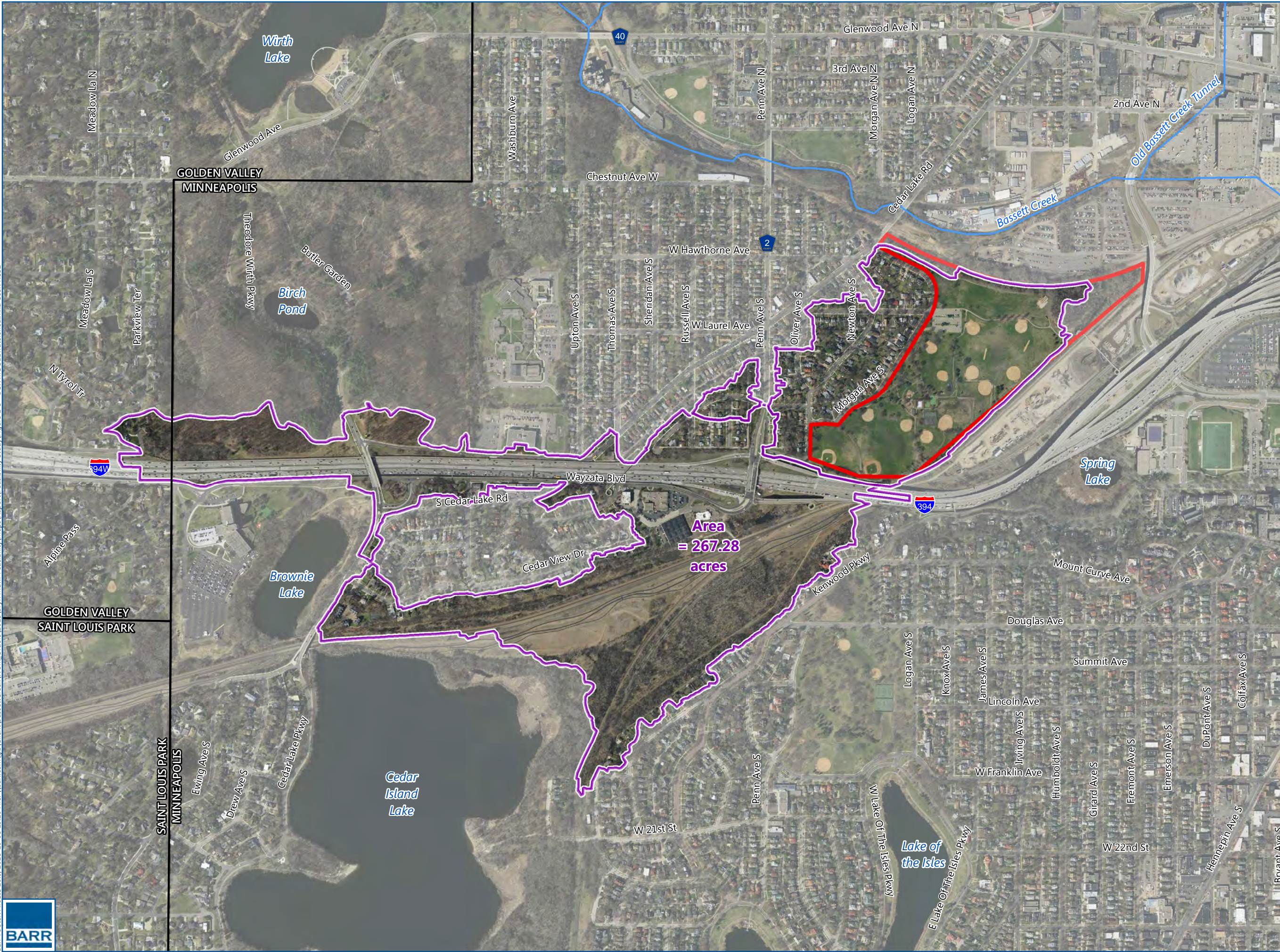
-  Creeks
-  BC-5 Feasibility Study Area
- 2016 Generalized Land Use (Met Council)**
-  Single Family Detached
-  Single Family Attached
-  Multifamily
-  Retail and Other Commercial
-  Office
-  Mixed Use Residential
-  Mixed Use Commercial and Other
-  Industrial and Utility
-  Institutional
-  Park, Recreational or Preserve
-  Railway
-  Agricultural
-  Undeveloped
-  Water



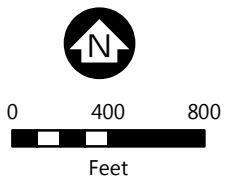
BCWMC  
 LOCATION AND LAND USE  
 Bryn Mawr Meadows Park  
 Water Quality Project BC-5

FIGURE 1-2





- Creeks
- Subwatershed
- BC-5 Feasibility Study Area
- Municipal Boundary



BCWMC  
SUBWATERSHED  
Bryn Mawr Meadows Park  
Water Quality Project BC-5

FIGURE 1-3



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## 2.0 Goals and Objectives

The goals and objectives of the feasibility study are to:

1. Review the feasibility of improving quality of stormwater runoff reaching Bassett Creek.
2. Develop conceptual designs.
3. Provide an opinion of cost for design and construction of concepts.
4. Identify potential impacts and permitting requirements.

The goal and objective of the water quality project is to reduce nonpoint source pollution to Bassett Creek.

### 2.1 Scope

As part of the Bryn Mawr Meadows Park reconstruction project, MPRB is proposing to construct additional water quality improvements to treat offsite stormwater runoff that would otherwise flow untreated to Bassett Creek. The BCWMC's BC-5 CIP project funding would be applied towards the portions of the water quality improvements that provide treatment "above and beyond" the BCWMC requirements for the park reconstruction project.

This project is consistent with the goals (Section 4.1) and policies (Sections 4.2.1, 4.2.2, and 4.2.10) in the 2015 – 2025 BCWMC Watershed Management Plan. The BCWMC has included the Bryn Mawr Meadows Water Quality Project in its CIP, based on gatekeeper policy 110 from the BCWMC Plan:

*The BCWMC will consider including projects in the CIP that meet one or more of the following "gatekeeper" criteria.*

- *Project is part of the BCWMC trunk system (see Section 2.8.1, Figure 2-14 and Figure 2-15)*
- *Project improves or protects water quality in a priority waterbody*
- *Project addresses an approved TMDL or watershed restoration and protection strategy (WRAPS)*
- *Project addresses flooding concern*

*The BCWMC will use the following criteria, in addition to those listed above, to aid in the prioritization of projects:*

- *Project protects or restores previous Commission investments in infrastructure*
- *Project addresses intercommunity drainage issues*
- *Project addresses erosion and sedimentation issues*
- *Project will address multiple Commission goals (e.g., water quality, runoff volume, aesthetics, wildlife habitat, recreation, etc.)*
- *Subwatershed draining to project includes more than one community*
- *Addresses significant infrastructure or property damage concerns*

*The BCWMC will place a higher priority on projects that incorporate multiple benefits, and will seek opportunities to incorporate multiple benefits into BCWMC projects, as opportunities allow.*

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The Bryn Mawr Meadows Water Quality Project meets multiple of the gatekeeper criteria—the project would improve water quality in a priority waterbody, and would address multiple Commission goals including improving quality of stormwater runoff, protecting fish and wildlife habitat, and potentially protect against flood risks by adding flood storage volume.

## **2.2 Considerations**

The following considerations played a key role in developing recommendations for the Bryn Mawr Meadows Water Quality Project and should continue to be evaluated through final design:

1. Maximizing the water quality benefit.
2. Minimizing permitting required to construct the project.
3. Minimizing wetland impacts.

## **3.0 Stakeholder Input**

### **3.1 Onsite Meeting**

A project meeting was held onsite on October 23, 2017. Attendees included Minneapolis Commissioner Michael Welch, the BCWMC administrator and engineers, City of Minneapolis staff, and MPRB staff. The BCWMC feasibility study scope and schedule were discussed. BCWMC engineers presented preliminary concept ideas. The MPRB staff shared their anticipated park reconstruction project schedule, starting with community advisory meetings that were occurring at the time of the meeting, and ending with future construction in 2021 or 2022. Attendees were informed of a design charrette MPRB would be holding in December 2017 or January 2018 for several park master plans. Bryn Mawr Meadows Park is one of the parks that would be worked on during the design charrette.

### **3.2 Design Charrette at MPRB**

MPRB hosted a parks master plan design charrette for several parks the week of January 8, 2018. The BCWMC administrator and engineer attended the first day of the charrette and met with the planners and landscape architects working on the Bryn Mawr Meadows Park Master Plan. The design charrette team was provided with existing conditions information, including park topography, utility locations, and flood plain elevation; and preliminary concept ideas developed to date. This information was used to help develop the MPRB master plan alternatives and ensured the coordination of the master plan with the BCWMC water quality project.

### **3.3 Technical Stakeholder Meeting**

One technical stakeholder meeting was held on January 19, 2018 at MPRB offices at 3800 Bryant Avenue South. The meeting included representatives from the City of Minneapolis, MPRB, and the Commission Engineer. The attendees discussed project scope, potential design concepts, regulatory issues, permits, and possible future conversations the City of Minneapolis would like to have with MPRB about adding flood control in this area. United States Army Corps Engineers (USACE) and Minnesota Department of

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Natural Resources (DNR) staff were invited to attend the meeting, however both agencies indicated they do not need to be involved with the project unless construction work happens within Bassett Creek.

### **3.4 Public Stakeholder Meeting**

A public stakeholder open house meeting was held on March 8, 2018 at Harrison Recreation Center in Minneapolis. The City of Minneapolis organized this meeting, which was an open house for several MPRB projects. The BCWMC administrator and BCWMC engineer attended the meeting. The BCWMC display included a watershed map, a brief project description, possible design concepts, educational materials, and information about the BCWMC. A landscape architecture firm hired by MPRB to design the Bryn Mawr Meadows Park Master Plan was situated next to BCWMC. Many conversations involved the MPRB's possible changes to the park and its programming. Residents were generally in support of the CIP design concepts.

### **3.5 Conference Call with Minnesota Department of Transportation (MnDOT)**

At the direction of the Commission at their meeting in October 2018, a conference call was held with Beth Neuendorf and Brian Kelly from MnDOT, the BCWMC administrator, and the BCWMC engineer on November 7, 2018. The focus of the call was to better understand the function and maintenance of the Penn Pond and surge basin system. When the water level rises in Penn Pond, it flows northeast into the surge basin under I-394. The surge basin drains back to Penn Pond when the water level in Penn Pond drops. The Penn Pond outlet pipe connects to the storm sewer in Morgan Avenue. MnDOT documentation from the past ten years indicates the pond and the storm sewer need maintenance. Sediment needs to be removed from the pond and the storm sewer. There are also downspouts near the surge basin which capture drainage from I-394, but they are no longer connected to the pond. The downspouts discharge flow overland, which cause erosion. The downspouts need to be connected to the pond and the erosion needs to be repaired.

MnDOT's access to Penn Pond and the surge basin is difficult due to the location of the basins between I-394 and the railroad. The upcoming reconstruction of Bryn Mawr Park (if the timing is right) could provide MnDOT with the opportunity to readily access the pond and basin via the park and under I-394, thus avoiding tearing up the park and the subsequent repairs. MnDOT and MPRB are amenable to this idea and they are willing to coordinate schedules as the park reconstruction date gets closer. Performing maintenance on Penn pond, the surge basin, and storm sewer will result in better performance of the existing water quality features, and less sediment and pollutants reaching Bassett Creek. A properly functioning pond was assumed in the analyses of concepts for this study.

### **3.6 BCWMC Staff Comments**

A draft version of the October 2018 draft feasibility report was provided to the BCWMC administrator and presented at the BCWMC meeting. The draft feasibility study was revised in response to the comments received. The revised draft was presented to the Commission at their October 2018 meeting. Action at

that meeting resulted in the meeting with MnDOT described above and further development of all 3 concepts with a focus on concept #3.

## 4.0 Water Quality Improvement Concepts

This section provides a summary of the alternatives analyzed for water quality and other improvements at Bryn Mawr Meadows Park. Multiple alternatives were evaluated for removing sediment and improving water quality. The measures considered for potential implementation include the following:

- Diverting runoff from a 15.9-acre residential area west of the park into a stormwater pond (Concept 1 – Northwest Neighborhood Diversion)
- Diverting low flows from Penn Pond discharge and 29.2-acre residential area west of the park into a stormwater pond (Concept 2 – Penn Pond Low Flow Diversion)
- Combine Concepts 1 and 2 (Concept 3 – Northwest Neighborhood Diversion and Penn Pond Low Flow Diversion)
- Other concepts considered, but not developed (treatment of full flows, infiltration, iron enhanced or other filtration)

The proposed concepts will reduce sediment and phosphorus loading to Bassett Creek and all downstream water bodies.

### 4.1 Concept 1 – Northwest Neighborhood Diversion

Concept 1 diverts stormwater runoff from 15.9 acres in the residential neighborhood west of the park into a proposed stormwater pond within the park (Figure 4-1). Soil borings indicate the site has six to fourteen feet of fill so all material excavated to create the pond may need to be disposed of offsite at a landfill. The cost estimate assumes disposal at a landfill.

The flow diversion would be installed near the intersection of Laurel Avenue West and Morgan Avenue South. Four existing catch basins on the north side of the intersection would be redirected into a proposed 15-inch storm sewer that would cross over the existing 42-inch diameter storm sewer located in Morgan Avenue South. Two additional catch basins may need to be added on Laurel Avenue West to capture the first flush of stormwater runoff. These catch basins have been included in the cost estimate for concept 1. Exact sizing of the pond and diversion storm sewer should be adjusted when the final grading reconstruction layout for the park is known.

### 4.2 Concept 2 – Penn Pond Low Flow Diversion

Concept 2 diverts stormwater runoff from the storm sewer in Morgan Avenue South (Figure 4-2). The diversion would be installed as far downstream as possible to capture as much untreated runoff from the surrounding neighborhood as possible, while allowing the diversion pipe to be high enough above the pond normal water level. A 12-inch low flow diversion pipe would be installed in a new storm sewer

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structure, allowing the first flush flows to be diverted into the water quality pond within the park (Figure 4-2). The proposed pond was sized with a permanent volume of 3.8 acre-feet based on runoff from a 2.5-inch storm. Soil borings indicate the site has six to fourteen feet of fill so all material excavated to create the pond may need to be disposed of offsite at a landfill. The cost estimate assumes disposal at a landfill. Exact sizing of the pond and diversion storm sewer should be adjusted when the final grading and reconstruction layout for the park is known.

### **4.3 Concept 3 – Northwest Neighborhood Diversion and Penn Pond Low Flow Diversion**

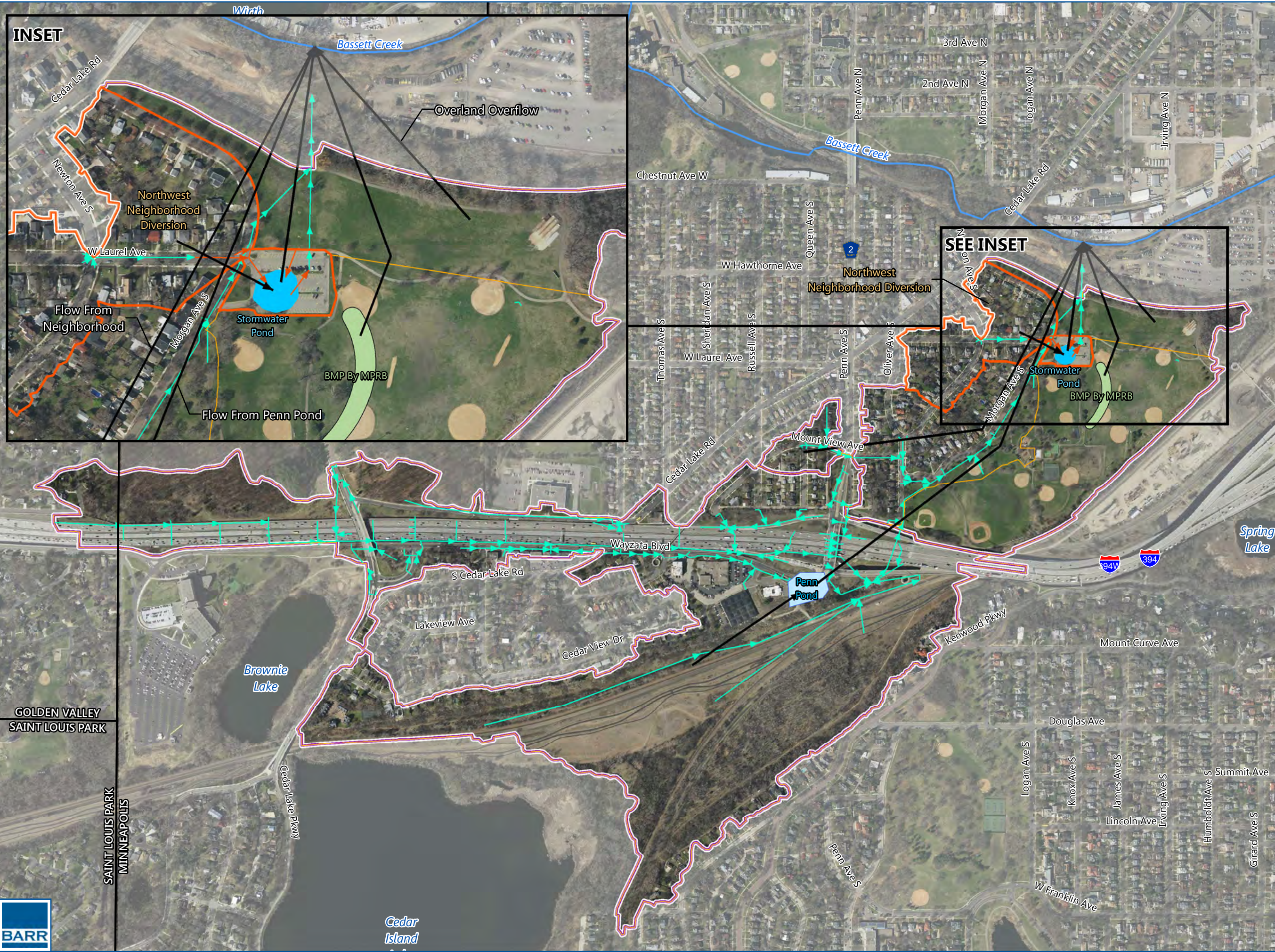
Concept 3 assumes both concepts 1 and 2 are constructed with a stormwater pond permanent volume equal to 5.4 acre-feet (Figure 4-3).

### **4.4 Other Concepts considered**

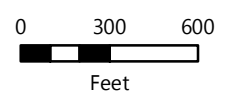
Another concept we evaluated was to direct all flows from Penn Pond and the rest of the subwatershed downstream of I-394 through the proposed water quality pond. This concept was not fully developed because preliminary modeling showed that the pond would need to be significantly larger, and the costs and space needed to excavate additional water quality storage were prohibitive.

Infiltration is not possible on this site due to tight soils and high groundwater; however, filtration BMPs were considered. Filtration BMPs would need to be installed at a higher site elevation than the proposed water quality pond due to the proximity of groundwater, flood plain elevation, and existing storm sewer elevation. Those parameters would cause any filtration BMPs to be located south of the proposed water quality pond, closer to the proposed building. Initially a linear water feature was considered, but MPRB will likely need the area near the building and other site features to meet BCWMC's water quality requirements when the park is reconstructed; therefore, this option was not developed further.

Installation of iron-enhanced sand filtration benches along the ponds were considered but not recommended due to the proximity of groundwater keeping the site wet. If iron enhancement materials are saturated for long periods of time they will release pollutants they previously captured.



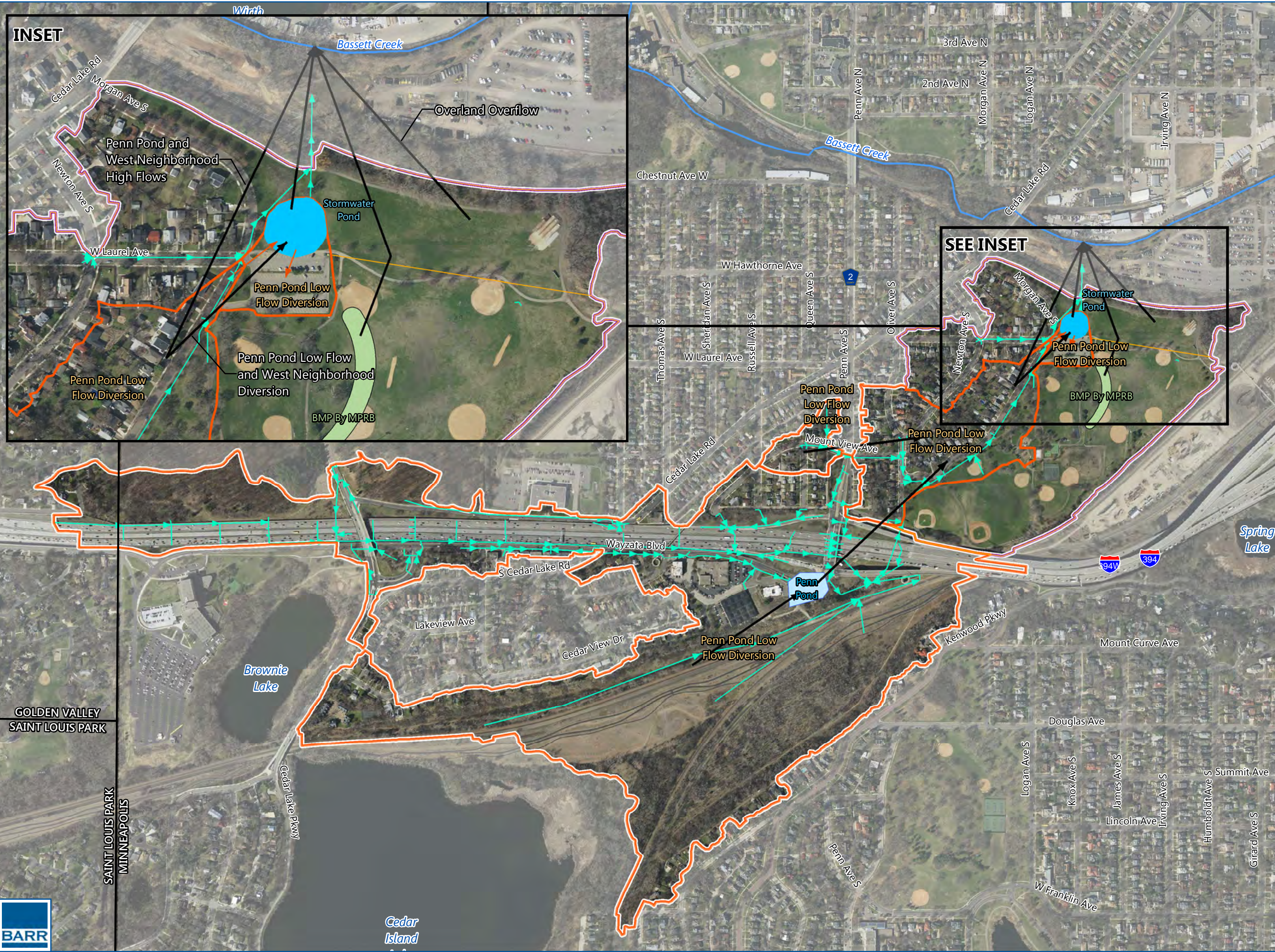
- Creeks
- Flow Paths
- Proposed Storm Sewer
- Existing Storm Sewer
- Proposed MPRB BMP
- Proposed Stormwater Pond
- Existing Stormwater Pond
- Proposed Watersheds
- Northwest Neighborhood Diversion
- Subwatershed
- Municipal Boundary









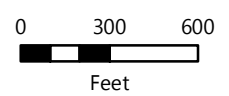
**CONCEPT 1**  
 Northwest  
 Neighborhood Diversion  
 Bryn Mawr Meadows Park  
 Water Quality Project BC-5  
**FIGURE 4-1**







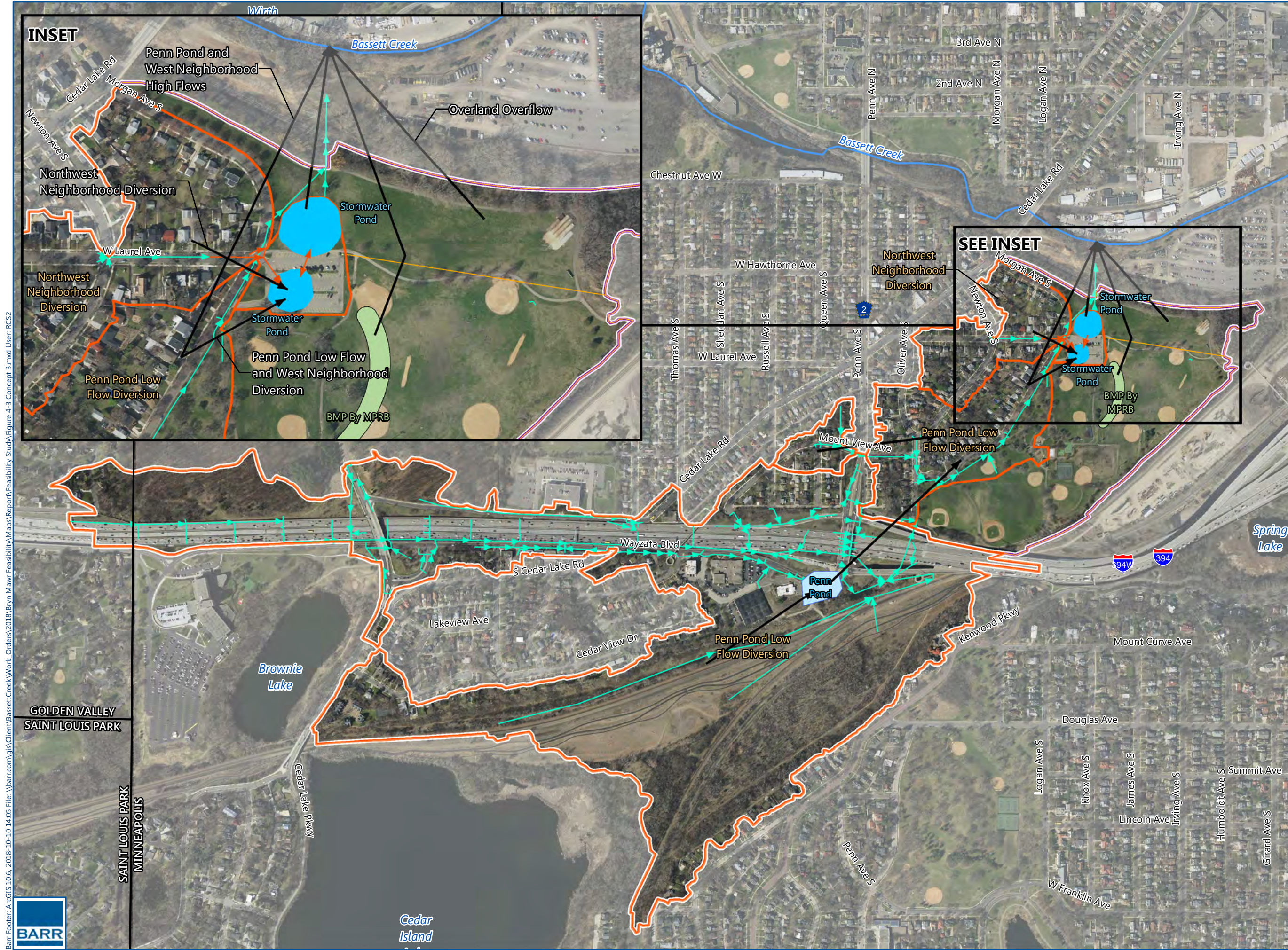
-  Creeks
-  Flow Paths
-  Proposed Storm Sewer
-  Existing Storm Sewer
-  Proposed MPRB BMP
-  Proposed Stormwater Pond
-  Existing Stormwater Pond
-  Proposed Watersheds
-  Penn Pond Low Flow Diversion
-  Subwatershed
-  Municipal Boundary



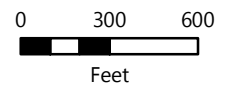
**CONCEPT 2**  
 Penn Pond  
 Low Flow Diversion  
 Bryn Mawr Meadows Park  
 Water Quality Project BC-5

FIGURE 4-2





-  Creeks
-  Flow Paths
-  Proposed Storm Sewer
-  Existing Storm Sewer
-  Proposed MPRB BMP
-  Proposed Stormwater Pond
-  Existing Stormwater Pond
-  Proposed Watersheds
-  Northwest Neighborhood Diversion and Penn Pond Flow Flow Diversion
-  Subwatershed
-  Municipal Boundary



**CONCEPT 3**  
 Northwest Neighborhood  
 Diversion and Penn Pond  
 Low Flow Diversion  
 Bryn Mawr Meadows Park  
 Water Quality Project BC-5

FIGURE 4-3



## 5.0 Water Quality Impacts

This section discusses impacts of the Bryn Mawr Meadows Quality Improvement Project, including estimated pollutant reductions resulting from each alternative. The BCWMC P8 model was used to evaluate anticipated pollutant removals for all concepts. Table 5-1 summarizes the results from each alternative.

**Table 5-1 Estimated Annual TP Removals for Concepts 1, 2, and 3**

Alternative	Estimated TP Removal (pounds/year)
Concept 1	6
Concept 2	27
Concept 3	30

## 6.0 Project Cost Considerations

This section presents a feasibility level opinion of cost of the evaluated concepts, discusses potential funding sources, and provides an approximate project schedule.

### 6.1 Opinion of Cost

The opinion of cost provided in Appendix E assumes all excavated material will need to be disposed of at a landfill. If the soils are tested and they are not contaminated, the cost for excavation and removal could be much less than what is shown in the opinion of cost. If the excavated material could be used onsite as fill for the park reconstruction project, the excavation and removal cost could be reduced by 50%.

The opinion of cost is a Class 4 feasibility-level cost estimate as defined by the American Association of Cost Engineers International (AACI International) and uses the assumptions listed below and detailed in the following sections.

1. The cost estimate assumes a 30% construction contingency.
2. Costs associated with design, permitting, and construction observation (collectively "engineering") is assumed to be 30% of the estimated construction costs (excluding contingency).

The Class 4 level cost estimates have an acceptable range of between -15% to -30% on the low range and +20% to +50% on the high range. Based on the development of concepts, it is not necessary to utilize the full range of the acceptable range for the cost estimate; and we assume the final costs of construction may be between -20% and +30% of the estimated construction budget. The assumed contingency for the project (30%) incorporates the potential high end of the cost estimate range.

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The estimated capital costs and a range of 20-year to 35-year annualized costs for each alternative are summarized in Table 6-1. Detailed cost-estimate tables for all concepts considered are provided in Appendix E.

## **6.2 Funding Sources**

MPRB proposes to use BCWMC CIP funds to pay for the Bryn Mawr Meadows Water Quality Improvement project. BCWMC would contract with the City of Minneapolis who would then subcontract with the MPRB to construct the project. The source of these funds is an ad valorem tax levied by Hennepin County over the entire Bassett Creek watershed.

A significant portion of the construction costs is the (assumed) landfill disposal of contaminated sediment. There are other funds available that could be used to help cover the costs of investigation and/or clean-up. For example, Hennepin County has non-competitive funds available to municipalities for the environmental investigation of soils. In addition, if the BCWMC or the MPRB investigates the soils and finds contamination, they can apply for Hennepin County Environmental Response Fund (ERF) grant money to aid in the clean-up effort. ERF grants are competitive and applications are accepted once per year in November.

## **6.3 Project Schedule**

Although this project is on the BCWMC's CIP schedule for 2020, the actual project schedule is dependent on MPRB's project schedule. MPRB plans on starting design in 2021 and construction sometime in 2022. The BCWMC must hold a public hearing and order the project in time to submit its final 2020 ad valorem tax levy request to Hennepin County. The BCWMC's CIP schedule includes a placeholder of \$500,000 for this project (to be collected over two levy years: 2020 and 2021) including feasibility study costs, design, construction, contingency, and administrative costs.

**Table 6-1 Estimated Capital and Annualized Costs for Concepts 1, 2, and 3**

Alternative	Construction Cost	Construction Contingency <sup>1</sup>	Planning, Engineering, Design, and Construction Observation <sup>2</sup>	Total Cost	Estimated TSS Removal (lbs/year)	Estimated Annualized Cost per Pound of TSS Removal (\$/lb TSS/year) <sup>3</sup>	Estimated TP Removal (lbs/year)	Estimated Annualized Cost per Pound of TP Removal (\$/lb TP/year) <sup>3</sup>
Concept 1 –	\$209,000	\$63,000	\$82,000	\$354,000	2,863	\$3.50-\$4.60	6	\$3,460-\$4,630
Concept 2 –	\$317,000	\$95,000	\$124,000	\$536,000	9,456	\$2.50-\$3.35	27	\$1,170-\$1,560
Concept 3 -	\$470,000	\$141,000	\$183,000	\$794,000	10,469	\$3.45-\$4.60	30	\$1,540-\$2,060

- (1) Assumed 30% contingency based on feasibility-level design (Class 4, 10-15% design completion per ASTM E 2516-06).
- (2) Assumed 30% of construction cost for Engineering, Design, and Construction Observation.
- (3) Assumed 4% interest rate and 20-year to 35-year lifespan.

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## 7.0 Permitting, Site Impacts, and Coordination

This section discusses permitting and coordination required for each alternative.

### 7.1 Permitting

No disturbance or fill of any wetlands, nor any work in public waters is anticipated as part of the water quality project. An NPDES will be required if the park reconstruction is over one acre in size. MPRB and its contractors will be responsible for any permits required by the park reconstruction project.

### 7.2 Site Impacts and Coordination

Construction of this project would be in conjunction with the MPRB plans to reconstruct Bryn Mawr Meadows Park and would not require additional park closure beyond those already planned. Continued coordination with MPRB will be required during final design. It is assumed MPRB and MnDOT would coordinate during park reconstruction to facilitate maintenance of Penn Pond and corresponding structures.

## 8.0 Recommendations

Concepts 2 and 3 provide the most water quality impact/treatment and cost effectiveness, based on the cost per pound of total phosphorus removed (see Table 6-1). However, concepts 2 and 3 would cost significantly more than the originally identified \$500,000 budget for this CIP. A significant percentage of the cost in each of the options is disposal of the excavated material to create the pond, due to unknown fill present at the site. If the soils are tested and found clean, they could be used onsite or hauled offsite for use at another location resulting in a lesser project cost. The opinion of cost in the feasibility study assumes all material must go to a landfill. We recommend BCWMC or MPRB request and utilize Hennepin County grant funds to investigate the site soils and better estimate the likely cost of excavation and disposal prior to final design.

Prior to full design, we recommend that MnDOT complete a survey and investigation, or maintenance, of Penn Pond and the surge basin beneath Interstate 394. Final design of the project will need to take the survey information into account. If it is found that there is more upstream storage and treatment for the 181 acres draining to Penn Pond, the size of the proposed water quality basin can be adjusted downward accordingly. Adjusting the volume of excavation will significantly impact the cost of the project, as excavation accounts for the largest portion of the construction cost estimate.

## 9.0 References

1. **Bassett Creek Watershed Management Commission.** 2015 Watershed Management Plan. September 2015.