COVINGTON CENTRAL RIVERFRONT

BENEFIT-COST ANALYSIS APPENDIX

FEBRUARY 2024

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EXECUTIVE SUMMARY

A Benefit Cost Analysis (BCA) for the Covington Central Riverfront Project (the "Project") was conducted for submission to the U.S. Department of Transportation (U.S. DOT) as a requirement of a discretionary grant application for the FY 2024 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program. The analysis was conducted in accordance with the benefit-cost methodology as outlined by U.S. DOT BCA Guidance for Discretionary Grant Programs, released in December 2023. The period of analysis corresponds to one year of preliminary engineering and design in 2024, two years of construction between April 2025 and March 2027, and 20 years of operations starting April 2027. Previously incurred costs have also been included into the analysis.

The Project is an undertaking of the City of Covington that was previously a demolished Internal Revenue Service (IRS) tax return processing site. The consolidation of land demanded multiple streets to be closed off, hence disrupting the natural flow of traffic, and creating bottlenecks in the region. This innovative project invests in land that displays extreme potential in its turnaround, but more importantly, exhibits multitudes of benefits – quantitative and qualitative – that can revive a city by providing ample recreational and community-centric opportunities for its residents.

The City of Covington envisions the Covington Central Riverfront (CCR) to be a multi-facility multi-modal public infrastructure projects that caters to tourists, residents, and visitors alike. Phase II of this project – for which funding is being requested for through this RAISE grant application – will serve the pedestrian-oriented aspect of the overall project. The components of Phase II include the completion of streetscape between 3rd and 4th streets, landscaping, installation of sidewalks and bike lanes, and the construction of a parking facility and public park space and other associated components. Phase II of the Project lays the groundworks that is required to graduate to Phase III of this Project, which entails the expansion of pathways and improvements in connectivity to surrounding locations.

COSTS

The capital cost for this Project is expected to be $44.6 million in discounted 2022 dollars through 2027 at a 3.1 percent real discount rate. Table ES-1 shows how these costs are allocated across time and major expense categories.

Table ES-1: Project Costs by Category and Year, in Undiscounted Millions of 2022 Dollars

Year	ROW	Other Previously Incurred Costs	Preliminary Engineering	Construction	Other	Total Capital Costs	Discounted Capital Costs
2019	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2020	$6.0	$0.0	$0.0	$0.0	$0.0	$6.0	$6.0
2021	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2022	$0.0	$2.0	$0.0	$0.0	$0.0	$2.0	$2.0
2023	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2024	$0.0	$0.0	$0.7	$0.0	$0.0	$0.7	$0.7
2025	$0.0	$0.0	$0.0	$15.7	$0.0	$15.7	$14.4
2026	$0.0	$0.0	$0.0	$19.8	$0.0	$19.8	$17.5
2027	$0.0	$0.0	$0.0	$4.7	$0.0	$4.7	$4.0
Total	$6.0	$2.0	$0.7	$40.2	$0.0	$49.0	$44.6

Source: City of Covington, 2024.

In addition to the upfront capital cost, operations and maintenance (O&M) costs are projected to average $39,093 annually over the analysis period. These O&M costs cover the maintenance of the public park

space, sidewalk and streets.[1] Over the entire 20-year analysis period these O&M costs accumulate to $0.8 million in undiscounted 2022 dollars. Note that these O&M costs are included as the numerator of the benefit-cost ratio calculation.

BENEFITS

In 2022 dollars, the Project is expected to generate $70.9 million in discounted benefits using a 3.1 percent discount rate. This leads to an overall project Net Present Value of $26.3 million dollars and a Benefit Cost Ratio (BCR) of 1.59.[2] The overall project benefit matrix can be seen in Table ES-2.

Table ES-2: Project Impacts and Benefits Summary, Monetary Values in Millions of 2022 Dollars

Current Status & Problem to be Addressed	Change to Baseline/Alternatives	Merit Criteria	Economic Benefit	Summary of Results (at 3.1% discount rate)	Page Reference in BCA
Undeveloped former IRS building	Redevelopment of land and implementation of utilities to make residential, plaza, and hotel development possible. Design of street trees, benches, etc. along 3rd street.	Quality of Life Mobility	Plaza Benefits	$30.7	p.19
			Parking Benefits	$27.5	p.21
Streets on site were demolished and fenced for 60 years, hence disrupting traffic patterns and creating high-volume traffic bottlenecks	Development of a complementary bike lane along Rivercenter and along Johnson St north of 3rd St as well as finished sidewalks along 3rd St.	Quality of Life Innovation Mobility Safety	Cycling Amenity Benefits	$0.3	p.20
			Pedestrian Amenity Benefits	$0.2	p.21
		Quality of Life	Health Benefits	$2.3	p.19
		Sustainability	Emissions Benefits	$0.1	p.22
All of the above	All of the above	State of Good Repair	O&M Cost Savings	-$0.5	p.23
			Repurposed ROW	$7.5	p.23

[1] Other O&M costs were not estimated due to lack of information.
[2] Per USDOT guidance, operations and maintenance costs are included in the numerator along with other project benefits when calculating the benefit-cost ratio.

Current Status & Problem to be Addressed	Change to Baseline/Alternatives	Merit Criteria	Economic Benefit	Summary of Results (at 3.1% discount rate)	Page Reference in BCA
			Residual Value	$2.9	p.24

In addition to the monetized benefits presented in Table ES-2, the Project contains facets that provide additional societal benefits that have not been monetized in this BCA. For example, Phase II involves landscaping and aesthetics of the overall projects that contributes to the modernization of the locality. Particularly, the creation of new greenspaces and pleasant walking environments could encourage transport mode-shift from automobiles to active transportation.

Similarly, the installation of electric vehicle chargers provides low-cost and low-carbon fueling infrastructure for electric vehicle users – helping to reduce carbon emissions in addition to those already quantified by this BCA.

Additional qualitative benefits are covered by this BCA Technical Report and the supplemental narrative application.

1 INTRODUCTION

A benefit-cost analysis (BCA) was conducted for the Covington Central Riverfront Project for submission to the U.S. Department of Transportation (U.S. DOT) as a requirement of a discretionary grant application for the RAISE 2024 program. The following section describes the BCA framework, evaluation metrics, and report contents.

1.1 BCA FRAMEWORK

A BCA is an evaluation framework to assess the economic advantages (benefits) and disadvantages (costs) of an investment alternative. Benefits and costs are broadly defined and are quantified in monetary terms to the extent possible. The overall goal of a BCA is to assess whether the expected benefits of a project justify the costs from a national perspective. A BCA framework attempts to capture the net welfare change created by a project, including cost savings and increases in welfare (benefits), as well as disbenefits where costs can be identified (e.g., project capital costs), and welfare reductions where some groups are expected to be made worse off because of the proposed project.

The BCA framework involves defining a Base Case or "No Build" Case, which is compared to the "Build" Case, where the grant request is awarded, and the Project is built as proposed. The BCA assesses the incremental difference between the Base Case and the Build Case, which represents the net change in welfare. BCAs are forward-looking exercises which seek to assess the incremental change in welfare over a project lifecycle. The importance of future welfare changes is determined through discounting, which is meant to reflect both the opportunity cost of capital as well as the societal preference for the present.

The analysis was conducted in accordance with the benefit-cost methodology as recommended by the U.S. DOT in the 2023 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.[3] This methodology includes the following analytical assumptions:

- Defining existing and future conditions under a No Build base case as well as under the Build case.
- Assessing the independent utility of each project if the overall application contains multiple separate projects linked together in a common objective.
- Using U.S. DOT recommended monetized values for reduced fatalities, injuries, property damage, travel time savings, and emissions, while relying on best practices for monetization of other benefits.
- Presenting dollar values in constant (real) 2022 dollars. In instances where cost estimates and benefits valuations are expressed in historical or future dollar years, using an appropriate inflation factor to adjust the values.
- Discounting future benefits and costs with a real discount rate of 3.1 percent for most benefits and using a real discount rate of 2 percent for CO_2 emissions consistent with the U.S. DOT guidance.

[3] U.S. Department of Transportation, Benefit-Cost Analysis Guidance for Discretionary Grant Applications, December 2023. https://www.transportation.gov/sites/dot.gov/files/2023-12/Benefit%20Cost%20Analysis%20Guidance%202024%20Update.pdf

1.2 REPORT CONTENTS

Section 2 of this report contains a description of the Covington Central Riverfront Project, information on the general assumptions made in the analysis, and a description of the base case compared to the build case.

Section 3 provides a summary of the anticipated project costs.

Section 4 reviews the expected economic benefits the Project would generate, including a review of the assumptions and methodology used to calculate the benefits.

Finally, Section 5 reports the high-level results of the benefit-cost analysis.

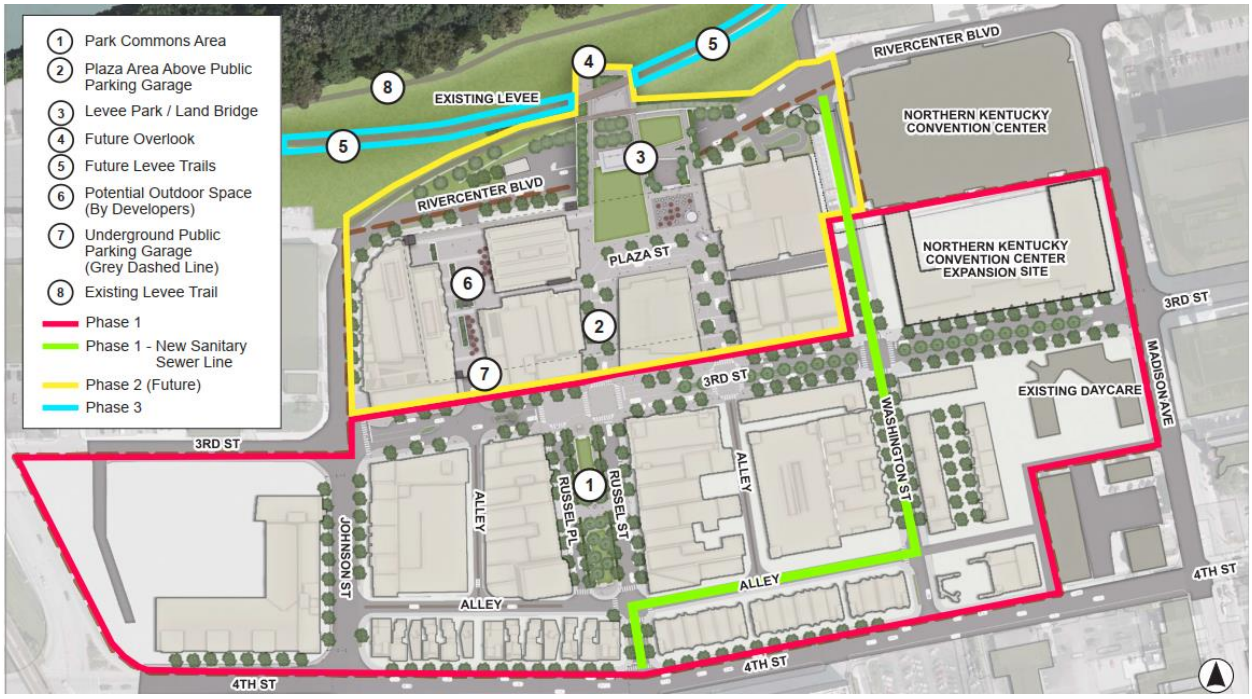
2 PROJECT OVERVIEW

2.1 DESCRIPTION

The Covington Central Riverfront (CCR) Hub project transforms a 23-acre site, once occupied by a massive IRS processing facility, into a mixed-use, multi-modal center for regional activity. The City of Covington is requesting $25 million in FY 2024 RAISE grants to fund transportation aspects of Phase II of this project.

Phase I-III of this project will restore the street grid (streets, alleys, and sidewalks) that were erased in the 1960s. It will create seamless connections with the surrounding neighborhoods of MainStrasse Village, Mutter Gottes, and the Central Business District. It will add much needed greenspace to the area and connect to the public transit center. Utility improvements will allow the replacement of antiquated utility systems, both public and private, including a 13,508 linear feet of combined sewer system servicing the site.

Figure 1: Plan View & Phasing Diagram of Proposed Central Riverfront Development



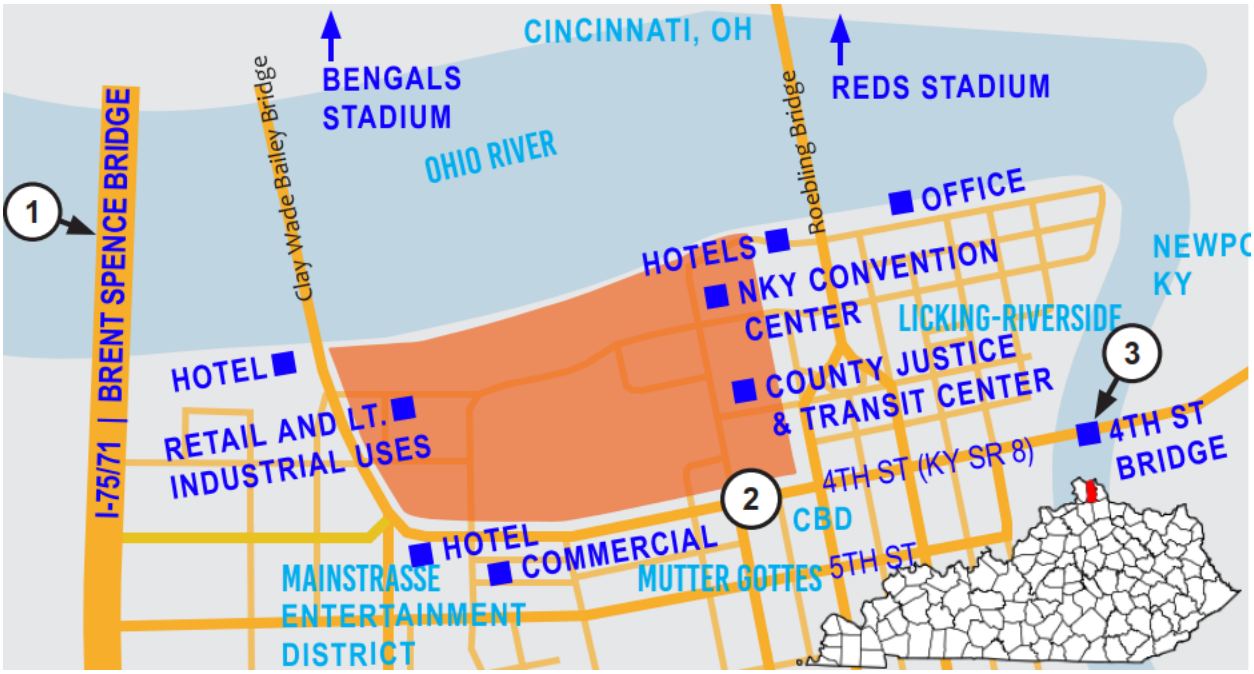
The scope of the phases include:

- Phase I includes the earthwork, roadways, utilities, and complete construction of the Park Commons area between 3rd & 4th Streets, as well as the complete construction of sidewalks and streetscape along 4th Street. Partial construction of the streetscape within the development, including silva cells to promote tree vitality, electrical conduit for pedestrian lighting, bollards, and a concrete base for pavers will be installed as part of Phase I. Development of construction documents for Phase I are complete; a contract will be awarded in March 2024 with construction

starting in April 2024 and being completed in 2025. Funding for Phase I will come from existing bond funds.

- Phase II is focused on the pedestrian-oriented part of the plan by providing enhanced public spaces and streetscapes within the development. Completion of the streetscape between 3rd & 4th Streets will be a part of Phase II, including installation of wide sidewalks, brick pavers, irrigated planter beds, and landscaping. Phase II also includes the construction of a public parking garage with a podium ("deck") structure that will support a curbless festival street and public park space that extends over Rivercenter Blvd. via a land bridge to connect the site and the surrounding neighborhoods to the top of a levee along the Ohio River. Pathways down from the levee connecting to new sidewalks along Rivercenter Blvd., are also included. Construction documents for Phase II are complete and construction may begin as soon as Quarter 1 of 2025.
- Phase III of the CCR project includes extending the pathways constructed as part of Phase II down the river side of the levee to directly connect to the Riverfront Commons Trail, a shared-use trail spanning multiple cities. Schematic design documents were completed in the Fall of 2022. The City plans to pursue RAISE design grant funding to complete the design of Phase III. Construction would begin following permit approval from the United States Army Corps of Engineers (USACE), which would require a NEPA analysis and a Hydrologic and Hydraulic study.

Figure 2: Location Map with Key Landmarks and Features



In 1962, the city assembled and cleared 161 individual light industrial and residential parcels for the construction of a new IRS tax return processing site at a cost of $4.3 million, completed in 1965. Consolidation of land into one uninterrupted parcel required the closure of multiple public streets and alleys, disrupting the street grid and normal flow of vehicular and pedestrian traffic in the area. To be competitive and gain the $6 million annual payroll from the federal jobs, the city sold the land to the federal government for $1 dollar.

The IRS constructed a 10-acre, single story building, eventually surrounded by 13 acres of ground level parking lots and employing nearly 4,500 people. The facility was designed to process 12 million paper tax returns annually, including a cafeteria, infirmary, and a daycare facility. The volume of paper tax returns had steadily dwindled in recent years, and the IRS closed and abandoned the facility in 2019.
The General Services Administration deemed the property obsolete, and the City of Covington purchased the site for the full market value of $20.5 million in 2020.

2.2 GENERAL ASSUMPTIONS

The BCA measures benefits against costs throughout a period of analysis beginning at the start of project development and includes 20 years of operations upon completion of the program improvements. The evaluation period for this Project includes a 4-year design and construction period, from 2024-2027, during which capital expenditures are undertaken, with an additional 20 years of operations beyond Project completion within which benefits accrue through 2046. The monetized benefits and costs are estimated in 2022 dollars with amounts occurring in future years discounted back to 2022 in compliance with federal discretionary grant requirements using a 3.1 percent real discount rate. Note that CO_2 emission reduction benefits are discounted using a 2 percent discount rate in compliance with federal discretionary grant requirements.

The methodology makes several important assumptions and seeks to avoid overestimation of benefits and underestimation of costs. Specifically:

- Input prices are expressed in 2022 dollars.
- The period of analysis begins in 2020 and ends in 2046. It includes previously incurred costs, right-of-way purchase, design and construction, plus 20 years of operations as follows:
    - 2020: City of Covington purchased the 23-acre IRS site. Costs of Phase II right-of-way have been prorated using acreage/area.
    - 2022: previously incurred costs, such as legal fees, geotechnical engineering, environmental, demolition, traffic impact study, etc., have been assigned to year 2022 for simplicity since these costs do not need to be discounted. City of Covington pro-rated previously incurred costs to Phase II based on acreage/area.
    - 2024: preliminary engineering and design will be completed in 2024.
    - 2025 – 2027: construction is expected to start in April 2025 and be finalized by the end of March 2027.
    - 2027 – 2046: 20-year operational benefits evaluation period (partial benefits in 2027 and full benefits starting in 2028).
- A constant 3.1 percent real discount rate is assumed throughout the period of analysis, consistent with USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs.
- CO_2 emission reduction benefits are discounted using a 2 percent discount rate in compliance with federal discretionary grant requirements.
- Unless specified otherwise, the results shown in this document correspond to the effects of the Build scenario.

The BCA produces several important measures to assess the cost-effectiveness of a proposed project. The benefit-cost ratio (BCR), calculated by dividing the Project's discounted societal benefits by its discounted project capital costs, measures the societal return on each dollar spent in project costs. A BCR of more than 1.0 indicates that for each dollar spent, more than one dollar worth of benefits will be generated by the Project. Another important measure is the net present value (NPV), calculated by subtracting the discounted project costs from the discounted societal benefits created by the Project. This measure indicates the present value of the net social worth created by the Project, after accounting for its costs.

However, the BCR and NPV only account for benefits that can be successfully quantified and monetized; some benefits generated by a project may be difficult to quantify or monetize and are therefore excluded from the measures described above. It is important that the BCR and NPV of a project be considered in conjunction with other criteria when judging a project's overall worth.

2.3 BASE CASE AND BUILD CASE

Base Case: The No Build alternative assumes that no proposed improvements in Phase II take place. Therefore, the No Build alternative does not include major capital improvements and costs, and hence also does not include operations and maintenance costs.

Build Case: In the Build case, Phase II will build the pedestrian-oriented part of the Covington Central Riverfront Hub project by providing enhanced public spaces and streetscapes within the Phase II development. Completion of the streetscape between 3rd & 4th Streets will be a part of Phase II, including installation of wide sidewalks, brick pavers, irrigated planter beds, and landscaping. Phase II also includes the construction of a public parking garage with a podium ("deck") structure that will support a curbless festival street and public park space that extends over Rivercenter Blvd. via a land bridge to connect the site and the surrounding neighborhoods to the top of a levee along the Ohio River. Pathways down from the levee connecting to new sidewalks along Rivercenter Blvd., are also included. Construction documents for Phase II are complete and construction may begin as soon as Quarter 1 of 2025.

3 PROJECT COSTS

3.1 CAPITAL COSTS

The City of Covington requests $25 million in FY24 RAISE funding to fund Phase II of the $72 million public infrastructure investment Covington Central Riverfront project (expressed in year-of-expenditure dollars).

The capital cost for this program is expected to amount to $49.0 million in undiscounted 2022 dollars.[4] At a 3.1% discount rate the discounted capital costs of this project amount to $44.6 million. Table 1 shows how these costs are allocated across time and major expense category.

Table 1: Project Costs by Category and Year, in Undiscounted Millions of 2022 Dollars

Year	ROW	Other Previously Incurred Costs	Preliminary Engineering	Construction	Other	Total Capital Costs	Discounted Capital Costs
2019	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2020	$6.0	$0.0	$0.0	$0.0	$0.0	$6.0	$6.0
2021	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2022	$0.0	$2.0	$0.0	$0.0	$0.0	$2.0	$2.0
2023	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2024	$0.0	$0.0	$0.7	$0.0	$0.0	$0.7	$0.7
2025	$0.0	$0.0	$0.0	$15.7	$0.0	$15.7	$14.4
2026	$0.0	$0.0	$0.0	$19.8	$0.0	$19.8	$17.5
2027	$0.0	$0.0	$0.0	$4.7	$0.0	$4.7	$4.0
Total	$6.0	$2.0	$0.7	$40.2	$0.0	$49.0	$44.6

Source: City of Covington, 2024.

3.2 OPERATIONS AND MAINTENANCE COSTS

BCA analyzes the O&M costs associated with the maintenance of the public park space and the resurfacing and replacement of sidewalk and streets included as part of Phase II for the Covington Central Riverfront infrastructure. A summary of O&M estimates for Build and No Build conditions are presented in Table 2, along with a breakdown by year.

Table 2: Operations and Maintenance and Repair/Rehabilitation/Replacement Costs, in Undiscounted Millions of 2022 Dollars

Year	No Build	Build	Change Between No Build and Build
2027	$0.00	$0.04	-$0.04
2028	$0.00	$0.04	-$0.04
2029	$0.00	$0.04	-$0.04

[4] The escalation rate is assumed to be 6.0 percent annually. City of Covington used 0.5 percent monthly escalation for cost estimates, which is equivalent to approximately 6.0 percent annual escalation.

Year	No Build	Build	Change Between No Build and Build
2030	$0.00	$0.04	-$0.04
2031	$0.00	$0.04	-$0.04
2032	$0.00	$0.04	-$0.04
2033	$0.00	$0.04	-$0.04
2034	$0.00	$0.04	-$0.04
2035	$0.00	$0.04	-$0.04
2036	$0.00	$0.04	-$0.04
2037	$0.00	$0.04	-$0.04
2038	$0.00	$0.04	-$0.04
2039	$0.00	$0.04	-$0.04
2040	$0.00	$0.04	-$0.04
2041	$0.00	$0.04	-$0.04
2042	$0.00	$0.04	-$0.04
2043	$0.00	$0.04	-$0.04
2044	$0.00	$0.04	-$0.04
2045	$0.00	$0.04	-$0.04
2046	$0.00	$0.04	-$0.04
Total	**$0.00**	**$0.78**	**-$0.78**

Source: City of Covington, 2024.

Due to the nature of this project, in a No Build scenario it is assumed that the public parks space, sidewalks, and streets would not be constructed altogether and hence there are no O&M costs associated with the scenario. The changes in operations and maintenance (O&M) associated with the Project, therefore, result in additional cost of approximately $0.8 million over 20-year analysis period.

4 PROJECT BENEFITS

The Project will provide several benefits to users of the Covington Riverfront Plaza along with the surrounding communities realizing the economic benefits. A summary of the monetized and quantified benefits is listed in Table 3 along with qualitative benefits that stem from the Project. Please reference the accompanying RAISE Grant Application Narrative for additional qualitative benefits descriptions.

Table 3: Project Benefits

Benefit Category	Description	Monetized	Quantified	Qualitative
Plaza	Value generated upon creation of a multi-faceted plaza that includes a convention center, parks, and shopping centers.	√	√	
O&M Cost Savings	Redevelopment of the area and adding new public assets requires costs for maintenance.	√	√	
Residual Value	Residual value of Phase II land purchased from the IRS from the City of Covington.	√	√	
Parking	Availability of parking to residents, hotel guests, and convention center guests. Accessibility and convenience of plaza amenities for users within the plaza and external visitors.	√	√	
Reduced Emissions	Shift to active transportation reduces emissions.	√	√	√
Health	Health benefit arising from projected shift to and induced active transportation trips as result of the provision of pedestrian path and bike trail.	√	√	
Pedestrian Amenity	Walkability benefits of the Plaza. Provision of commercial retailer. Finished sidewalks, street trees, and benches create modern green spaces.	√	√	√
Cycling Amenity	Bicycle trail and improved access to Riverfront Commons Trail. Bicycle crossings and trails improve access to amenities for residents and visitors	√	√	√
Repurposed Right of Way	Conversion of unutilized land to a mixed-use multi-modal center of regional activity	√	√	
EV Charging Stations	Provision of charging stations EV charging facilities in parking lot			√

Benefit Category	Description	Monetized	Quantified	Qualitative
Reduced Road Damage	Induced active transportation trips and lower motorist traffic volumes reduce road wear and tear			√
Jobs	Creation of 1,159 permanent jobs and 1,651 temporary construction jobs.			√

This project has multiple benefit categories, some quantified in this analysis, as shown and described above, and others described qualitatively here.

The provision of a parking lot reduces time spent idling or searching for parking spaces, hence reducing emissions associated with these inefficiencies. The parking lot being constructed on the site also features electric-vehicle charging ports, as this project appeals to and factors in a niche set of consumers through innovative and future-oriented investments and design concepts. This project also creates both temporary and permanent job opportunities, bringing an estimated $1.7 million in payroll taxes and potentially creating even more jobs from subsequent development.

Furthermore, the Project serves to make the urban environment of the Covington Central Riverfront Project more inviting and aesthetically pleasant. The project created new green spaces in areas that were previously unutilized. The provision of green spaces, and defined pedestrian and bike pathways surrounding retailers, hotels, offices, and apartments can further encourage users to partake in active transportation modes beyond what is quantified in this BCA. This concurrently provides a safe and community-centric environment.

4.1 DEMAND PROJECTIONS

4.1.1 *CYCLING DEMAND PROJECTIONS*

The BCA quantifies and monetizes the following safety improvements associated with pedestrian and cycling infrastructure being constructed as part of Phase II of the Covington Central Riverfront Project:

- Expansion of existing pedestrian infrastructure
- Installation of new bicycle infrastructure

According to Replica, an activity-based travel demand model, the Riverfront Commons trail along Rivercenter Boulevard already has existing bike trips even without a dedicated bikeway. Assumptions used to estimate the cycling demand are presented in Table 4. The active transportation growth rate is assumed follow the forecasted population growth rate in Covington during the period 2022-2027.

Table 4: Cycling Demand Projections Assumptions

Variable	Unit	Value	Source/Notes
Cyclists Base Year	year	2023	Project Assumption
Daily Cyclists	daily number	213	Source: Replica Great Lakes Spring 2023

Variable	Unit	Value	Source/Notes
Build Induced Bike Demand Increase	percent	60%	Fosgerau, Lukawska, Paulse, and Rasmussen. "Bikeability and the induced demand for cycling". 2022. Technical University of Denmark. Research provides estimates for induced demand of 60-90% because of cycling infrastructure improvement. The BCA assumes an estimate of a 60% induced demand increase as a conservative assumption.
Covington Population Growth Rate	percent	0.7%	ESRI Forecast 2022-2027
Annualization Factor	factor	360	BCA Assumption

Additionally, in order to quantify the number of induced trips resulting from the construction of a defined trail, the BCA assumes that the Project improvements will induce an additional 60% in ridership in a build-scenario.

4.1.2 PEDESTRIAN DEMAND PROJECTIONS

In order to project the number of pedestrians trips, the BCA evaluates capacity of the CCR's hotel and its residential complex. The uptake ratios were sourced from a market analysis conducted independently of this application that analyzed trends among similar hotel and residential locations in the vicinity of the plaza.

Table 5 summarizes assumptions that were the basis for estimating the pedestrian demand in Phase II area. This demand estimate does not account for plaza employees, office employees, shoppers, convention center guests, tourists, and other visitors.

Table 5: Pedestrian Demand Projections Assumptions

Variable	Unit	Value	Source
Residential Uptake 2027	percent	50%	Source: City of Covington; BCA Assumption.
Residential Uptake 2032	percent	92%	
Hotel Uptake 2027	percent	44%	
Hotel Uptake 2032	percent	78%	
Number of Residential Units	number	87	
Residential Number of Occupants per Unit	occupants/unit	2	
Number of Hotel Units	number	400	
Hotel Average Occupancy	occupants/unit	1	

4.2 QUALITY OF LIFE

This project will create quality of life / livability benefits which include the benefits associated with the provision of a plaza as well as health benefits due to an anticipated shift from automobiles to active transportation modes.

4.2.1 COVINGTON CENTRAL RIVERFRONT PLAZA BENEFITS

Phase II's public plaza adds significant value for residents and anticipated hotel guests. To assess this benefit, the BCA employed the 'travel cost method,' estimating travel time saved compared to alternative plazas or public parks. By identifying nearby substitutes, the BCA quantified the time savings gained through the development's own public plaza. Using assumptions in Table 6 and information on the number of residents and hotel guests in 4.1.2 Pedestrian Demand Projections, the BCA estimated the value of having a public plaza in Covington is approximately $30.7 million in discounted 2022 dollars (Table 7).

Table 6: Plaza Benefits Assumptions and Sources

Variable	Unit	Value	Source
Distance to Goebel Park	minutes	12	Google maps
Distance to Smale Riverfront Park	minutes	27	
Distance to General James Taylor Park	minutes	21	
Distance to Covington Plaza	minutes	9	
Average Distance to Alternatives	minutes	17.25	Calculation; the BCA takes the average trip distance to alternative parks to value the benefit of having a public plaza
Travel Time to Covington Plaza for Residents	minutes	3	Google maps
Travel time to Covington Plaza for Hotel Residents	minutes	7	
Daily Travel Time Savings (Residential)	hours	102.90	BCA Calculation
Travel Time Savings (Hotel)	hours	136.67	
Value of Walking Time	2022 $/ hour	$35.80	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023

Table 7: Plaza Benefits, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Plaza Benefits	$48.1	$30.7

4.2.2 HEALTH BENEFITS

Using the assumptions about mortality reduction benefit from Table 8 and projections from Section 4.1 Demand Projections, the BCA estimated that the discounted health benefit from induced cycling ridership is $2.3 million (presented in Table 9).

Table 8: Health Benefits Assumptions and Sources

Variable	Unit	Value	Source
Cycling health benefits	2022 $ / trip	6.8	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023
Induced Trips within Applicable Age Range (20-64) - Cycling	percent	0.59	
Proportion of Trips Induced from non-active transportation modes	percent	0.89	

Table 9: Health Benefits, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Mortality Reduction (Health) Benefit - Cycling	**$3.6**	**$2.3**

4.3 MOBILITY AND COMMUNITY CONNECTIVITY

An overarching goal of this project is to reintegrate the property into the city's community. By removing the perimeter security fencing and other physical barriers, the Project creates land that is pedestrian and bicycle friendly. Moreover, it connects the population to some of Covington's community hotspots like the Devou Park and Riverfront Commons Trail. This section covers benefits associated with improved mobility and community connectivity.

4.3.1 *CYCLING AMENITY BENEFITS*

The BCA estimates the cycling amenity benefit from installing a cycling lane on Rivercenter and along Johnson St. north of 3rd St. A summary of assumptions and data for this benefit is summarized in Table 10 and 4.1.1 Cycling Demand Projections.

Table 10: Cycling Amenity Benefits Assumptions and Sources

Variable	Unit	Value	Source
Dedicated cycling lane	2022 $ / cycling mile	$1.86	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - January 2023
Bike Lane Length	miles	0.1	Source: City of Covington
Bike Lane Expansion	feet	11	
Cyclists Base Year	year	2023	Project Assumption
Rule of Half	percent	0.5	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023

The BCA estimates that the Project results in discounted $0.3 million cycling amenity benefits (presented in Table 11). For induced ridership, the BCA applied the "rule of half".

Table 11: Cycling Amenity Benefits, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	**Discounted (3.1%)**
Cycling Amenity Benefits	$0.4	$0.3

4.3.2 *PEDESTRIAN AMENITY ASSUMPTIONS*

The BCA estimates the pedestrian amenity benefit from installing sidewalks along 3rd St. Using assumptions in Table 12 and 4.1.2 Pedestrian Demand Projections, the BCA estimated pedestrian amenity benefits.

Table 12: Pedestrian Amenity Benefits Assumptions and Sources

Variable	Unit	Value	Source
Expand Sidewalk (per foot of added Width)	2022 $/person-mile	$0.11	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - January 2023
Distance walked	miles	0.2	Source: City of Covington; BCA assumption.
Added width of sidewalk	feet	5	

The BCA estimates that the Project results in discounted $0.2 million pedestrian amenity benefits (presented in Table 13). Since all these pedestrian trips would be new, the BCA applied the "rule of half" to pedestrian amenity benefit to account for induced demand.

Table 13: Pedestrian Amenity Benefits, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Pedestrian Amenity Improvement	$0.4	$0.2

4.3.3 PARKING STRUCTURE BENEFITS

Similar to the benefit of having a public plaza, the BCA estimated the benefit of having a public parking space using the "travel cost method". Assumptions for parking benefits are outlined in Table 14. The BCA also assumes that the parking lot occupancy will mirror the residential uptake assumptions outlined in 4.1.2 Pedestrian Demand Projections. Total parking amenity benefits are approximately $27.5 million in discounted 2022 dollars (Table 15).

Table 14: Parking Amenity Benefit Assumptions

Variable	Unit	Value	Source
Parking Units	units	649	City of Covington
Distance to Covington Plaza Parking Garage (Alternative)	miles	0.3	Google Maps
Distance to Kenton County Parking (Phase II)	miles	0.01	Google Maps
Trips	trips	2	Project Assumption
Walking Speed	miles per hour	3.2	BCA Assumption
Average Vehicle Occupancy	persons/vehicle	1.67	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023

Table 15: Parking Amenity Benefit, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Parking Amenity	**$43.1**	**$27.5**

4.4 ENVIRONMENTAL SUSTAINABILITY

The Project is expected to incentivize mode shift away from autos. The BCA estimated how increase in bike ridership in the Project area will reduce emissions. Emissions are estimated from the Environmental Protection Agency's (EPA) Motor Vehicle Emissions Simulator (MOVES) for Trenton County, Kentucky. Four forms of emissions were identified, measured, and monetized, including: nitrous oxide (NOx), particulate matter ($PM_{2.5}$), sulfur oxides (SO_x), and carbon dioxide (CO_2). The MOVES database provides emission rates measured in grams per mile.

Table 16: Emission Reduction Benefit Assumption and Source

Variable	Unit	Value	Source
Average Bike Distance	miles	2.38	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023; 2017 National Household Travel Survey
Cost of NOx emissions	2022 $/metric ton	$21,300	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs - December 2023; cost shown for opening year (2027)
Cost of SOx emissions	2022 $/metric ton	$58,700	
Cost of $PM_{2.5}$ emissions	2022 $/metric ton	$1,030,600	
Cost of CO_2 emissions	2022 $/metric ton	$245	
Emissions per VMT	grams/mile	Varies by year, vehicle type, speed, and emission type	EPA's MOVES was used to simulate emissions rates for Trenton County, KY.

Due to expected increase in bike trips, the project is expected to reduce auto emissions. Overall, the Project lifecycle's emission cost savings are estimated at $0.1 million in discounted 2022 dollars.

Table 17: Emission Reduction Benefit, 2022 Dollars

Benefit	Project Lifecycle		
	Metric Tons	Undiscounted	Discounted
CO2 Emissions Savings	533.8	$152,420	$113,530
Nox Emissions Savings	0.025	$551	$401
PM2.5 Emissions Savings	0.001	$1,449	$958
SO2 Emissions Savings	0.003	$169	$110
Total Emissions Savings	533.8	$154,589	$114,998

4.5 STATE OF GOOD REPAIR

The City of Covington's Covington Central Riverfront Hub with Phase II brings valuable new resources to the community, such as installation of wide sidewalks, brick pavers, irrigated planter beds, and landscaping. This project, transforming the former IRS site, fosters local development while bringing the responsibility of maintaining these new assets.

4.5.1 O&M COST SAVINGS

Using information in 3.2 Operations and Maintenance Costs, the BCA estimated the increases in O&M costs as presented in Table 18. Due to the nature of this project, in a No Build scenario it is assumed that the public parks space, sidewalks, and streets would not be constructed altogether and hence there are no O&M costs associated with the scenario. The changes in operations and maintenance (O&M) associated with the Project, therefore, result in additional cost of approximately $0.5 million discounted ($0.8 million undiscounted) over 20-year analysis period.

Table 18: O&M Cost Savings, Millions of 2022 Dollars

Benefit	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
O&M Savings	-$0.8	-$0.5

4.5.2 REPURPOSED ROW

By redeveloping the Phase II area, City of Covington will create a new value for air rights for real estate development. City of Covington had provided internal estimates for total Phase II air rights for the BCA (shown in Table 19). Instead of selling the air rights, City of Covington will likely lease the air rights to developers. For simplicity, the BCA assigned the value of created air rights to the project opening year since the Project would create that value after Phase II completion. A sensitivity analysis assigning the value of air rights or repurposed ROW to the final year is presented in 5.3 Sensitivity Testing.

Table 19: Repurposed ROW Assumptions and Sources

Variable	Unit	Value	Source
Phase II Air Rights	Millions of 2027 $	$11.6	City of Covington
Year of Sale/Creation	year	2027	
Escalation rate	percent	6.0%	
Phase II Air Rights	Millions of 2022 $	$9.84	

The repurposed ROW benefit is estimated to be approximately $7.5 million in discounted 2022 dollars.

Table 20: Repurposed ROW Benefit, Millions of 2022 Dollars

Variable	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Repurposed ROW	$8.7	$7.5

4.5.3 RESIDUAL VALUE

City of Covington prorated the cost of total ROW to Phase II development based on its area. The BCA assigned the pro-rated cost of ROW to the final year of the analysis.

Table 21: Residual Value Assumptions and Sources

Variable	Unit	Value	Source
Prorated Cost of Phase II ROW	2022 $	$5.7	City of Covington
Final Year of Analysis	Year	2046	Project Assumption

5 SUMMARY OF RESULTS

5.1 EVALUATION MEASURES

The benefit-cost analysis converts potential gains (benefits) and losses (costs) from the Project into monetary units and compares them. The following common benefit-cost evaluation measures are included in this BCA:

- Net Present Value (NPV): NPV compares the net benefits (benefits minus costs) after being discounted to present values using the real discount rate assumption. The NPV provides a perspective on the overall dollar magnitude of cash flows over time in today's dollar terms.
- Benefit Cost Ratio (BCR): The evaluation also estimates the benefit-cost ratio; the present value of incremental benefits is divided by the present value of incremental costs to yield the benefit-cost ratio. The BCR expresses the relation of discounted benefits to discounted costs as a measure of the extent to which a project's benefits either exceed or fall short of the costs.
- Internal Rate of Return (IRR): The IRR is the discount rate which makes the NPV from the Project equal to zero. In other words, it is the discount rate at which the Project breaks even. Generally, the greater the IRR, the more desirable the Project.
- Payback Period: The payback period refers to the period of time required to recover the funds expended on a Project. When calculating the payback period, the time value of money (discounting) is not considered.

5.2 BCA RESULTS

Table 22 below presents the evaluation results for the Project. Results are presented in undiscounted, discounted at 3.1 percent as prescribed by the U.S. DOT. All benefits and costs were estimated in constant 2022 dollars over an evaluation period extending 20 years beyond project completion.

This project is calculated to achieve a Benefit Cost Ratio of 1.59 meaning that for every dollar of capital investment, this project is estimated to produce $1.59 of societal benefit.

Table 22: Benefit Cost Analysis Results, Millions of 2022 Dollars

BCA Metric	Project Lifecycle	
	Undiscounted	Discounted (3.1%)
Total Benefits	**$109.6**	**$70.9**
O&M and R&R Cost Savings	-$0.77	-$0.50
Residual Value	$6.0	$2.9
Repurposed ROW (Value of Air Rights Created)	$8.7	$7.5
Pedestrian Amenity Benefits	$0.4	$0.2
Cycling Amenity benefits	$0.4	$0.3
Health Benefits	$3.6	$2.3
Plaza benefits	$48.1	$30.7
Emissions Savings	$0.2	$0.1
Parking Benefits	$43.1	$27.5
Total Costs	$49.0	$44.6
Net Present Value (NPV)	**$60.6**	**$26.3**
Benefit Cost Ratio (BCR)	**2.24**	**1.59**
Internal Rate of Return (IRR)	**8%**	
Payback Period (Years)	**10**	

5.3 SENSITIVITY TESTING

This analysis relies on many assumptions that, while based on the best available knowledge, are uncertain. This sensitivity analysis evaluates the impact of adjusting key assumptions on the BCR and NPV.

Table 23: Benefit Cost Analysis Sensitivity Analysis, Millions of 2022 Dollars

Sensitivity Variable	Sensitivity Value	BCR	NPV	% Change in NPV	Source / Notes
Base results	**N/A**	**1.59**	**$26.3**	**N/A**	No Change to the Model
Analysis Period	30 years	2.05	$46.7	77%	Extending the analysis period to 30 years.
Repurposed ROW	Final Year	1.52	$23.0	-13%	Assigning the repurposed ROW benefit to the final year of the analysis.
Uptake Parameter	Max occupancy reached in 2030	1.63	$28.1	7%	Assuming that the residential and hotel occupancy peak can be reached in 2030 instead of 2032.