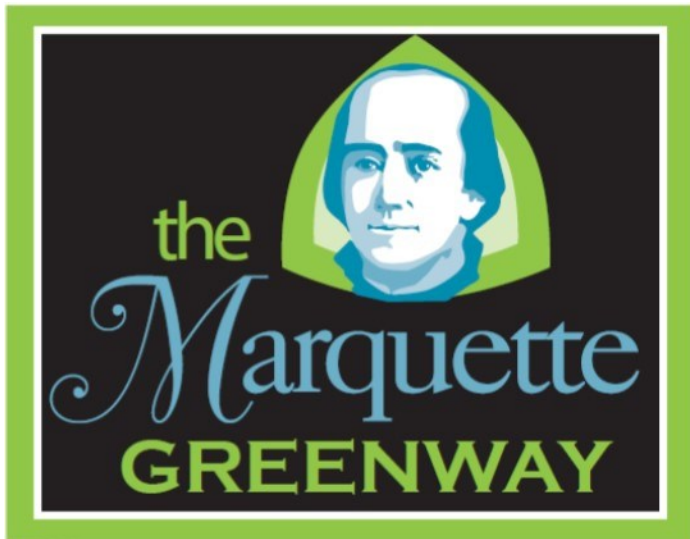




COMPLETING THE VISION II



WEST GARY PHASE



FY 2024 RAISE Benefit-Cost Analysis Narrative

February 28, 2024

I. Executive Summary

The Benefit-Cost Analysis for the proposed 3.75-mile RAISE-funded Marquette Greenway project in the City of Gary adheres to the National Cooperative Highway Research Program Report 552: Guidelines for Analysis of Investments in Bicycle Facilities (NCHRP 552) and the U.S. Department of Transportation’s (USDOT’s) Benefit-Cost Analysis Guidance for Discretionary Grant Programs (December 2023). In summary, the economic value was estimated for the proposed Marquette Greenway project in terms of improvements to recreation, mobility, health, decreased auto use, and safety benefits. The assumptions are that the project will be developed in 2024 through 2026, constructed in 2027 and 2028, and open by 2029 with a 20-year life ending in 2048. Also, the project is expected to affect an area of within 1.5 miles of the trail. In summary, the proposed \$21.2 million Marquette Greenway project will conservatively provide up to \$27.5 million in economic benefits (Exhibit 1) in a low scenario. This results in a benefit-cost ratio of 8.37:1 when a 3.1 percent discount rate is applied to the costs for their estimated year of expenditures. The project is also expected to accumulate hard-to-estimate benefits in tourism and increased property values.

Exhibit 1: Net Present Value Benefits and Costs of Marquette Greenway Project with a 3.1 Percent Discount Rate (Medium Scenario for Recreation, Health, and Decreased Auto Use Benefits) in 2022 \$

Category	Marquette Greenway RAISE Project
Recreation Benefit	\$128,423,953
Mobility Benefit	\$683,539
Health Benefit	\$4,524,710
Decreased Auto Use Benefit	\$244,453
Safety Benefit	\$7,657,804
Total Benefit	\$141,534,459
Preliminary Engineering Cost	(\$1,780,482)
Right-of-Way Cost	(\$30,846)
Construction Cost	(\$12,816,122)
Project Management for Construction Cost	(\$213,480)
Construction Engineering Cost	(\$1,601,095)
Operations and Maintenance Cost	(\$474,932)
Total Cost	(\$16,916,956)
Benefit-Cost Ratio	8.00

As explained in the benefits section later, if a more conservative scenario for recreation, health, and decreased auto use benefits is assumed, then the Marquette Greenway project results in a benefit-cost ratio of 0.96:1 with a 3.1 percent discount rate as shown in Exhibit 2.

Exhibit 2: Net Present Value Benefits and Costs of Marquette Greenway Project with a 3.1 Percent Discount Rate (Low Scenario for Recreation, Health, and Decreased Auto Use Benefits) in 2022 \$

Category	Marquette Greenway RAISE Project
Recreation Benefit	\$8,112,885
Mobility Benefit	\$683,539
Health Benefit	\$305,575
Decreased Auto Use Benefit	\$150,437
Safety Benefit	\$7,657,804
Total Benefit	\$16,910,240
Preliminary Engineering Cost	(\$1,780,482)
Right-of-Way Cost	(\$30,846)
Construction Cost	(\$12,816,122)
Project Management for Construction Cost	(\$213,480)
Construction Engineering Cost	(\$1,601,095)
Operations and Maintenance Cost	(\$474,932)
Total Cost	(\$16,916,956)
Benefit-Cost Ratio	1.00

II. Project Costs

Total project costs were compiled by engineers working in the area (Butler, Fairman & Seufert) using estimates based on actual costs of bicycle trail and bridge projects currently under construction or completed within the last three years, including various segments of already existing or funded portions of the Marquette Greenway outside the proposed RAISE-funded Marquette Greenway project. The breakdown of the projected costs is included in the Marquette Greenway RAISE application narrative and Exhibit 3 below. Note all costs are in 2022 dollars.

Total Estimated Project Costs: \$19,319,142

Less Already Obligated and Local Contributions: \$0 (Project is 100 percent federal)

RAISE Request: \$19,319,142 (nominal request is \$21,192,937 in 2024 dollars for the purposes of this grant application)

Exhibit 3: Project Costs Associated with Marquette Greenway Project (2022 \$)

Entity	Segment Detail	Preliminary Engineering Cost	Right-of-Way Cost	Construction Cost (plus 20% Contingency)	Project Management of Construction Cost	Construction Engineering Cost	Total Cost
Gary	3.75 mi trail	\$1,980,666	\$34,852	\$15,157,539	\$252,481	\$1,893,604	\$19,319,142
Total		\$1,980,666	\$34,852	\$15,157,539	\$252,481	\$1,893,604	\$19,319,142

It is assumed that 10 percent of preliminary engineering costs will be expended in 2024, 40 percent of preliminary engineering costs will be expended each in 2025 and 2026, and 10 percent of preliminary engineering costs will be expended in 2027. It is assumed that right-of-way costs will be expended in 2026. It is assumed that 50 percent of construction costs, 50 percent of construction engineering costs, and 50 percent of project management of construction costs will be expended in 2027, and the remaining 50 percent of these costs will be expended in 2028. It is also assumed that operations and maintenance costs will be \$6,500 per mile per year (2002 \$) in accordance with the National Cooperative Highway Research Program and Minnesota Department of Transportation’s Benefit-Cost Analysis of Bicycle Facilities Tool, which translates to \$38,696 per year of the trail’s operation for the entire 3.75-mile project (2022 \$).¹

III. Benefits

Recreation

Within 1.5 miles of the Marquette Greenway project, approximately 10.7% of households do not have access to a vehicle.² This means that an estimated 1,033 households will gain readily available access to the recreation opportunities afforded by these projects. Using the National Cooperative Highway Research Program and Minnesota Department of Transportation’s Benefit-Cost Analysis of Bicycle Facilities Tool, a low annual estimate of the recreation benefit expected to result from the project is \$661,005 (2022 \$) beginning in 2029 and a medium annual estimate is \$10,463,463.³ This corresponds to a Net Present Value of \$8,112,885 for a low estimate or \$128,423,953 for a medium estimate with a 3.51 percent discount rate over the 20-year life of the project.

Mobility

Bicyclists are willing to travel additional distances to avoid biking in traffic. The National Cooperative Highway Research Program finds that bicyclists are willing to travel up to 22 additional minutes to use an off-street bicycle path if one is available instead of the shortest path in mixed traffic.⁴ Currently, 0.2 percent of commuters in the 1.5-mile radius of the Marquette Greenway project bicycle to work. This

¹ https://www.pedbikeinfo.org/bikecost_x/step1.cfm using input parameters of Metro Area: Suburban Chicago, Mid-Year of Construction: 2027, Facility Type: Off-Street Bicycle Trail, Improvement Type: Trail Asphalt.

² American Community Survey, 2018-2022 5-year Estimates Table B25044 for Block Groups within 1.5 miles of project.

³ https://www.pedbikeinfo.org/bikecost_x/step1.cfm using input parameters of Metro Area: Suburban Chicago, Mid-Year of Construction: 2027, Facility Type: Off-Street Bicycle Trail, Commute Share: 0.2009%, Residential Density within 800 m: 582, between 801 m and 1600 m: 1484, between 1601 m and 2400 m: 2025, Facility Length: 6035 meters.

⁴ NCHRP Report 552

corresponds to about 44 existing bicycle commuters in the 1.5-mile radius of the project and about 14 additional bicycle commuters expected to be added as a result of the project being built.

The National Cooperative Highway Research Program and Minnesota Department of Transportation's Benefit-Cost Analysis of Bicycle Facilities Tool estimates that annual mobility benefits are expected to be \$55,692 (2022 \$).⁵ This corresponds to a Net Present Value of \$683,539 over the 20-year life of the project using a 3.51 percent discount rate.

Health

A more physically active population will enjoy lower health care costs. NCHRP 552 shows how to monetize the annual per-capita cost savings from increased physical activity caused by the increased bicyclists expected to result from the Marquette Greenway project. It is estimated that there will be an additional 194 new bicyclists from this project, which includes 14 new bicycle commuters.⁶

The National Cooperative Highway Research Program and Minnesota Department of Transportation's Benefit-Cost Analysis of Bicycle Facilities Tool applies a formula that monetizes the health benefits using a low, medium, and high model. To be conservative, only the low and medium model estimates are used in this valuation. The tool's low estimate model values the annual health benefits at \$24,897 (2022 \$), while the tool's medium estimate model values the annual health benefits at \$368,655 (2022 \$). Applying a 3.51 percent discount rate, these figures correspond to Net Present Value of the health benefits of \$305,575 and \$4,524,710 respectively over the 20-year life of the project.

Decreased Auto Use

New bicycle commuters taking advantage of the Marquette Greenway project would avoid adding to congestion, air pollution and excess user costs associated with otherwise driving motorized vehicles. NCHRP 552 finds that new recreational bicyclists do not replace motor vehicles, so no decreased auto use benefits are monetized for this group. The National Cooperative Highway Research Program and Minnesota Department of Transportation's Benefit-Cost Analysis of Bicycle Facilities Tool estimates that the Marquette Greenway project will generate 14 new bicycle commuters.⁷

This analysis assumes that the total amount of new bicycle commuter mileage is a reasonable number to use to represent the total amount of now bicycle riding substituting for driving. This is assumed to be a conservative assumption because a very high proportion of commuters within 1.5 miles of the proposed projects currently drive in a motor vehicle to work. The American Community Survey finds that 88 percent of commuters drive in a motor vehicle, so there is a high potential for growth in bicycle commuting. The average commute distance by bicycle in the Northwestern Indiana Regional Planning Commission (NIRPC, the Metropolitan Planning Organization for most of the project area) region of Lake, Porter, and LaPorte Counties in Indiana is 4.59 miles.⁸

The National Cooperative Highway Research Program and Minnesota Department of Transportation's Benefit-Cost Analysis of Bicycle Facilities Tool estimates annual monetized decreased auto use benefits

⁵ <http://www.pedbikeinfo.org/bikecost/step1.cfm> using same input parameters as in Footnote 3.

⁶ <http://www.pedbikeinfo.org/bikecost/step1.cfm> using same input parameters as in Footnote 3.

⁷ <http://www.pedbikeinfo.org/bikecost/step1.cfm> using same input parameters as in Footnote 3.

⁸ Cross-tabulation in the 2018 My Daily Travel Household Travel Survey - NIRPC for Work Trips with Commute Mode of Bicycle.

of \$12,257 for the low estimate and \$19,917 for the medium estimate (2022 \$).⁹ Applying a 3.51 percent discount rate, the Net Present Values of these benefits are \$150,437 and \$244,453 respectively over the 20-year life of the project.

Safety

Injury and fatality numbers involving bicyclists and pedestrians used for the benefit calculation were pulled from the Automated Reporting Information Exchange System (ARIES).¹⁰ The average annual bicycle and pedestrian-involved crashes within 1.5 miles of the Marquette Greenway project were estimated from 2018 to 2022. Per the USDOT's Benefit-Cost Analysis Guidance for Discretionary Grant Programs document, a crash modification factor (CMF) of 0.93, representing an expected 7% reduction in crashes involving bicyclists and pedestrians as a result of the Marquette Greenway projects being constructed, was applied.¹¹ Since ARIES did not document injury severity, a value of \$217,600 was assessed for each "unknown if injured" injury and \$313,000 was assessed for each injury crash in accordance with the USDOT's Benefit-Cost Analysis Guidance for Discretionary Grant Programs document, which is reasonably conservative. The final estimated valuation of the safety benefit after applying the CMF factor and monetizing bicycle and pedestrian injury and fatal crashes is \$623,927 annually (2022 \$) beginning in 2029 or a Net Present Value of \$7,657,804 over the 20-year life with a 3.51 percent discount rate.

Total Benefits

Including recreation, mobility, health, decreased auto use, and safety benefits, a low estimate for the total annual benefits of the Marquette Greenway project is \$1,377,778 and a medium estimate for the total annual benefits of the Marquette Greenway project is \$11,531,654 (2022 \$). In particular, recreation, health, and decreased auto use benefits are analyzed with both low and medium-case estimation models because they can vary greatly depending on the estimation model. Exhibit 6 shows the benefits in both low and medium-case scenarios.

⁹ <http://www.pedbikeinfo.org/bikecost/step1.cfm> using same input parameters as in Footnote 3; suburban was used for the low estimate and urban was used for the medium estimate, since this facility is in an urban area but is arguably more suburban in character considering higher density in metropolises across the US and the fact that this area has a high degree of vacant housing units.

¹⁰ <https://www.ariesportal.com/>

¹¹ <http://www.cmfclearinghouse.org> using the Countermeasure: Installation of a cycle track over 5m from the side of the main road with cyclist priority at intersections.

Exhibit 6: Total Economic Benefits of Marquette Greenway Project in Low and Medium Scenarios (3.51 percent Discount Rate applied to 20-Year Benefits)

Benefit	Low Scenario	Medium Scenario
Annual Recreation Benefit	\$661,005	\$10,463,463
Annual Mobility Benefit	\$55,692	\$55,692
Annual Health Benefit	\$24,897	\$368,655
Annual Decreased Auto Use Benefit	\$12,257	\$19,917
Annual Safety Benefit	\$623,927	\$623,927
Total Annual Benefit	\$1,377,778	\$11,531,654
20-Year Recreation Benefit	\$8,112,885	\$128,423,953
20-Year Mobility Benefit	\$683,539	\$683,539
20-Year Health Benefit	\$305,575	\$4,524,710
20-Year Decreased Auto Use Benefit	\$150,437	\$244,453
20-Year Safety Benefit	\$7,657,804	\$7,657,804
Total 20-Year Benefit	\$16,910,240	\$141,534,459

In a medium scenario for expected benefits, the benefits significantly exceed the project costs. In a low scenario for expected benefits, the benefits equal the costs, but the construction costs include a generous 20% contingency instead of an industry-standard 10% contingency. In the cases of recreation, health, and decreased auto use benefits, there could even be a high scenario that is not shown here where those benefits would be even higher, so the low scenario is very conservative and the medium scenario is somewhat conservative. Furthermore, there are expected to be additional benefits to tourism and property value increases, but these are difficult to quantify and excluded in this case since the other benefits are already estimated to significantly outweigh the costs.