



Hiawatha Golf Course Area Water Management Alternatives Assessment

Benefits and Costs Comparative Screening

Prepared for
Minneapolis Park and Recreation Board, City of Minneapolis, &
Minnehaha Creek Watershed District

7/14/2017



Technical Memorandum

MPRB Hiawatha Golf Course Alternatives Assessment Project

Benefits and Costs Comparative Screening

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
From: Matt Metzger, PE, ENV SP, Jen Koehler,, Barr Engineering Co.,
Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Project: Hiawatha Golf Course Alternatives Assessment Project
c: Della Shall Young, ENV SP, Kurt Leuthold, PE

Table of Contents

1.0	Background and Summary.....	2
2.0	Methodology and Assumptions.....	6
3.0	Demographic and Economic Characteristics.....	7
4.0	Revenue	9
5.0	Opinion of Cost: Construction	11
6.0	Opinion of Cost: Operation & Maintenance	14
7.0	Triple-Bottom-Line Cost Benefit Analysis (TBL-CBA).....	15
8.0	Results and Discussion.....	20
9.0	Sensitivity Analysis.....	24
10.0	Definitions.....	27
11.0	Attachments – Planning Level Estimates of Revenue, Construction Costs, and O&M Costs for Alternative A and Alternative B.....	31

1.0 Background and Summary

The Barr Engineering team (Barr) has been assisting the Minneapolis Park and Recreation Board (MPRB) and the City of Minneapolis (City) on the evaluation of the surface, storm, and groundwater management issues related to the Hiawatha Golf Course area. As part of this project, the MPRB has directed Barr to perform a detailed assessment of two alternatives for the Hiawatha Golf Course area, selected by MPRB, City, and Minnehaha Creek Watershed District (MCWD) staff. This project is not a complete master plan for the Hiawatha Golf Course area, but rather a high level comparative assessment of two alternative visions for the area based on water management solutions that will help the MPRB select the future direction of and set the stage for master planning, budgeting, permitting, and ultimately, design.

Because the issues in the Hiawatha Golf Course area are primarily related to groundwater and surface water management, the MPRB, City and MCWD selected two alternatives based on differing water management approaches for the area and is documented in the Hiawatha Golf Course Area – Water Management Alternatives memo dated 6/21/2017. Alternative A (Alt. A) maintains the area as an 18-hole golf course (with existing pumping rates) while Alternative B (Alt. B) considers a reduced-pumping approach and modifications to water management in the golf course area, likely resulting in a change in the recreational use of the land.

As part of the alternatives assessment, the Barr team has also performed an impact assessment to help quantify the differences between Alternative A and Alternative B, considering the following:

- Surface water and groundwater impacts
- Ecological implications
- Recreation and economic concepts
- Traffic and parking impacts
- Applicable regulations
- Cultural resources review

This impact assessment is summarized in the Hiawatha Golf Course Area – Impact Assessment memo dated 7/14/2017.

The information compiled in the impact assessment memo for the two alternatives was used to further inform the review of each alternative through the sustainability lens as well as the benefit-cost assessment for the two alternatives that attempts to quantify the triple bottom line (social, economic, and ecological costs and benefits) of each alternative.

This memorandum summarizes the review of each of the two water management alternatives for the Hiawatha Golf Course area based on the benefit-cost analysis performed for each alternative.

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Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 3

The MPRB and City of Minneapolis both have long-standing goals and plan elements intended to pursue long-term sustainability and create value in the public realm; the process used to screen the two alternatives was collaborative. The inclusion of public social and environmental benefits and costs for the alternatives comparison is intended to provide an additional assessment factor for considering long-term sustainability.

A benefit and cost comparative assessment was performed by combining a traditional economic assessment with monetization of additional financial, social and environmental factors. To perform the analysis, AutoCASE™ was used, which in the software vendor's words "is a web-based software valuation tool with the primary purpose of producing risk-adjusted, dollar-based metrics for infrastructure projects and buildings based on their costs, benefits, and sustainable design features. It is designed to be run early and often through the feasibility, planning, design, and construction stages of a project, and it can be used with minimal information, drawing on standard, regionally-specific inputs and best practice data." This tool was used to perform a Triple-Bottom-Line Cost Benefit Analysis (TBL-CBA), which is "an evidence-based economic method that combines Life Cycle Cost Analysis (LCCA) and Cost-Benefit Analysis (CBA) techniques to quantify and attribute monetary values to the Triple-Bottom-Line (TBL) – the financial, social and environmental impacts of a given project or proposal."

The screening-level benefit-cost assessment is not intended to identify a project alternative "winner" and "loser". It is intended to:

- compare, in monetized estimates, the potential value each alternative might provide the MPRB and the public community over a 20-year period. This includes consideration of social and environmental benefits to the public in addition to traditional financial factors (income and expenses).
- present two alternatives for a project formulation that have the potential to generate enterprise revenue for the MPRB.
- compare the potential for each alternative to build natural capital at the site in the form of ecosystem services.
- identify possible advantages and disadvantages each alternative may present for balancing various social, environmental and financial needs.

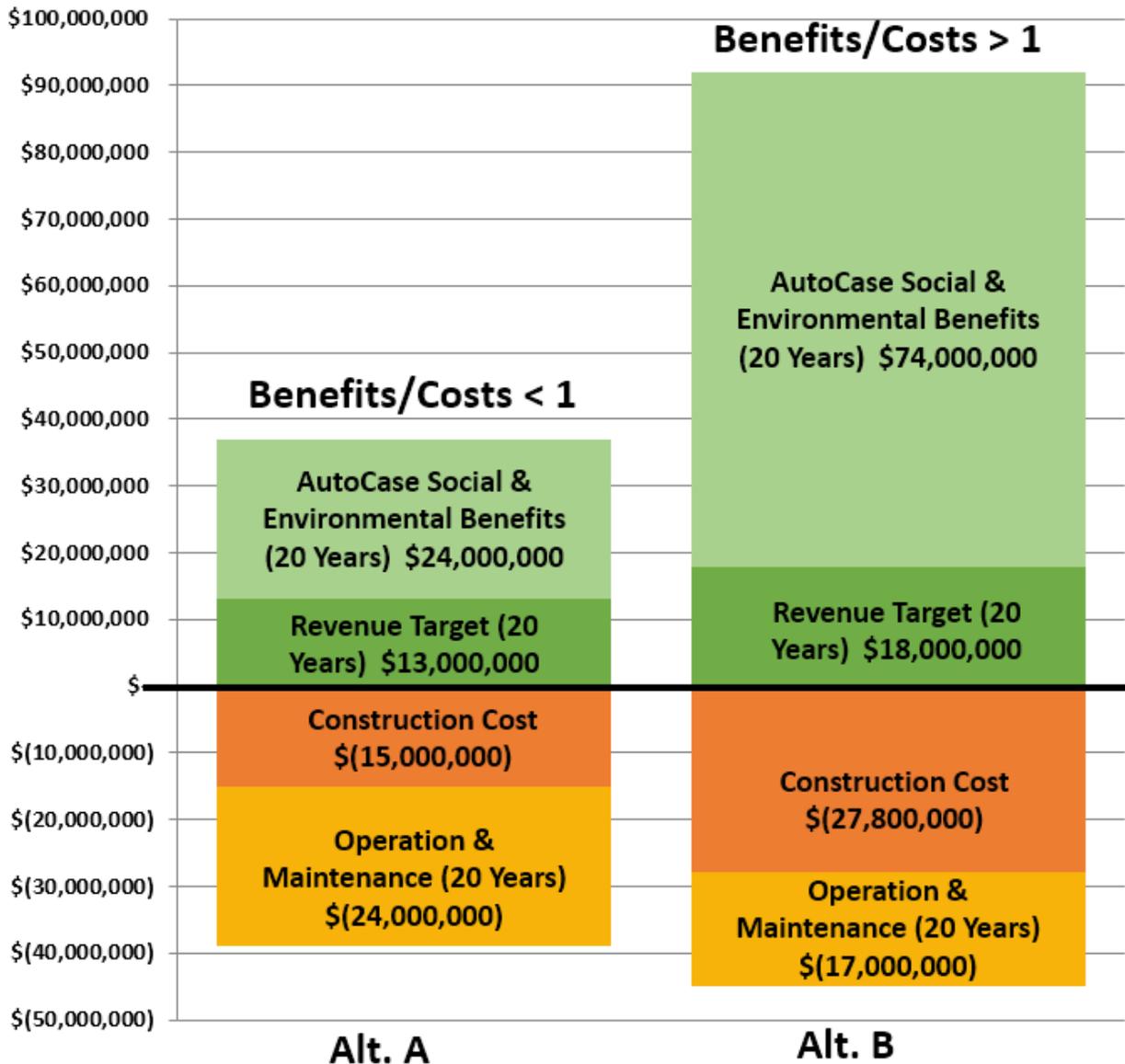
The results of the analysis for the two water management alternatives for the Hiawatha Golf Course area are summarized in Figure 1 below, and the complete analysis is presented in the remainder of this memo. The final section of this technical memorandum provides definitions.

Figure 1 presents a screening-level comparison of the total costs and benefits for a 20-year time period for both alternatives. A conceptual benefit-to-cost ratio (Benefits/Costs) can be observed by comparing total benefits (presented in green) to total costs (presented in orange).

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Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 4

Construction costs (including planning, engineering, design, and permitting), long-term operation and maintenance costs, MPRB net revenue and triple-bottom-line (TBL) costs and benefits for a 20-year period were estimated. Sensitivity analysis was performed to identify project parameters that most significantly influence the balance of benefits and costs over this period and to develop reasonable, defensible assumptions for those parameters.

Figure 1 - Triple-Bottom-Line Cost Benefit Analysis (TBL-CBA) Summary
MPRB Hiawatha Golf Course Area Water Management Alternatives



Time-Value-of-Money Not Included (i.e. Discount Rate is 0% - see Sensitivity Analysis Section).

The public financial, social, and environmental benefits of Alt. A nearly match the total costs over 20-years, demonstrating the public value potentially brought by improving the clubhouse to make it a neighborhood amenity and maintaining the 18-hole golf course. The analysis also suggests the long-term public benefits of Alt. B could far outweigh the total project costs. For the 20-year analysis period, the public benefit-to-cost ratio of Alt. B could be two to three times greater than Alt. A for a similar 20-year investment. Project performance will ultimately depend on project planning, design, and implementation.

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Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 6

After 20 years, public benefits will continue to accrue. Despite having a larger construction cost, Alt. B may have a similar 20-year life cycle cost, due largely to the long-term benefit of reduced annual operation and maintenance costs achieved by replacing the higher-maintenance 18-hole golf course turf with a naturalized park with water, wetlands and ecological restorations, which require significant investment during the establishment period but decreases once the communities are well-established.

Many public ecological, water quality and recreation benefits are realized by reducing pumping at the Hiawatha golf course site and working with naturalized land cover and hydrology to create the public park in Alt. B. It is these enhanced natural spaces, development of active and passive recreation opportunities, an improved clubhouse area and other facilities, and improved connectivity to the existing regional park system that could attract more users to the Alt. B park space. The projected beneficiary group for Alt. B is a larger and more diverse group of stakeholders than for Alt. A, which would primarily serve golfers and users of an improved clubhouse area. The park would serve many uses for diverse user groups in a naturalized setting that showcases the assets and natural resources of the City, MPRB, and the MCWD. This results from conversion of the 146 acres of fee-access public space with a specific use to freely-accessible public space with many uses.

These comparative factors are reflected in the inputs and results of the AutoCASE™ economic models developed for both alternatives. The following memo, which builds off the information compiled in the impact assessment memo, summarizes the methodology, assumptions, and results of the benefit cost analysis.

2.0 Methodology and Assumptions

The project definition for the two alternatives was advanced in parallel to performing economics exercises as programming for the alternatives was formulated to generate revenue for the MPRB. Site programming considered the input provided by stakeholders at public meetings, MPRB staff and other project stakeholder input, regulatory considerations, findings of previous MPRB golf course management studies, the information compiled in the impact assessment memo, and the water management studies developed as part of this project.

Construction costs, operation and maintenance costs, MPRB revenue and public triple-bottom-line benefits were estimated for a 20-year period. Sensitivity analysis was performed to identify parameters that influence the balance of benefits and costs over this period and to develop reasonable, defensible assumptions for those parameters.

The triple-bottom-line economics software tool AutoCASE™ was used to perform the assessment. It is a companion tool of the independent third-party Envision™ sustainability framework by Institute for Sustainable Infrastructure. A preliminary monetized evaluation of financial, social and environmental costs and benefits in monetary terms was developed. For example, monetized recreational benefits, carbon

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Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 7

sequestration, and water quality improvement can be considered companion benefits to the net revenue generated for the MPRB. Factors such as number of site users, site uses and land cover also contribute to creating this value. The TBL-CBA estimates value in the context of costs and benefits to the public and the community overall is intended to provide an additional assessment factor for comparing the two project alternatives resulting from the water management and pumping options. The screening-level TBL-CBA supplements, but does not replace, other types of necessary financial analyses, such as establishing project financing strategies or building a pro-forma of income and expenses during planning and detailed design.

The anticipated cost for each alternative is based on high-level conceptual design. Capital cost and operation and maintenance cost estimates were developed in 2017 dollars using a Class 5 level of detail per the ASTM E 2516-11 standard, assuming less than a 5% project definition is available at this time. The estimated cost of each alternative is a point estimate within a range of possible costs for the alternative. The selected accuracy range for these point estimates is -25% to +50%. The estimated capital costs include up-front costs associated with estimated planning, engineering, design, permitting, construction management, construction, and contingency. A construction schedule is not available at this time.

As indicated above, the opinion of probable cost for each alternative based on the concepts outlined in the impact assessment memo was developed for comparative purposes only using comparable information and unit costs from similar projects and the consulting team's experience and qualifications. The opinion of cost represents the team's best judgment as experienced and qualified professionals familiar with the project, based on project-related information available at this time, available cost information from other projects and a concept design for each alternative. The opinion of probable cost will change as more information becomes available and the level of design detail is advanced. In addition, since the team has no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, it can be expected that proposals, bids, or actual construction costs will vary from this opinion of probable cost. The opinion of probable cost can be refined as a more detailed study and definition of the alternatives is completed.

3.0 Demographic and Economic Characteristics

The demographics of the neighborhoods surrounding the Nokomis-Hiawatha Regional Park were compared to the demographics of the seven-county metro area to provide insight into programming and enterprise options for the site. The summary of demographic and economic characteristics is presented in the impact assessment memo.

Nearby neighborhood users are anticipated to be the recreation and other use beneficiaries for both alternatives. By making the public space freely-accessible under Alt. B, the potential exists for a wider

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Date: July 14, 2017
Page: 8

range of demographic groups to be beneficiaries of the project, whereas under Alt. A, the primarily users of the land are golfers who pay a fee to access the land. Users from outside of the nearby neighborhood are anticipated for events at the reconstructed clubhouse area under both alternatives, and the flexible event/retreat space identified under Alt.B.

Historical MPRB performance data for Hiawatha Golf Course and other MPRB golf courses, users, event facilities and concessions were reviewed. This information was used to evaluate golf course options and develop assumptions related to potential programming and enterprise operations at the site. Local demographics, community input from the public meetings, and the neighborhood fabric surrounding the Hiawatha Golf Course influenced the decision to assume neighborhood-friendly site uses and to avoid large regional destination uses.

Multiple working sessions with the Barr Engineering team, including Economic Development Services, Inc. (the Barr team), and MPRB and City staff were convened to build the revenue, cost, and benefit assumptions for both alternatives. This collaborative team developed traditional projections for revenue, construction costs and operation and maintenance costs (O&M) that served as the foundation for a triple-bottom-line cost-benefit-analysis (TBL-CBA).

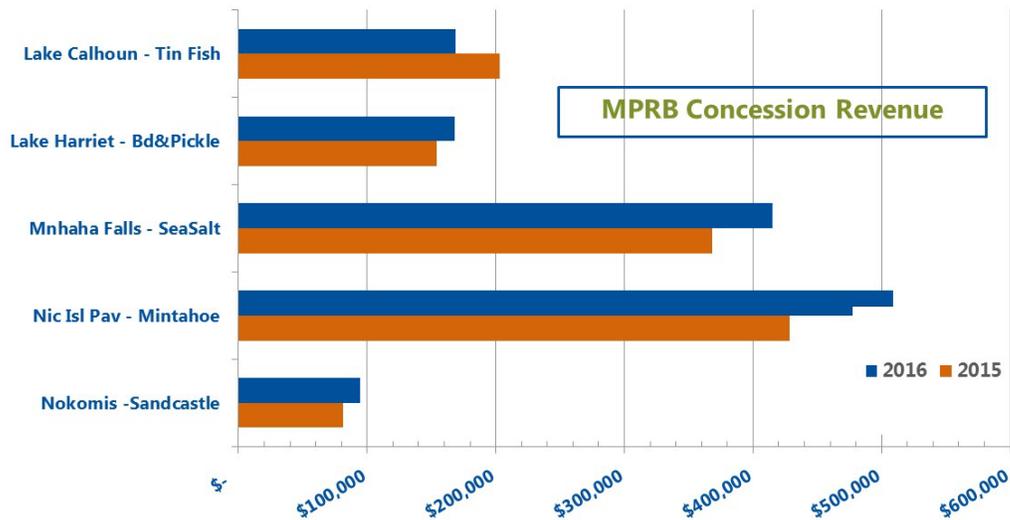
The assumptions and estimates for the revenue, construction costs, and O&M costs used to inform each alternative is attached to the end of this memo.

4.0 Revenue

In recent years, the Hiawatha Golf Course has experienced negative revenue, due in part to course maintenance costs, repairing damage to the course resulting from flooding, and a trend of declining numbers of golfers and rounds-played-per-year. A 20-year history of Hiawatha Golf Course revenue was used to develop assumptions for Alt. A, which propagates the area as an 18-hole golf course.

For purposes of the economic modeling, the team sought a mix of uses that would meet the criteria identified in the stakeholder and community meetings and if possible, be revenue-neutral or revenue-positive compared to typical operations over the twenty-year period. The team reviewed existing park concessions operations (both within MPRB and elsewhere in the region) to identify comparable scale facilities and inform revenue estimates. For example, the team reviewed the annual net revenue to MPRB from existing concession operations, such as SandCastle (Lake Nokomis), Bread and Pickle (Lake Harriet) and Tin Fish (Lake Calhoun) and others to inform the assumptions for both alternatives. A summary of 2015 and 2016 MPRB revenue from existing concessions is presented in Figure 2 below.

Figure 2 –2015 and 2016 MPRB Concession Revenue



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Date: July 14, 2017
Page: 10

The following assumptions were used to estimate the revenue for Alternative A:

- Continued operation of the 18-hole golf course and driving range, based on MPRB data. Recent rates of golf rounds-per-year (the existing golf course experiences 20,000-40,000 rounds per year in the most recent MPRB golf data; 31,700 per year based on data from 2010-2013 for the Golf Convergence study completed for the MPRB) are assumed to continue.; however, recent data indicates the number of rounds played per year is declining.
- Renovation or reconstruction of the clubhouse area, creation of a neighborhood restaurant with indoor and patio seating, commercial kitchen, and 200-person banquet facility.
- Estimated to attract 211,000 visits per year upon build-out, mostly users of the new clubhouse neighborhood restaurant/patio and banquet facility. Golfers would account for approximately 20% of the annual users for Alternative A.
- Based on the concept, Alternative A could generate between \$400,000 and \$900,000 per year for MPRB, based on the performance of golf and other similar concessions and facilities in the MPRB system.

The following assumptions were used to estimate the revenue for Alternative B:

- Creation of a public park with multi-use trails and ecological restorations.
- Transfer of a small portion of Hiawatha Golf Course rounds to other MPRB courses (assumed 15%).
- Construction of a flexible event space for corporate retreats, weddings, memorial services, etc.
- Addition of one large rental picnic pavilion, and 3 smaller picnic pavilions
- Creation of a 3-acre minimally-developed outdoor festival ground, used a few times per year.
- Renovation or reconstruction of the clubhouse area, creation of a neighborhood restaurant with indoor and patio seating, commercial kitchen, and 200-person banquet facility. This facility is assumed to generate 25% more revenue than the Alt. A facility because the park user base is estimated to be several times larger in Alt. B than Alt. A.
- Addition of canoe storage racks, launch, and watercraft rentals.
- Implementation of pay parking similar to other MPRB facilities.
- This option could attract an estimated 525,000 visits per year upon build-out, including users of the proposed facilities as well as the passive recreation trails and areas.
- Based on the concept, Alternative B could generate between \$600,000 and \$1,200,000 per year in revenue to the MPRB.

The team estimated a low and high range for MPRB revenue, and used the average projected revenue when running the economic models.

5.0 Opinion of Cost: Construction

The team reviewed existing park concessions operations (both within MPRB and elsewhere in the region) and comparable park facilities to compile a list of reference construction costs for facilities. Other recent projects were also evaluated to estimate typical unit costs to estimate costs for the various park features. Where the team estimated a possible low and high range for construction costs, the team used an average cost.

The following assumptions were used to estimate the planning, engineering, design, and permitting costs along with the project construction costs for Alternative A:

- One (1) partial renovation of the 18-Hole Golf Course to accommodate an open drainage channel, upgrade the course and repair areas. A minimum of \$1,500,000 is assumed. The open drainage channel creation includes creation of embankments and streambank restoration and trash collection. The renovation includes 20 acres of upland native vegetation restorations.
- Two (2) partial renovation of the 18-Hole Golf Course during the 20-year time period to repair damage resulting from Minnehaha Creek flooding. A minimum of \$400,000 per occurrence is assumed.
- The existing clubhouse and parking would be reconstructed and expanded, with new water and sanitary sewer utilities. Facility would include a patio, restaurant, commercial kitchen and banquet facility. A facility sewer availability charge (SAC) of \$641,000 for 258 units was assumed.
- New car and bicycle parking areas at the renovated clubhouse area.
- Includes green infrastructure stormwater management for impervious areas.

The estimated construction cost for Alt. A is \$15,100,000, which includes 25% contingency and an allowance of 25% for planning, engineering, design, permitting, and construction administration.

The following assumptions were used to estimate the planning, engineering, design, and permitting costs along with the project construction costs for Alternative B:

- The existing clubhouse and parking is reconstructed and expanded, with new water and sanitary sewer utilities. Facility includes a patio, restaurant, commercial kitchen and banquet facility. A facility sewer availability charge (SAC) of \$641,000 for 258 units was assumed.
- New flexible event space to be used for corporate retreats, weddings, memorials, etc.
- Large rental picnic pavilion with restrooms and numerous small picnic pavilions.
- 3-acre minimally-developed outdoor festival grounds.
- Canoe storage, rental and launch.
- Fishing pier.
- 30 acres upland native plant community restorations.
- 30 acres of open turf park land.

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Date: July 14, 2017
Page: 12

- 50 acres of wetland restorations and additional open-water wetland creation.
- Drainage channel creation with streambank restorations and trash collection.
- Minnehaha Creek realignment.
- Approximately 2 miles of paved multi-use trails.
- Boardwalk trail.
- New car and bicycle parking areas (bituminous, permeable pavers and reinforced turf overflow parking) around the clubhouse area and other parts of the park.
- Green infrastructure stormwater management for impervious areas.
- 260,000 cubic yards of mass site grading and 33,000 cubic yards of pond/wetland excavation to increase water depths and promote open water conditions on portions of the site.
- Groundwater pumping systems at Longfellow Drain and at 43rd Street/17th Avenue S.

The estimated construction cost for Alt. B is \$27,800,000, which includes 25% contingency and an allowance of 25% for planning, engineering, design and construction administration.

A summary of estimated construction costs and associated facility improvements are summarized in Table 1.

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Date: July 14, 2017
Page: 13

Table 1 – Opinion of Probable Construction Cost

Item Description	Alt. A (2017-dollars, including 25% contingency)	Alt. B (2017-dollars, including 25% contingency)
Mobilization/Demobilization	720,000	1,200,000
18-Hole Golf Course Renovation, Upland Native Plant Community Restorations & Restoration After 10-Year Flood	2,900,000	N/A
Clubhouse Reconstruction	6,500,000	6,600,000
Retreat Center	N/A	2,900,000
Picnic Facilities	N/A	1,000,000
Festival Grounds	N/A	141,000
Paddling and Boating Facilities	N/A	328,000
Plant Community Restorations	(included w/ Golf Course Renovation)	700,000
Open Channel and Trash Collection	1,800,000	600,000
Creek and Stormwater Features	60,000	1,600,000
Multi-Use Trails	N/A	3,400,000
Parking Lots	175,000	1,100,000
Site Grading for Restorations	N/A	2,400,000
Pumping Systems	N/A	212,300
Planning, Engineering, Design, Permitting, Construction Admin. (assumed 25% of construction cost)	3,000,000	5,600,000
Opinion of Construction Cost, (Rounded to nearest \$100,000)	\$ 15,100,000	\$ 27,800,000

6.0 Opinion of Cost: Operation & Maintenance

Operation and maintenance (O&M) costs are based on references provided by MPRB and referenced historical projects of similar size and complexity in the region. Where possible, historical MPRB costs were referenced to estimate unit O&M costs. An O&M allowance of 2% of constructed cost per year was allocated to items for which reference project cost information was not compiled.

The following assumptions were used to estimate the annual O&M costs for Alternative A:

- O&M of the clubhouse, event & concessions facilities was assumed to be \$22-per-square-foot-per-year. This estimate is based on the MPRB concessions building annual set-aside for refectories at Lake Calhoun, Nicollet Island, Lake Harriet, Lake Nokomis and Minnehaha Falls. These costs include allowance for building maintenance, renovation, tenant turnover improvements and future replacement.
- The maintenance for the 18-Hole Golf Course is between \$700,000 and \$1,100,000 per year, or \$4,800 to \$7,500 per acre per year, assuming a 146-acre golf course. This is based on MPRB data.

The following assumptions were used to estimate the annual O&M costs for Alternative B:

- Similar to Alt. A, the O&M of the clubhouse, event & concessions facilities was assumed to be \$22-per-square-foot-per-year.
- Similar to Alt. A, an O&M allowance of 2% of constructed cost per year was allocated to items for which reference project cost information was not compiled.
- Picnic pavilion facilities assume O&M of \$15,000 per year each, based on MPRB estimates.
- Natural ice skating trails assume O&M of \$50,000 per year.
- Vegetation establishment and native plant community restoration costs were developed in collaboration with MPRB, using previous MPRB project information and reference costs from other restoration projects. A range of costs for each type of plant community was developed:
 - Park land open turf: \$5,300+ per acre per year long-term.
 - Native plant communities (upland), including pollinator: \$2,000 to \$3,000 per acre per year long-term. Higher costs can be anticipated in the first five years of establishment.
 - Wetland restorations: \$1,400 to \$2,600 per acre per year, not including earthwork. Higher costs can be anticipated in the first five years of establishment.

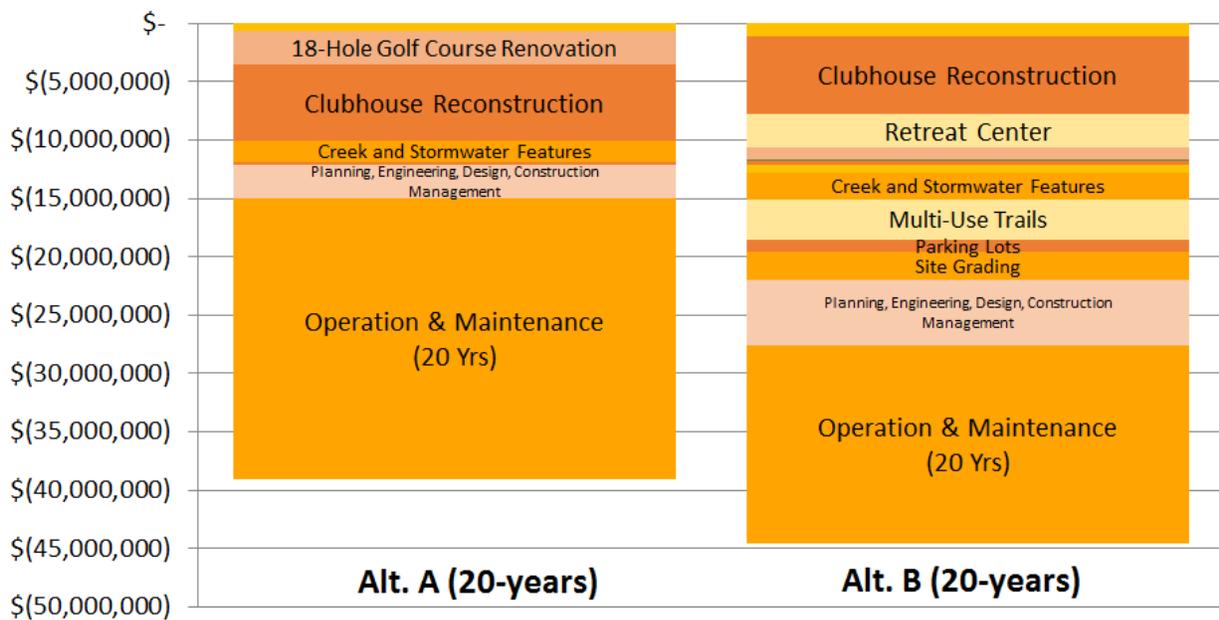
Where the team estimated a possible low and high range for O&M costs, the team used an average cost. A summary of estimated operation and maintenance costs and associated facility improvements for each alternative are summarized in Table 2 below:

Table 2 – Summary of Estimated Annual Operation and Maintenance Costs

Item Description	Alt. A (\$2017)	Alt. B (\$2017)
Annual Operation and Maintenance Cost (Low)	1,000,000/year	800,000/year
Annual Operation and Maintenance Cost (High)	1,400,000/year	900,000/year
Annual Operation and Maintenance Cost (Avg)	1,200,000/year	850,000/year

A summary of estimated construction costs and 20-years of O&M costs is shown in Figure 3.

Figure 3 – Summary of 20-Year Life Cycle Costs



*Note, this summary presents all costs in 2017-dollars. Time-value-of-money is not included (see Sensitivity Analysis Section).

7.0 Triple-Bottom-Line Cost Benefit Analysis (TBL-CBA)

A triple-bottom-line economics software tool, named AutoCASE™ was used to analyze costs and benefits of both of the water management and pumping alternatives for the Hiawatha Golf Course. It is a companion tool to the independent third-party Envision™ sustainability framework by Institute for Sustainable Infrastructure. For a detailed discussion of AutoCASE™ methodology and calculations, please refer to the AutoCASE™ user manual.

Costs and benefits of financial, social and environmental factors were estimated in monetary terms for a 20-year period based on key parameters for Alternative A and Alternative B, summarized below. Financial

parameters were developed as previously described and serve as inputs for the analysis as summarized in Table 3.

Table 3 –AutoCASE™ Triple-Bottom-Line Benefit & Cost Assessment: Financial Parameters

Benefit Description	Alt. A	Alt. B
Time Frame Duration for Analysis	20 Years	20 Years
Estimated Construction Cost	15,100,000	27,800,000
Annual Operation & Maintenance Cost	1,200,000/year	850,000/year
Operation & Maintenance Cost (20-Year Total, No Time-Value-of-Money Applied)	24,000,000	17,000,000
Annual Estimated Revenue	630,000/year	912,000/year
Total Estimated Revenue (20-year total, 2017-dollars, no time-value-of-money applied)	13,000,000	18,000,000

Site Connectivity, Recreation and Land Cover Assumptions

- Alt. A is comprised of the 146 acre Hiawatha Golf Course that is fenced off (fee-access only) public space. This area would be used during an estimated 211,000 visits per year (upon full build-out) for two primary recreation uses (golf/clubhouse & restaurant use and winter cross-country skiing/walking). The land cover assumed for the Alt. A AutoCASE™ model is based on land cover breakdown presented in the impact assessment memo, which includes developed areas, limited upland native vegetation, turf grass, wetlands, trees, shrubs and open water. The golf course is part of the 214-acre project area identified for this study that includes Lake Hiawatha.
- Alt. B is comprised of the 146 acres of Hiawatha Golf Course, converted to parkland, restored uplands, wetlands, and open water. The area would be fully-accessible to the public with a network of multi-use trails and shares recreational and ecological connectivity with Lake Hiawatha and Minnehaha Creek. This area would be used year round with an estimated 525,000 visits per year (upon full build-out) for numerous recreational uses (walking trails, biking trails, non-motorized boating/paddling, fishing, picnicking, birdwatching, cross-country skiing, etc.). The land cover assumed for the Alt. B AutoCASE™ model is based on land cover breakdown presented in the impact assessment memo, which includes developed areas, significant upland native vegetation, turf grass, wetlands, trees, shrubs and open water. The parkland is part of the 214-acre project area for the study that includes Lake Hiawatha.
- A conversion from recreation visits (visitor counts) to annual user-days was completed by assuming typical hours per activity. An annual park user growth rate of 5% per year was assumed, which is based on park visitor counts from MPRB. The average number of visitors and user days for the 20-year period was used for the AutoCASE™ analysis (i.e. used "Year 10" user-days to

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Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 17

represent average for the 20-year analysis period). A summary of recreation visits and user-days is presented in Table 4.

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
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 Janna King, Economic Development Services, Inc.,
 Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
 Date: July 14, 2017
 Page: 18

Table 4 –AutoCASE™ Recreation Visits and User-Day Estimates (including Future Projections)

Site Use	Alt. A					Alt. B			
	Capacity	Projected Annual Visits (Yr 0)	Typical Hours per Visit	Annual User Hours	Annual User Days	Projected Annual Visits (2020)	Typical Hours per Visit	Annual User Hours	Annual User Days
146-acre 18-Hole Golf Course	100	30,000	4	120,000	12,000	N/A	N/A	N/A	N/A
<i>League Players (included in annual rounds)</i>	Included in rounds listed above					N/A	N/A	N/A	N/A
<i>First Tee (included in annual rounds)</i>						N/A	N/A	N/A	N/A
<i>High School League (South, Roosevelt, Washburn, Southwest and Minnehaha) (included in annual rounds)</i>						N/A	N/A	N/A	N/A
Golf Driving Range & Practice Area		25,000	1	25,000	2,500	N/A	N/A	N/A	N/A
Clubhouse (Reconstructed): Indoor/Outdoor Neighborhood Restaurant with Beer	250	125,000	3	375,000	37,500	125,000	3	375,000	37,500
Clubhouse (Reconstructed): Flex Space	200	20,800	4	83,200	8,320	20,800	4	83,200	8,320
Retreat Center	150	N/A	N/A	N/A	N/A	15,600	4	62,400	6,240
146-acre Park Land (includes water activities)		N/A	N/A	N/A	N/A	335,800	3	1,007,400	100,740
Winter Activities (including cross country skiers)		10,000	2	20,000	2,000	20,000	2	40,000	4,000
Picnic Pavilions	90	N/A	N/A	N/A	N/A	1,350	3	4,050	405
Large Picnic Pavilion	90	N/A	N/A	N/A	N/A	1,350	3	4,050	405
Festival Grounds	1300	N/A	N/A	N/A	N/A	5,200	4	20,800	2,080
Total (Estimated Use Frequency in 2017)		210,800		623,200	62,320	525,100		1,596,900	159,690
Visits-per-acre		1,444				3,597			

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
From: Matt Metzger, PE, ENV SP, Jen Koehler,, Barr Engineering Co.,
 Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 19

		Alt. A			Alt. B				
	Year	Projected Annual Visits			Annual User Days	Projected Annual Visits			Annual User Days
Total (Estimated Use Frequency in 2020)	2020	210,800			62,320	525,100			159,690
Estimated Annual User Growth Rate		5%			5%	5%			5%
Total (Estimated Use Frequency in 2025)	2025	269,040			79,538	670,175			203,809
Total (Estimated Use Frequency in 2030)	2030	343,371			101,513	855,333			260,118
Total (Estimated Use Frequency in 2035)	2035	438,238			129,559	1,091,645			331,984
Total (Estimated Use Frequency in 2040)	2040	559,315			165,354	1,393,247			423,705
Total (Estimated Use Frequency in 2045)	2045	713,844			211,038	1,778,175			540,767

Stormwater Treatment Assumptions

Both alternatives provide some stormwater treatment; however, Alt. B creates a much larger treatment area in the form of dead storage for greater removal of sediment and nutrients from the local Lake Hiawatha watershed. A summary of stormwater treatment measures used to estimate runoff pollutant removal both alternatives is shown in Table 4 below.

Table 5 –Stormwater Treatment Features

Stormwater Treatment Measure	Unit	Alt. A	Alt. B
Pond Area	acre	5.6	34.7
Pond Max Depth	feet	8.4	12.2
Storage Dead	acre-feet	17	75
Storage Live	acre-feet	356	298
Rainwater Gardens	square feet	3,200	8,600
Permeable Pavement	square feet	0	43,000

Water Quality Enhancement and Water Resource Value Assumptions

- Alt. A assumes no change in total phosphorus removal or surface water quality compared to existing conditions.
- Alt. B assumes an increase in annual total phosphorus reduction by 183 lbs per year, which is 5% of the reduction goal for the Lake Hiawatha Total Maximum Daily Load (TMDL). This removal was estimated using engineering calculations outside of AutoCASE™. This estimated runoff nutrient reduction was assumed to result in a 3% improvement to Lake Hiawatha water quality for the AutoCASE™ model. This modeling approach is more conservative than assuming a 5% improvement to Lake Hiawatha water quality in the model.

8.0 Results and Discussion

The traditional economics analysis, the parameters described in the previous section and parameters developed based on impact assessment memo were used to perform the AutoCASE™ Triple-Bottom-Line Benefit & Cost Assessment. Impact Infrastructure, the AutoCASE™ model developer, was engaged during this project to discuss model inputs and review model results.

Table 6 –AutoCASE™ Triple-Bottom-Line Benefit & Cost Assessment: 20-Year Benefit Summary

Benefit Description	Alt. A (20-years)	Alt. B (20-years)	Comparison
Recreational Value	8,000,000	20,000,000	Alt. B is greater due to more visitors, more user-days and more uses on the same acreage.
Water Quality	4,000,000	43,000,000	Alt. B improves water quality and restores habitat and exposes more users to that improved natural resource.
Heat Island Effect	6,000,000	6,000,000	Similar because the area of green space is similar for both alternatives.
Flood Risk	2,000,000	2,000,000	Similar because the alternatives provide comparable flood storage for surface runoff during large events.
Other Benefits (such as surrounding Property Value Uplift, Carbon Sequestration by Vegetation, Air Pollution Reduction by Vegetation, etc.)	4,000,000	3,000,000	AutoCASE™ shows a slight decrease due to replacement of “green space” with open water and wetlands and not including reforestation potential for Alt. B. Further analysis would be beneficial to verify.
AutoCASE™ Social & Environmental Public Benefits (20-years, not including MPRB revenue, rounded to the nearest \$million)	24,000,000	74,000,000	Alt. B appears to generate two to three times more social and environmental benefits during the 20-year analysis period.

Notes:

Time-value-of-money not included (i.e. discount rate is 0%).

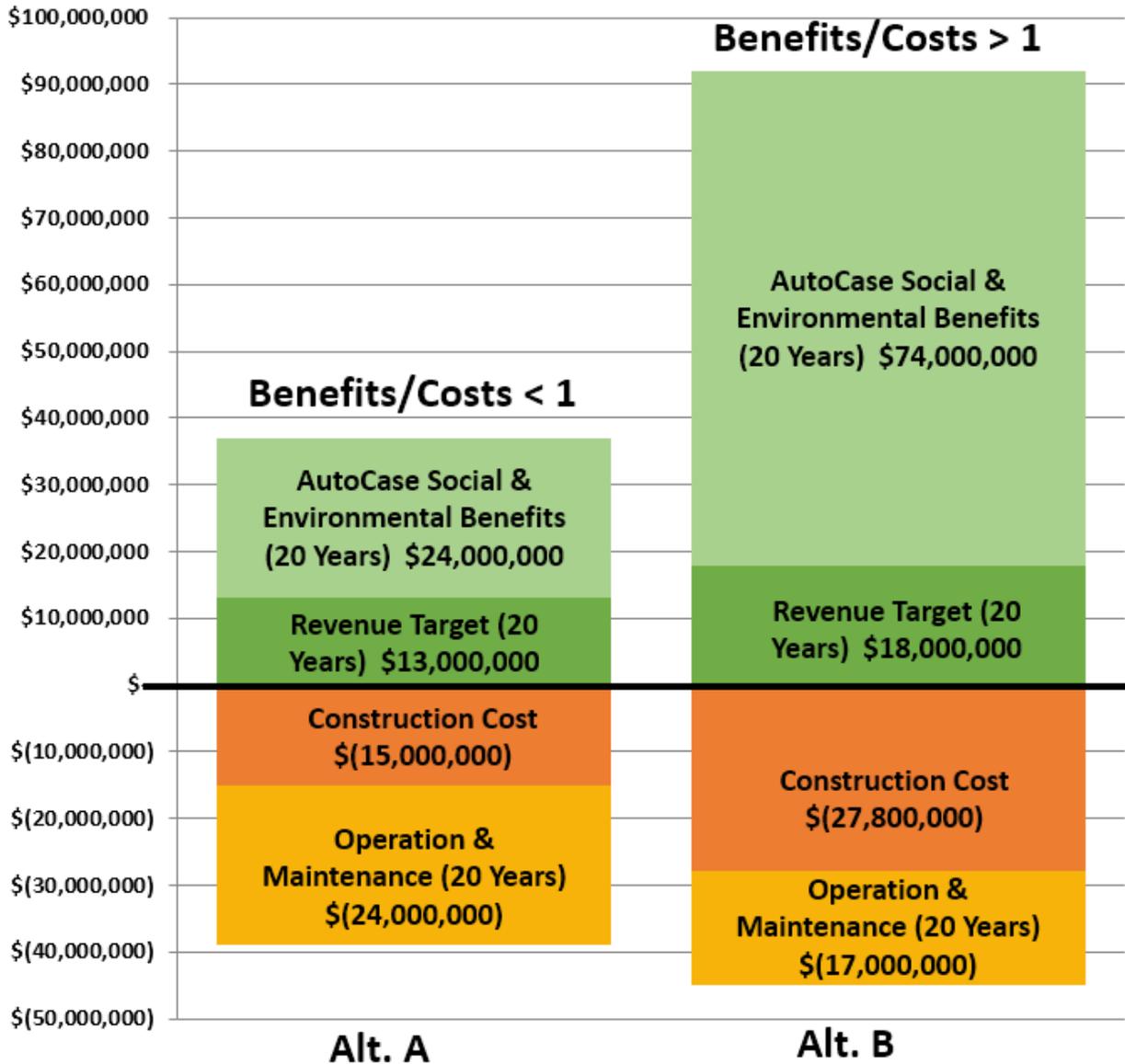
Assumes 5% annual growth rate of park visitors (based on 2012-2013 MPRB growth visitor growth rate)

Additional social and environmental factors were estimated using AutoCASE™ , but were not significant differentiators between Alt. A. and Alt. B and were not reported above (for example, Shadow Wage, Income Tax Transfers, Wage Transfers, Air Pollution and Carbon Emissions from Energy Use). The MPRB may consider revisiting these additional factors as project definition increases in the future as concepts are more fully developed. Similarly, AutoCASE™ includes the ability to perform risk-adjusted analysis using Monte-Carlo statistical simulation. The results of the risk-adjusted analysis were referred to when reviewing model results but are not included in this report.

The estimated 20-year social and environmental benefits were considered in addition to the 20-year estimated revenue potential, construction costs and 20-year O&M costs for both alternatives to provide a

more full assessment of financial, social and environmental value that each alternative provides. A summary of the complete TBL-CBA analysis for the two alternatives for the Hiawatha Golf Course is shown in Figure 5.

**Figure 5 –Summary: Triple-Bottom-Line Benefit & Cost Assessment
(Time Value of Money Not Included)**



Time-Value-of-Money Not Included (i.e. Discount Rate is 0%).

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
From: Matt Metzger, PE, ENV SP, Jen Koehler,, Barr Engineering Co.,
Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 23

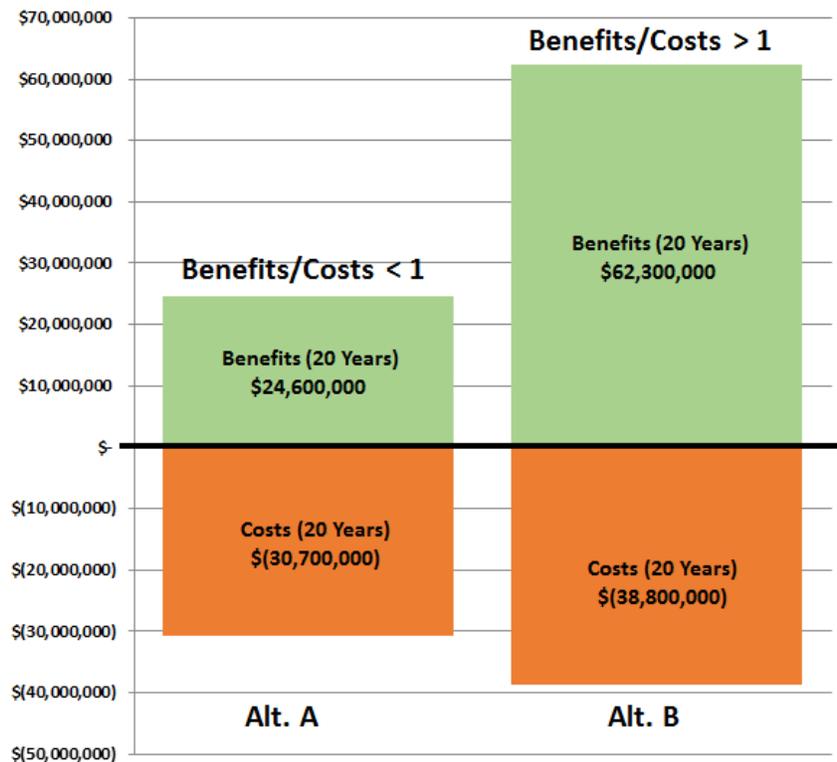
The public financial, social, and environmental benefits of Alt. A nearly match the total costs over 20-years, demonstrating the public value potentially brought by improving the clubhouse to make it a neighborhood amenity and maintaining the 18-hole golf course. The analysis also suggests the long-term public benefits of Alt. B could far outweigh the total project costs. For the 20-year analysis period, the public benefit-to-cost ratio of Alt. B could be two to three times greater than Alt. A for a similar 20-year investment. Project performance will ultimately depend on project planning, design, and implementation. After 20 years, public benefits will continue to accrue. Despite having a larger construction cost, Alt. B may have a similar 20-year life cycle cost, due largely to the long-term benefit of reduced annual operation and maintenance costs achieved by replacing the higher-maintenance 18-hole golf course turf with a naturalized park with water, wetlands and ecological restorations, which require significant investment during the establishment period but decreases once the communities are well-established.

Many public ecological, water quality and recreation benefits are realized by reducing pumping at the Hiawatha golf course site and working with naturalized land cover and hydrology to create the public park in Alt. B. It is these enhanced natural spaces, development of active and passive recreation opportunities, an improved clubhouse area and other facilities, and improved connectivity to the existing regional park system that could attract more users to the Alt. B park space. The projected beneficiary group for Alt. B is a larger and more diverse group of stakeholders than for Alt. A, which would primarily serve golfers and users of an improved clubhouse area. The park would serve many uses for diverse user groups in a naturalized setting that showcases the assets and natural resources of the City, MPRB, and the MCWD. This results from conversion of the 146 acres of fee-access public space with a specific use to freely-accessible public space with many uses.

9.0 Sensitivity Analysis

Sensitivity analysis was performed on the AutoCASE™ models to observe how benefit and cost estimates changed in response to assuming a range of parameters. Sensitivity analysis was performed on the AutoCASE™ model discount rate. By including a time-value-of-money discount rate of 4-percent, annualized costs and benefits are discounted to present-day value. The total present-day value of 20-year costs and benefits is less than if no discount rate is applied and affects both Alt. A and Alt. B equally. This slightly changes the observed total costs and total benefits, as observed in the figure above. However, Alt. B still appears to generate at least 2 times more benefits than Alt. A. during the 20-year period analyzed. For example, the 20-year total Alt. B benefits of \$90,000,000 (no discount rate) are discounted in AutoCASE™ to present day value of \$62,000,000 using an annual rate of 4%, as shown in Figure 5 below.

**Figure 5 – Summary: Sensitivity Check for Time Value of Money
 Triple-Bottom-Line Benefit & Cost Assessment
 (Time Value of Money Included as a Discount Rate of 4% for 20-Years)**



Time-value-of-money included as a discount rate of 4%.

Sensitivity analysis was also performed to observe how the modeled benefit estimates change when using the area-based versus user-day based methods for estimated recreation benefits. This check demonstrates that the area-based approach, whether considering only the 146-acre golf course or the combined 214-acre golf course and Lake Hiawatha area generates similar order-of-magnitude estimated recreational benefits as the user-day based approach. The user-day approach was used for the final analysis.

**Table 7 – Summary: Sensitivity Check for 20-Year Recreation Benefits (Method)
AutoCASE™ Triple-Bottom-Line Benefit & Cost Assessment**

Parameter Varied to Observe Model Sensitivity	Alternative A		Alternative B	
	Assumption	AutoCASE™ Recreation Benefit (20-Years) (\$)	Assumption	AutoCASE™ Recreation Benefit (20-Years) (\$)
Method: Recreation Area Extents, golf course area only	146 acres, 2 uses	9,400,000	146 acres, 5+ uses	9,400,000
Method: Recreation Area Extents, including the golf course and new connection to Lake Hiawatha surface area	146 acres, 2 uses	9,400,000	214 acres, 5+ uses	14,000,000
Method: Recreation User-Days (Year 0, assuming 5% annual growth)	60,000	4,500,000	150,000	11,300,000
Method: Recreation User-Days (Year 10, assuming 5% annual growth)	100,000	7,600,000	250,000	18,900,000

Time-value-of-money not included.

Finally, a sensitivity analysis was performed to test how a 3% MPRB visitor growth rate versus the 5% MPRB visitor growth rate affected the estimated benefits for Alt. B. The 3% user growth rate resulted in an overall decrease of \$11 million of Alt. B 20-year benefits compared to the 5% user growth rate, a decrease of 12% of total financial, social and environmental benefits. However, since this growth rate was applied to both Alternative A and Alternative B, a similar reduction would be anticipated for the benefits for Alternative A as well.

Table 8 – Summary: Sensitivity Check for 20-Year Recreation Benefits (User Growth Rate) AutoCASE™ Triple-Bottom-Line Benefit & Cost Assessment

Parameter Varied to Observe Model Sensitivity	Alternative B (20-years assuming 3% annual visitor growth rate)	Alternative B (20-years assuming 5% annual visitor growth rate)
Recreation Benefits	17,000,000	20,000,000
Water Quality Benefits	35,000,000	43,000,000
Subtotal	52,000,000	63,000,000

Time-value-of-money not included.

The sensitivity analysis provides a basis for demonstrating that the AutoCASE™ modeling approach generates results that are reasonable, given the project definition available at this stage. It is intended to demonstrate how changes to some modeling parameters might influence estimated costs and benefits.

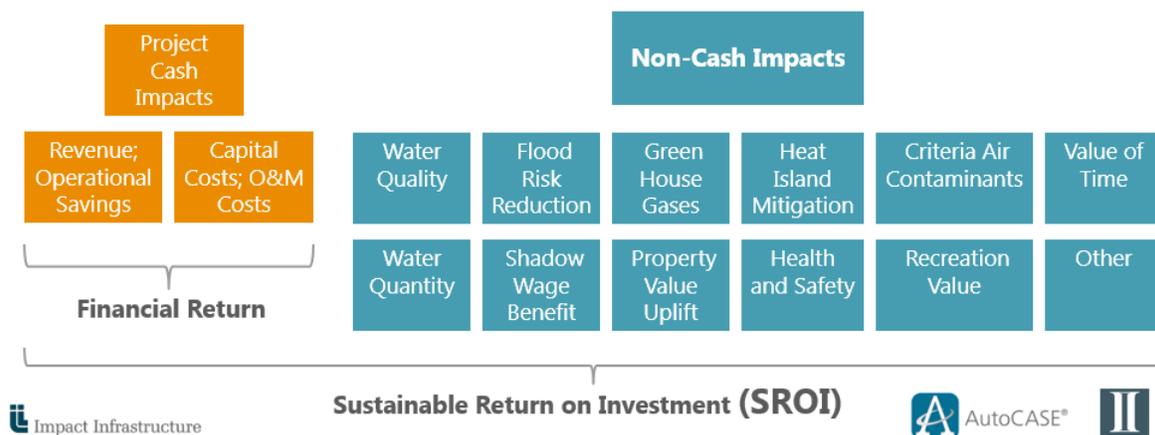
10.0 Definitions

The following definitions are intended to introduce terminology used in this report summary document:

Triple-Bottom-Line: the intertwined financial, social and environmental factors that contribute to the long-term risks, resilience and relative sustainability of a program, project or decision.

Triple-Bottom-Line Cost Benefit Analysis: an evidence-based economic method that combines Life Cycle Cost Analysis (LCCA) and Cost-Benefit Analysis (CBA) techniques to quantify and attribute monetary values to the Triple-Bottom-Line (TBL) – financial, social and environmental – impacts of a given project or proposal.

Sustainable-Return-On-Investment: the Sustainable Return on investment (SROI) is the Systematic process for calculating and comparing benefits and costs of a project to justify an investment or compare projects. The SROI process accounts for a project’s triple bottom line: its full range of economic/financial, environmental, and social impacts. See image below courtesy of Impact Infrastructure:



AutoCASE™™: a web-based software valuation tool with the primary purpose of producing risk-adjusted, dollar-based metrics for infrastructure projects and buildings based on their costs, benefits, and sustainable design features. It is designed to be run early and often through the feasibility, planning, design, and construction stages of a project, and it can be used with minimal information, drawing on standard, regionally-specific inputs and best practice data.

Institute for Sustainable Infrastructure (ISI) Envision™: a sustainability framework offered by Institute for Sustainable Infrastructure, the American Public Works Association (APWA), American Society of Civil

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
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Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 28

Engineers (ASCE), American Council of Engineering Companies (ACEC) and the Harvard University Zofnass Program for Sustainable Infrastructure. The framework is intended to be applied to infrastructure outside of the building envelope. According to ISI, The Envision™ *“sustainable infrastructure rating system has been created to evaluate, grade and give recognition to infrastructure projects that provide progress and contributions for a sustainable future. Its purpose is to foster a necessary and dramatic improvement in the performance and resiliency of physical infrastructure across the full economic, social, and environmental dimensions of sustainability. It is designed to help users identify ways in which sustainable approaches can be used to plan, design, construct and operate infrastructure projects.”*

Summary Description of AutoCASE™ Methodology for Benefit and Cost Categories:

Air Pollution: “Air pollution emissions can either increase or decrease due to changes in operational energy usage, and a net increase or decrease in vegetation. The air pollutants addressed in AutoCASE™ include nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), and particulate matter of aerodynamic diameter of two-point-five micrometers or fewer (PM-2.5). Practices that provide a direct impact on uptake and deposition include the net gain or loss of trees, shrubs, grassy area, green roof area, herbaceous plant area, and any changes in energy usage. As some of these practices require maintenance, such as the mowing of grassy areas, the emissions from these maintenance activities are also included. Air pollution emissions can either increase or decrease due to changes in operational energy usage and a net increase or decrease in vegetation.” [AutoCASE™ user manual]

Carbon Emissions: “Avoided CO₂ emissions, as well as increased CO₂ sequestration, can be a large benefit of investing in green infrastructure development. The approach to quantifying the value of changes in Air Pollution and Carbon Emissions involves the quantification of changing emissions due to energy usage, materials usage, and a change in vegetation.” [AutoCASE™ user manual]

Envision™ Credits Value: “AutoCASE™ has been developed to enhance the Envision™ rating system, adding the ability for the Envision™ system to provide value-based and risk-adjusted analyses of infrastructure projects. Net benefits are allocated to the Envision categories.” [AutoCASE™ user manual]

Flood Risk: “As climate change has progressed and rainfall events in some regions have become more extreme, flood risk has become an important consideration in infrastructure development. AutoCASE™ quantifies the value of reduced flood risk due to a smaller volume of runoff from the project’s property during storm events. This can be caused by increased green acreage, stormwater storage capacity, stormwater drainage capacity, or reducing the surface area covered by impervious land.” [AutoCASE™ user manual]

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
From: Matt Metzger, PE, ENV SP, Jen Koehler, Barr Engineering Co.,
Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 29

Heat Mortality: “Green infrastructure (GI) can reduce the severity of extreme heat events by creating shade and reducing the amount of heat absorbed by pavement and rooftops. The Urban Heat Island (UHI) effect compromises human health and comfort by causing respiratory difficulties, exhaustion, heat stroke, and heat-related mortality. Various studies have estimated that trees and other vegetation within building sites can reduce temperatures by 5 °F when compared to outside non-green space. At larger scales, variation between non-green city centers and rural areas has been shown to be as high as 9 °F during the day and up to 22 °F during the night.” [AutoCASE™ user manual]

Property Value: “The use of Green Infrastructure (GI) or Low Impact Development (LID) features can lead to increased property prices in a region. The “Property Uplift” benefit in AutoCASE™ provides a value estimate of a project’s direct impacts on market prices. Increased value can be attributed to improved aesthetic value of the local area...” [AutoCASE™ user manual]

Recreational Value: “Green infrastructure has been shown to increase recreational opportunities. The value of added recreational opportunities is measured by the increase in recreational trips or user days gained from urban greening. Use values can then be assigned to the various recreational activity trips. AutoCASE™ uses a methodology developed by the US Army Corps of Engineers to quantify this benefit, while also incorporating low and high ranges into the analysis.” [AutoCASE™ user manual]

Risk-Adjusted Monte Carlo Simulation: AutoCASE™ runs a Monte Carlo-based engine to simulate future outcomes and project value. Low, Most Likely, and High values are used from both user inputs and from values in literature to reflect uncertainty. These values then are defined by a distribution, and values are selected from these distributions and input into the simulation and cost-benefit analysis.

Shadow Wage: “The Shadow Wage Benefit represents the poverty reduction benefits of increased local employment opportunities... an increase in employment may lead to hiring more people from a pool of unemployed individuals, which creates value because the wages paid in the new jobs is greater than what they would otherwise be doing for the construction phase AutoCASE™ assumes a wage of \$22 per hour for construction workers” [AutoCASE™ user manual]

Social Value of Water: “If an increase in water storage capacity on the project site leads to the reuse of stormwater, there is the possibility that the user will realize a direct financial benefit due to a reduced water bill. The value of water is determined by both the water use category and water resource region.” [AutoCASE™ user manual]

Water Quality: “Increased acres of vegetation, including forest or wetlands, can positively influence the water quality in a local area. In addition, using LID for stormwater management can reduce the stormwater volume that must be managed by grey infrastructure, reducing the frequency and volume of overflowing sewer systems in large storm events. This leads to improved water quality in local waters. The

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Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 30

improvement can be quantified using an avoided treatment cost approach. The improvement can also be quantified by assessing the willingness-to-pay (WTP) of local households for improvements in water quality." [AutoCASE™ user manual]

Wetlands: "The value measure for wetlands is based on a number of beneficial functions that wetlands serve, including the following: food control, water supply, water quality, recreation, commercial fisheries, and habitat. In AutoCASE™™, the approach taken is to use a meta-analysis of over 200 studies quantifying the value of wetlands in the United States." [AutoCASE™ user manual]

To: Michael Schroeder, MPRB, Katrina Kessler, City of Minneapolis
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Janna King, Economic Development Services, Inc.,
Subject: MPRB Hiawatha Golf Course – Benefits and Costs Comparative Screening
Date: July 14, 2017
Page: 31

11.0 Attachments – Planning Level Estimates of Revenue, Construction Costs, and O&M Costs for Alternative A and Alternative B

**Hiawatha Golf Course
Site Redevelopment Comparison - Alt. A vs. Alt. B
Engineer's Opinion of Probable Cost (OPC)**

Date: June 29, 2017

Order of Magnitude Feasibility Estimate (ASTM E2516-11, Class 5)

Barr Engineering #23-27-1466

MPRB Estimated Revenue

Category	Item Description	Unit	Low High		Alt. A Revenue			Alt. B Revenue		
			Unit Income ³	Unit Income ³	Qty	Low Extension	High Extension	Qty	Low Extension	High Extension
18-HOLE GOLF COURSE RENOVATION	18-Hole golf course renovation (all work)	LS	\$ 130,000	\$ 250,000	1.0	\$ 130,000	\$ 250,000	N/A	N/A	N/A
	18-Hole golf course rounds to other MPRB courses	LS	\$ 12,000	\$ 27,000	N/A	N/A	N/A	1.0	\$ 12,000	\$ 27,000
	Neighborhood restaurant w/ beer, indoor & outdoor	LS	\$ 75,000	\$ 250,000	1.0	\$ 75,000	\$ 250,000	1.0	\$ 75,000	\$ 312,500
	Clubhouse banquet hall & flex space	LS	\$ 100,000	\$ 130,000	1.0	\$ 100,000	\$ 130,000	1.0	\$ 150,000	\$ 162,500
	Clubhouse banquet hall & flex space (food & beverage)	LS	\$ 75,000	\$ 250,000	1.0	\$ 75,000	\$ 250,000	1.0	\$ 112,500	\$ 312,500
	Retreat center for event rental	LS	\$ 80,000	\$ 166,000	N/A	N/A	N/A	1.0	\$ 80,000	\$ 166,000
	Large rental pavilion w/ seasonal restroom	LS	\$ 10,000	\$ 15,000	N/A	N/A	N/A	1.0	\$ 10,000	\$ 15,000
	Festival grounds	LS	\$ 50,000	\$ 100,000	N/A	N/A	N/A	1.0	\$ 50,000	\$ 100,000
	Canoe launch and rentals	LS	\$ 17,000	\$ 32,000	N/A	N/A	N/A	1.0	\$ 17,000	\$ 32,000
	Canoe and kayak racks	LS	\$ 4,000	\$ 6,000	N/A	N/A	N/A	1.0	\$ 4,000	\$ 6,000
	Pay Parking	LS	\$ 70,000	\$ 110,000	N/A	N/A	N/A	1.0	\$ 70,000	\$ 110,000
	SUBTOTAL					\$ 380,000	\$ 880,000		\$ 580,500	\$ 1,243,500
SUBTOTAL w/ CONTINGENCY	ANNUAL ESTIMATED REVENUE PER YEAR					\$ 400,000	\$ 900,000		\$ 600,000	\$ 1,200,000

Annual O&M Per Year

Notes	
1	Limited Design Work Completed (Less than 5%).
2	Quantities Based on Design Work Completed.
3	Unit Income Goals Based on Information Available at This Time.
<p>The OPC was developed for comparative purposes only using information from similar projects and the consulting team's experience and qualifications. The opinion of cost represents the team's best judgment as experienced and qualified professionals familiar with the project, based on project-related information available at this time, available cost information from other projects and a screening level design for each alternative. The opinion of probable cost will change as more information becomes available and the level of design detail is advanced. In addition, since the team has no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, it can be expected that proposals, bids, or actual construction costs will vary from this opinion of probable cost. If a more accurate opinion of probable cost is desired, a more detailed study including a more detailed definition of the alternatives would be necessary.</p>	

**Hiawatha Golf Course
Site Redevelopment Comparison - Alt. A vs. Alt. B
Engineer's Opinion of Probable Cost (OPC)**

Date: June 29, 2017

Order of Magnitude Feasibility Estimate (ASTM E2516-11, Class 5)

Barr Engineering #23-27-1466

Construction Costs

Category	Item Description	Unit	Unit Price ³	Alt. A Capital Cost		Alt. B Capital Cost	
				Qty	Extension	Qty	Extension
GENERAL	Mobilization/Demobilization (5%)	LS	varies	1	\$ 500,000	1	\$ 800,000
	Traffic and Pedestrian Safety, Site Prep, Erosion Control (1%)	LS	varies	1	\$ 76,000	1	\$ 160,000
18-HOLE GOLF COURSE RENOVATION	18-Hole golf course renovation (all work)	LS	\$ 1,500,000.00	1.0	1,500,000.00	N/A	N/A
	18-Hole golf course renovation (reconstruct portion after 10-year flood)	LS	\$ 400,000.00	2.0	800,000.00	N/A	N/A
CLUBHOUSE RECONSTRUCTION	Clubhouse assessment, abatement and demolition	LS	25,000.00	1	25,000.00	1	25,000.00
	Site sanitary sewer	LF	50	300	15,000.00	1,500	75,000.00
	Sanitary access charge (SAC)	LS	640,000.00	1	640,000.00	1	640,000.00
	Site water service	LF	50	300	15,000.00	1,500	75,000.00
	Neighborhood restaurant w/ beer, indoor (all work)	SF	500	1,600	800,000.00	1,600	800,000.00
	Neighborhood restaurant w/ beer, outdoor patio (all work)	SF	50	4,000	200,000.00	4,000	200,000.00
	Clubhouse commercial kitchen	SF	\$ 500.00	800	400,000.00	800	400,000.00
	Clubhouse commercial kitchen (equipment)	LS	\$ 250,000.00	1	250,000.00	1	250,000.00
	Clubhouse entrance space	SF	\$ 500.00	600	300,000.00	600	300,000.00
	Clubhouse banquet hall & flex space	SF	\$ 500.00	5000.0	2,500,000.00	5000.0	2,500,000.00
	Clubhouse lawn games	LS	\$ 25,000.00	1.0	25,000.00	1.0	25,000.00
	Retreat center for event rental	SF	\$ 750.00	N/A	N/A	3000.0	2,250,000.00
	Picnic pavilions	EA	\$ 100,000.00	N/A	N/A	3.0	300,000.00
	Large rental pavilion w/ seasonal restroom	EA	\$ 500,000.00	N/A	N/A	1.0	500,000.00
	Festival grounds	LS	\$ 112,800.00	N/A	N/A	1.0	112,800.00
	Canoe launch and rentals	EA	\$ 250,000.00	N/A	N/A	1.0	250,000.00
	Canoe and kayak racks	EA	\$ 2,000.00	N/A	N/A	6.0	12,000.00
	Park land open turf	AC	\$ 2,000.00	N/A	N/A	26.5	53,000.00
	Native plant community restorations & pollinator habitat	AC	\$ 2,300.00	N/A	N/A	28.0	64,400.00
	Wetland restoration	AC	\$ 6,325.00	N/A	N/A	49.6	313,720.00
	Tree removal	EA	\$ 500.00	17.0	8,500.00	189.0	94,500.00
	Tree plantings	EA	\$ 200.00	17.0	3,400.00	189.0	37,800.00
	Open drainage channel excavation and bank restoration	LF	\$ 300.00	4300.0	1,290,000.00	1190.0	357,000.00
	Minnehaha Creek realignment	LF	\$ 300.00	N/A	N/A	3536.0	1,060,800.00
	Minnehaha Creek diversion structure	LS	\$ 100,000.00	N/A	N/A	1.0	100,000.00
	Paved multi-use trails (biking, walking, running)	LF	\$ 30.00	N/A	N/A	12000.0	360,000.00
	Multi-use trail bridges	EA	\$ 200,000.00	N/A	N/A	3.0	600,000.00
	Multi-use boardwalk trail	SF	\$ 75.00	N/A	N/A	16000.0	1,200,000.00
	Automobile parking lot (bituminous pavement)	SY	\$ 27.00	4444.0	119,988.00	4630.0	125,010.00
	Automobile parking lot (permeable pavement)	SY	\$ 100.00	N/A	N/A	4630.0	463,000.00
	Automobile parking lot (overflow, reinforced turf)	SY	\$ 66.00	N/A	N/A	4630.0	305,580.00
	Bicycle parking	EA	\$ 191.00	104.0	19,864.00	324.0	61,884.00
Mass site grading	CY	\$ 5.00	N/A	N/A	260000.0	1,300,000.00	
Pond/wetland excavation	CY	\$ 20.00	N/A	N/A	32267.0	645,340.00	
Stormwater management (green infrastructure)	SF	\$ 15.00	3178.0	47,670.00	8556.0	128,340.00	
Site lighting and site park furnishings	LS	\$ 500,000.00	N/A	N/A	1.0	500,000.00	
Groundwater Pumping System (Longfellow Drain)	LS	\$ 150,000.00	N/A	N/A	1.0	150,000.00	
Groundwater Pumping System (Well at E 43rd Street and 17th Avenue S)	LS	\$ 20,000.00	N/A	N/A	1.0	20,000.00	
Trash collection system	LS	\$ 150,000.00	1.0	150,000.00	1.0	150,000.00	
SUBTOTAL					\$ 9,685,422		\$ 17,765,174
CONTINGENCY	25%				\$ 2,421,356		\$ 4,441,294
SUBTOTAL w/ CONTINGENCY					\$ 12,110,000		\$ 22,210,000
PLANNING, ENGINEERING AND DESIGN (PED) AND CONSTRUCTION MANAGEMENT (CM)	25%				\$ 3,027,500		\$ 5,552,500
Total Opinion of Construction Cost ^{1 2 3 4 5 6}					\$ 15,100,000		\$ 27,800,000
Anticipated Accuracy Range ⁶		High	+50%		22,650,000		41,700,000
		Low	-25%		11,325,000		20,850,000

Notes

- ¹ Limited Design Work Completed (Less than 5%).
- ² Quantities Based on Design Work Completed.
- ³ Unit Prices Based on Information Available at This Time.
- ⁴ Limited Soil Boring and Field Investigation Information Available.
- ⁵ Based on Preliminary Project Alignment Definition.
- ⁶

Hiawatha Golf Course
Site Redevelopment Comparison - Alt. A vs. Alt. B
Engineer's Opinion of Probable Cost (OPC)
Order of Magnitude Feasibility Estimate (ASTM E2516-11, Class 5)
Barr Engineering #23-27-1466

Date: June 29, 2017

Operation and Maintenance Costs					Alt. A			Alt. B		
					Low		High	O&M Cost		O&M Cost
Item Description	Unit	Unit Price ³	Unit Price ³	Qty	Low Extension	High Extension	Qty	Low Extension	High Extension	
18-Hole golf course annual maintenance (all work)	LS	\$ 700,000	\$ 1,100,000	1.0	\$ 700,000	\$ 1,100,000	N/A	N/A	N/A	
Neighborhood restaurant w/ beer, indoor (all work)	SF	22	22	1600.0	\$ 35,200	\$ 35,200	1600.0	\$ 35,200	\$ 35,200	
Neighborhood restaurant w/ beer, outdoor patio (all work)	SF	22	22	4000.0	\$ 88,000	\$ 88,000	4000.0	\$ 88,000	\$ 88,000	
Clubhouse commercial kitchen	SF	22	22	800.0	\$ 17,600	\$ 17,600	800.0	\$ 17,600	\$ 17,600	
Clubhouse entrance space	SF	22	22	600.0	\$ 13,200	\$ 13,200	600.0	\$ 13,200	\$ 13,200	
Clubhouse banquet hall & flex space	SF	22	22	5000.0	\$ 110,000	\$ 110,000	5000.0	\$ 110,000	\$ 110,000	
Clubhouse lawn games	LS	\$ 500.00	\$ 500.00	1.0	\$ 500	\$ 500	1.0	\$ 500	\$ 500	
Retreat center for event rental	SF	22	22	N/A	N/A	N/A	3000.0	\$ 66,000	\$ 66,000	
Picnic pavilions	LS	\$ 15,000.00	\$ 15,000.00	N/A	N/A	N/A	1.0	\$ 15,000	\$ 15,000	
Large rental pavilion w/ seasonal restroom	LS	\$ 15,000.00	\$ 15,000.00	N/A	N/A	N/A	1.0	\$ 15,000	\$ 15,000	
Festival grounds	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	2256.0	2,256.00	
Canoe launch and rentals	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	5000.0	5,000.00	
Canoe and kayak racks	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	240.0	240.00	
Park land open turf	AC	\$ 5,374.60	\$ 5,374.60	N/A	N/A	N/A	26.5	142427.0	142,427.00	
Native plant community restorations & pollinator habitat	AC	\$ 2,005.39	\$ 3,071.29	N/A	N/A	N/A	28.0	56151.0	85,996.00	
Wetland restoration	AC	\$ 1,373.51	\$ 2,557.82	N/A	N/A	N/A	49.6	68126.0	126,868.00	
Tree removal	see plant community maintenance			N/A	N/A	N/A	N/A	N/A	N/A	
Tree plantings	see plant community maintenance			N/A	N/A	N/A	N/A	N/A	N/A	
Open drainage channel excavation and bank restoration	see plant community maintenance			N/A	N/A	N/A	N/A	N/A	N/A	
Minnehaha Creek realignment	see plant community maintenance			N/A	N/A	N/A	N/A	N/A	N/A	
Paved multi-use trails (biking, walking, running)	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	7200.0	7,200.00	
Multi-use trail bridges	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	12000.0	12,000.00	
Multi-use boardwalk trail	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	24000.0	24,000.00	
Natural skating trails/loop	LS	\$ 50,000.00	\$ 50,000.00	N/A	N/A	N/A	1.0	50000.0	50,000.00	
Automobile parking lot (bituminous pavement)	LS	2% of constr.	2% of constr.	1.0	2399.8	2,399.76	1.0	2500.2	2,500.20	
Automobile parking lot (permeable pavement)	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	9260.0	9,260.00	
Automobile parking lot (overflow, reinforced turf)	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	6111.6	6,111.60	
Bicycle parking	LS	2% of constr.	2% of constr.	1.0	397.3	397.28	1.0	1237.7	1,237.68	
Stormwater management (green infrastructure)	LS			1.0	953.4	953.40	1.0	1069.5	1,069.50	
Site lighting and site park furnishings	LS	2% of constr.	2% of constr.	N/A	N/A	N/A	1.0	10000.0	10,000.00	
Groundwater Pumping System (Longfellow Drain)	LS	\$ 1,800.00	\$ 1,800.00	N/A	N/A	N/A	1.0	1800.0	1,800.00	
Groundwater Pumping System (Well at E 43rd Street and 17th Avenue S)	LS	\$ 1,100.00	\$ 1,100.00	N/A	N/A	N/A	1.0	1100.0	1,100.00	
Trash collection system	LS	\$ 5,000.00	\$ 5,000.00	1.0	5000.0	5,000.00	1.0	5000.0	5,000.00	
SUBTOTAL					\$ 973,250	\$ 1,373,250		\$ 765,979	\$ 854,566	
ANNUAL O&M PER YEAR^{1 2 3 4 5 6}					\$ 1,000,000	\$ 1,400,000		\$ 800,000	\$ 900,000	

Low High Low High

Notes

¹ Limited Design Work Completed (Less than 5%).

² Quantities Based on Design Work Completed.

³ Unit Prices Based on Information Available at This Time.

⁴ Limited Soil Boring and Field Investigation Information Available.

⁵ Based on Preliminary Project Alignment Definition.

⁶ This feasibility-level (Class 5, < 5% design completion per ASTM E 2516-11) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. The estimated accuracy range for the Total Project Cost as the project is defined is -25% to +100%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped.

The OPC was developed for comparative purposes only using information from similar projects and the consulting team's experience and qualifications. The opinion of cost represents the team's best judgment as experienced and qualified professionals familiar with the project, based on project-related information available at this time, available cost information from other projects and a screening level design for each alternative. The opinion of probable cost will change as more information becomes available and the level of design detail is advanced. In addition, since the team has no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, it can be expected that proposals, bids, or actual construction costs will vary from this opinion of probable cost. If a more accurate opinion of probable cost is desired, a more detailed study including a more detailed definition of the alternatives would be necessary.

**Hiawatha Golf Course
 Site Redevelopment Comparison - Alt. A vs. Alt. B
 Engineer's Opinion of Probable Cost (OPC)**

Date: June 29, 2017

Order of Magnitude Feasibility Estimate (ASTM E2516-11, Class 5)

Barr Engineering #23-27-1466

Construction Costs

Category	Item Description	Unit	Unit Price ³	Alt. A Capital Cost		Alt. B Capital Cost	
				Qty	Extension	Qty	Extension
<p>³This feasibility-level (Class 5, < 5% design completion per ASTM E 2516-11) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. The estimated accuracy range for the Total Project Cost as the project is defined is -25% to +100%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. Operation and Maintenance costs are not included.</p>							
<p>The OPC was developed for comparative purposes only using information from similar projects and the consulting team's experience and qualifications. The opinion of cost represents the team's best judgment as experienced and qualified professionals familiar with the project, based on project-related information available at this time, available cost information from other projects and a screening level design for each alternative. The opinion of probable cost will change as more information becomes available and the level of design detail is advanced. In addition, since the team has no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, it can be expected that proposals, bids, or actual construction costs will vary from this opinion of probable cost. If a more accurate opinion of probable cost is desired, a more detailed study including a more detailed definition of the alternatives would be necessary.</p>							