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## **BUILD Capital Grant: BCA Narrative**

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## Benefit-Cost Analysis

Dyersville, Iowa is requesting \$25 million in US Department of Transportation (USDOT) Better Utilizing Investments to Leverage Development (BUILD) Grant funds to enhance connectivity with the construction of a \$29.62 million (undiscounted 2024 dollars) project to build new key roadway and bridge connections, on- and off-street bicycle facilities, and Americans with Disabilities Act (ADA) compliant sidewalk connections in this rural city. This request accounts for 88 percent of future eligible project costs.<sup>1</sup> Dyersville is burdened with disconnected roads, trails, and sidewalks, along with physical barriers during flood events and train activity which cut off critical access for emergency and city services. These missing connections also hinder growth of community connectivity in the city. USDOT resources will help Dyersville establish a complete transportation network to improve access throughout the community, eliminate a hazardous at-grade rail crossing, reduce emergency response times, and promote economic development.

A significant transportation concern is discontinuity among the community due to the existing design of the local roadway network, which is further exacerbated during flooding events that cut off several neighborhoods. Dyersville's disconnected road network causes numerous access problems, isolates neighborhoods, and creates challenges for emergency vehicles trying to reach flooded neighborhoods. The proposed bridges over the creek and floodplains would alleviate this issue.

The City of Dyersville's economy relies heavily on agriculture, manufacturing, and tourism, which draws more than 275,000 tourists annually. This influx of people to the small, rural, Iowan town places additional strain on local infrastructure. Additionally, 18% of Dyersville's population is 65 years old or older. The project elements will improve all transportation access throughout the city for this population. In seeking to address safety and EMS response times during rail crossing closures and delays, flood events isolating neighborhoods, and increasing traffic volumes, Dyersville has proposed the construction of new east-west and north-south connections through town. The Connections for Economic Freedom project consists of three primary components:

1. **North-South Connection:** 7th Street SW connection to 1st Avenue W over Bear Creek and Beltline Road Overpass to provide a grade-separated crossing of the CN railway on the north edge of town.
2. **East-West Connection:** 13th Avenue SE connection to 12th Avenue SW over North Fork Maquoketa River to provide an essential connection for emergency services and between residents to the east and west of the river.
3. **Community Trail Connection:** A six-foot wide paved path along the east side of 7<sup>th</sup> Street SW combined with painted bike lanes will complete the trail network, promoting connectivity. Marked crosswalks and MUTCD-compliant signage will raise awareness of the presence of vulnerable road users.

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<sup>1</sup> Future eligible costs do not include NEPA and Permitting Costs. These items are included in the BCA Analysis to consider all project costs, eligible and otherwise.

The proposed project improves the transportation network to more efficiently move people and goods. The construction of bridges over the creek and floodplains specifically addresses the need to improve safety and explicitly addresses resiliency through infrastructure that enhances connectivity for all communities at all times, but particularly during the frequent flood events.

**Table 1: Summary of Infrastructure Improvements and Associated Benefits**

<b>Current Status &amp; Anticipated Changes to Baseline Conditions</b>	<b>Type of Impacts</b>	<b>Population Affected by Impacts</b>	<b>Economic Benefits</b>	<b>Discounted Monetized Benefits (millions of 2024 dollars)</b>	<b>Merit Criteria (Section)</b>
Undersized roads and disjointed routes with level grade crossings that top over with floodwaters and are blocked by trains, separating neighborhoods across Dyersville.	Crash Reduction Benefit	Drivers and passengers	Monetized reduction in injury and fatality crashes.	\$5.59	Safety (6.1)
	Emergency Response Benefit	General public	Fire and EMS will be able to arrive at emergencies faster and without obstruction	\$3.76	
Three new resilient bridges—one over the railroad tracks and two over bodies of water—that will knit Dyersville together and be resilient	Emissions Reduction	General public	Dollar value associated with reduced vehicle emissions	\$0.01	Environmental Sustainability (6.2)
	Reduced Mortality Benefit – New Cyclists and Pedestrians	New cyclists and pedestrians	Implied dollar value of health benefits realized by new riders	\$0.05	Quality of Life (6.3)

Current Status & Anticipated Changes to Baseline Conditions	Type of Impacts	Population Affected by Impacts	Economic Benefits	Discounted Monetized Benefits (millions of 2024 dollars)	Merit Criteria (Section)
against stormwaters. Multi-use trails throughout Dyersville to fill gaps in the existing trail network, promoting connectivity.			and pedestrians		
	Facility Improvements for Cyclists and Pedestrians	Existing and new cyclists and pedestrians	Implied dollar value of amenity benefits from improved facility	\$0.46	Mobility and Community Connectivity (6.4)
	Travel Time Savings	Drivers and passengers	Dollar value associated with travel time savings.	\$7.74	Economic Competitiveness and Opportunity (6.5)
	Vehicle Operating Cost Savings	Drivers	Dollar value savings associated with VMT reduced by more efficient routes	\$3.81	
	Pavement Maintenance Cost Savings	State and local governments	Dollar value associated with maintaining roadway pavement	\$0.002	State of Good Repair (6.6)
	Residual Infrastructure Value	State and local government	Remaining value in infrastructure assets at the	\$2.34	

Current Status & Anticipated Changes to Baseline Conditions	Type of Impacts	Population Affected by Impacts	Economic Benefits	Discounted Monetized Benefits (millions of 2024 dollars)	Merit Criteria (Section)
		s; General public	end of the period of analysis		
	Incremental Operating and Maintenance Costs	Additional Operating and Maintenance Costs	Additional maintenance costs due to new construction	-\$0.94	N/A (disbenefit)

The period of analysis used in the estimation of benefits and costs runs from 2025 through 2050, which includes 6 years of project development (ROW, design, and construction) and 20 years of operations.<sup>2</sup> In constant 2024 dollars, total undiscounted project capital costs are \$29.62 million, and discounted costs (using a 7% discount rate) are \$20.67 million (see Table 2).<sup>3</sup>

**Table 2: Summary of Project Capital Costs, in Dollars of 2024**

Cost Category	Undiscounted Project Costs	Discounted Project Costs
Capital Costs	\$29,616,697	\$20,688,023

*Per USDOT Guidance, incremental operations and maintenance (O&M) costs due to the project are classified as disbenefits, rather than an increase in cost.*

A summary of the relevant data and calculations used to derive the benefits and costs (in dollars of 2024) of the project are shown in the Benefit-Cost Analysis (BCA) model Microsoft Excel file also submitted with this application package. Based on the analysis presented in the rest of this document, the project is expected to generate \$22.82 million in total discounted benefits and \$20.67 million in discounted capital costs, using a 7 percent real discount rate. **Therefore, the project is expected to generate a Net Present Value (NPV) of \$2.15 million and a benefit-cost ratio (BCR) of 1.10.**

<sup>2</sup> Note that all costs incurred prior to 2025 are modeled in 2025.

<sup>3</sup> Monetized Project costs account for NEPA costs, which are required by for Project completion but not an eligible expense for the grant request. The Project total cost shown in the grant request includes only eligible costs.

In addition to the monetized benefits, the project will generate many benefits that are difficult to quantify and monetize in a BCA. These non-monetized benefits – which include increased jobs and economic development, expanded infrastructure to handle future Major League Baseball (MLB) games, increased infrastructure resiliency, decreased flooding impacts across Dyersville, and avoided delay at railroad grade crossings – are further discussed in the project description and merit criteria sections.

## Introduction

This document provides detailed technical information on the economic analyses conducted in support of the grant application for Enhancing Multimodal Connections in Dyersville.

- Section 2, Methodological Framework, introduces the conceptual framework used in the BCA;
- Section 3, Project Overview, provides an overview of the project, including a brief description of existing conditions and proposed alternatives, a summary of cost estimates and schedule, and a description of the types of effects that the project is expected to generate;
- Section 4, General Assumptions, discusses the general assumptions used in the estimation of project costs and benefits;
- Section 5, Demand Projections, provides estimates of travel demand and traffic growth;
- Section 6, Benefits Measurement, Data and Assumptions, provides specific data elements and assumptions pertaining to the long-term outcome selection criteria, along with associated benefit estimates;
- Section 7, Summary of Findings and BCA Outcomes, presents estimates of the projects NPV, its BCR, and other project evaluation metrics; and
- Section 8, BCA Sensitivity Analysis, provides the outcomes of the sensitivity analysis.

Additional data tables are provided within the separately uploaded BCA model file, including annual estimates of benefits and costs, to assist the U.S. Department of Transportation (USDOT) in its review of the application.<sup>4</sup>

## 2. Methodological Framework

The BCA conducted for this project includes the monetized benefits and costs measured using USDOT guidance, as well as the quantitative and qualitative merits of the project. A BCA provides estimates of the benefits that are expected to accrue from a project over a specified time period and compares them to the anticipated costs of the project. Project costs include the resources required to develop the project. Estimated benefits are based on the projected impacts of the project on both users and non-users

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<sup>4</sup> The Microsoft Excel-based BCA model is provided separately as part of the application package.

of the facility, valued in monetary terms. Costs of maintaining the new or improved asset over time are included as disbenefits.<sup>5</sup>

While BCA is just one of many tools that can be used in making decisions about infrastructure investments, USDOT believes that it provides a useful benchmark from which to evaluate and compare potential transportation investments.<sup>6</sup>

The specific methodology employed in this application was developed using the USDOT's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs* (December 2025) and is consistent with BUILD program guidelines. In particular, the methodology involves:

- Establishing existing and future conditions under the Build and No-Build scenarios;
- Assessing benefits with respect to each of the merit criteria identified in the Notice of Funding Opportunity (NOFO);
- Measuring benefits in dollar terms, whenever possible, and expressing benefits and costs in a common unit of measurement;
- Using USDOT guidance for the valuation of travel time improvements, safety benefits, reductions in air emissions and residual infrastructure value while relying on industry best practice for the valuation of other effects;
- Discounting future benefits and costs with the real discount rate recommended by USDOT (7 percent); and
- Conducting a sensitivity analysis to assess the impacts of changes in key estimating assumptions.

### 3. Project Overview

The Connections for Economic Freedom project will improve connectivity, emergency response times (especially in times of flooding), better handle increasing traffic volumes, improve the level of service, provide additional direct connections across Dyersville, reduce auto accidents, avoid rail conflicts, improve the pedestrian and bicycling environment, and promote economic development in Dyersville.

The City of Dyersville, Iowa seeks Better Utilizing Investments to Leverage Development (BUILD) Grant funds to support the Connections for Economic Freedom project. The proposed project creates sustainable, new multimodal transportation connections through key infrastructure additions that create alternative access across the North Fork of the Maquoketa River, Bear Creek, and the Canadian National (CN) Railway, connecting neighborhoods, modes, and economies within this rural town. These connectivity enhancements include a new bridge crossing across the North Fork, a new bridge connection across the Maquoketa River, new trail connectivity, wider

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<sup>5</sup> USDOT, *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*, December 2025.

<sup>6</sup> Ibid.

sidewalks and bike lanes. The improvements will create resilient, sustainable, future-proof infrastructure connections to support quality of life and economic prosperity.

### *3.1 Base Case and Alternatives*

Estimates of baseline conditions (the “No-Build” scenario) were forecasted over the analysis period and then compared to the alternative conditions of the Build scenario in the benefit-cost analysis. The Full Build scenario assumes the creation of two key bridge connections and one additional element as described below:

- 1. North-South Connection:** 7th Street SW connection to 1st Avenue W over Bear Creek and Beltline Road Overpass to provide a grade-separated crossing of the CN railway on the north edge of town.
- 2. East-West Connection:** 13th Avenue SE connection to 12th Avenue SW over North Fork Maquoketa River to provide an essential connection for emergency services and between residents to the east and west of the river.
- 3. Community Trail Connection:** A six-foot wide paved path along the east side of 7<sup>th</sup> Street SW combined with painted bike lanes will complete the trail network, promoting connectivity. Marked crosswalks and MUTCD-compliant signage will raise awareness of the presence of vulnerable road users.

The two primary bridge connection elements (the “East-West” and the “North-South”) are also evaluated independently in this BCA, though the discussion primarily focuses on the Full Build scenario, where all project elements are constructed.

### *3.2 Types of Impacts*

The BCA measures impacts on residents and workers in Dyersville, as well as on visitors and society at large. These impacts include direct traffic impacts, vehicle emissions, infrastructure maintenance, vehicle safety, emergency response, and quality of life / health impacts.

### *3.3 Project Cost and Schedule*

The total capital cost of the full project, including costs to date, is estimated to be \$29.62 million (undiscounted) in 2024 dollars. The project team has prepared a schedule of planning, construction and implementation, available in the main application. Future capital expenditure is scheduled to begin in 2027 and conclude in 2030.

### *3.4 Effects on Selection Criteria*

The main benefit categories associated with the project are mapped into the seven selection criteria set forth for the BUILD program in the table below.

**Table 3: Benefit Categories and Expected Effects on BUILD Merit Criteria**

BUILD Merit Criteria	Benefit or Impact Categories	Description	Monetized	Quantified	Qualitative
Safety	Crash Reduction Benefit	Reduced VMT will result in fewer traffic incidents reducing costs associated with fatalities, injuries and property damage.	Yes	Yes	Yes
	Emergency Response Benefit	Reduced congestion and improved connections will result in improved fire and EMS emergency vehicle response times.	Yes	Yes	Yes
Environmental Sustainability	Emissions Reduction	Reductions in greenhouse gas and air pollutant emissions will result from changes in auto use as some people will opt to walk or bike rather than drive.	Yes	Yes	Yes
	Improved Infrastructure Resiliency	Adding 2 bridges over water will provide travel	No	No	Yes

<b>BUILD Merit Criteria</b>	<b>Benefit or Impact Categories</b>	<b>Description</b>	<b>Monetized</b>	<b>Quantified</b>	<b>Qualitative</b>
		options during flooding events.			
Quality of Life	Reduced Mortality Benefit – New Cyclists and Pedestrians	People not currently biking or walking will be induced to do so as a result of the project, leading to increased physical activity and providing a health benefit to these new users.	Yes	Yes	Yes
Mobility and Community Connectivity	Facility improvement benefits for new and existing cyclists and pedestrians	New and existing cyclists and pedestrians will enjoy the amenities of improved sidewalks/paths.	Yes	Yes	Yes
Economic Competitiveness and Opportunity	Travel Time Savings	Reduction in VHT for passenger vehicle and truck trips in the project area.	Yes	Yes	Yes
	Vehicle Operating Cost Savings	Reduction in VMT will result in VOC savings associated with fuel, repairs and maintenance,	Yes	Yes	Yes

BUILD Merit Criteria	Benefit or Impact Categories	Description	Monetized	Quantified	Qualitative
		insurance and depreciation.			
State of Good Repair	Pavement Maintenance Savings	Reductions in auto use and VMT will also, reduce pavement wear and tear on existing roadways.	Yes	Yes	Yes
	Residual Infrastructure Value	Disused infrastructure brought into a state of good repair and new infrastructure constructed for the project will provide decades of use beyond the period of analysis of this BCA.	Yes	Yes	Yes
Partnership and Collaboration	Discussed in the application narrative.		No	No	Yes
Innovation					

#### 4. General Assumptions

The BCA measures benefits against costs throughout a period of analysis beginning in 2025 and ending in 2050, which includes 6 years of project development spending and 20 years of operations.

The monetized benefits and costs are estimated in 2024 dollars with future dollars discounted in compliance with BUILD requirements using a 7 percent real discount rate.

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

- Input prices are expressed in 2024 dollars;
- The period of analysis begins in 2025 and ends in 2050. It includes permitting, design, and public engagement (2025 – 2030), and construction (2027 – 2030), and 20 years of full operations (2031 – 2050);
- A constant 7 percent real discount rate is applied throughout the period of analysis;
- The project will be substantially complete by the end of 2030, the first year of benefits are quantified in 2031; and
- The results shown in this document correspond to the effects of the Full Build alternative and includes the defined East-West component and North-South component.

## 5. Demand Projections

Multiple categories of benefits generated by the Connections for Economic Freedom project result directly from its implementation. These benefits include travel time savings, vehicle operating cost savings, pavement maintenance savings, safety benefits, emissions reductions, emergency services benefits, new cyclist and pedestrian health benefits, facility amenity benefits to existing and new cyclists and pedestrians, and residual infrastructure value. These benefits are generated primarily from the alleviation of congestion in the project area and use of affordable transportation options that is expected due to the connectivity improvements. The monetization of these benefit categories depends on projections of future vehicle, truck and cyclist and pedestrian activity in the Build scenario, and a comparison to how this behavior differs from the No Build scenario.

This section of the narrative presents the vehicular, pedestrian and cyclist travel projections utilized in the BCA and details the methodological approach used to estimate this activity.

### 5.1 Methodology

Vehicle traffic activity in the Full Build, East-West component and North-South component were provided via Traffic Model data from the City of Dyersville which are representative of weekday traffic. The projections include daily savings in VHT and VMT in the project area for 2025 and 2054. Demand was interpolated from 2026 through 2053 using a linear growth rate to estimate future daily VHT and VMT savings. Daily VHT and VMT savings values were annualized using a factor of 260 which represents the number of business days per year. The traffic analyses (for all build and no build scenarios in 2025 and 2054) were performed using procedures outlined in the Highway Capacity Manual 6<sup>th</sup> Edition, and the model was generated in Synchro Studio 11 with

SimTraffic 11. Additional information about the traffic modeling procedures are fully described in the Traffic Study Memorandum attached as [Appendix B](#).<sup>7</sup>

Average annual bike and walk activity was estimated using American Community Survey (ACS) population and commuter data in the project area and supplemented with information from a survey of residents and Replica network linkage data. Daily cyclist and pedestrian traffic volumes were annualized by a factor of 120 for trips to school, 173 for trips to work and 104 for trips to services. ACS data indicates that 3.0 percent of residents walk to work and 0.3 percent bike to work across Iowa, but rates of walking and biking are lower in Dyersville. Replica network linkage data suggests current Dyersville travel patterns have 3.8% of residents walk to work and 0 percent of residents bike to work. This analysis assumes that the rate of walking and biking in Dyersville will reach the state-wide average rates when existing levels are below the statewide average as a result of the new North-South and East-West bridge connections and Community Trails. Statewide rates are collected from the 2022 National Household Transportation Survey. Specifically, the share of work-related cycling trips will rise from 0 percent to 0.3 percent, the share of school-based walking trips will increase from 24.5 percent to 36.8 percent, and the share of school-related cycling trips will increase from 0.8 percent to 1.2 percent. A survey of the local elementary school indicated that there are approximately 15-20 students who currently bike in milder weather and 10 students who walk regardless of weather conditions. Based on observed data that the number of students walking or biking to school roughly doubled upon completion of a new nearby pedestrian bridge in 2020, it is assumed that an additional 50-percent increase of walking trips would be expected because of project improvements.<sup>8</sup> The average walking trip distance is assumed to be 0.86 miles and the average bike trip distance is assumed to be 2.38 miles, in accordance with USDOT BCA guidance.

## 6. Benefits Measurement, Data and Assumptions

This section lists the BUILD merit criteria and describes the methodology, assumptions, and results for the benefits corresponding to each criteria. Note that the project is also expected to generate additional O&M costs due to the new construction. This disbenefit is included in the summary of BCA results in Section 8.

### 6.1 Safety

The project generates safety benefits in two ways. First by reducing the number of anticipated crashes in the project study area due to the reduction in vehicle miles traveled. Second, by improving connectivity in the study area the project will improve travel time for emergency response services during major flooding events. The Federal

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<sup>7</sup> Traffic Study Memorandum for Dyersville, Iowa. Prepared for City of Dyersville, IA 2025. Prepared by WHKS and provided January 2025.

<sup>8</sup> Analysis of Replica Network Linkage data suggests that the share of school-related cycling trips in Dyersville are larger than the statewide average and are not assumed to increase after project completion.

Emergency Management Agency (FEMA) provides guidance for monetizing improved emergency vehicle response for BCA's.<sup>9</sup> These benefits were estimated both fire and EMS response.

### 6.1.1 Methodology

Crashes per 100 million vehicle miles travelled (MVMT) are provided from 2021 through 2025.<sup>10</sup> The average of which is used to calculate the number of crashes avoided due to reduced VMT brought about by new connections. Historical crashes in the study area were retrieved using the Iowa DOT Crash Analysis Tool and used to procure the number of vehicles involved per crash, the number of occupants per crash, and the distribution of injury severity per person involved in crashes in Dyersville.

Safety benefits are calculated by applying the crashes per MVMT rate to the VMT reduction described in the Demand Projections. Total crashes avoided are applied to the vehicles per crash rate to estimate the amount of property damage avoided. Crashes avoided are also applied to the number of vehicle occupants per crash then the distribution of injury severities to estimate the number of KABCO events avoided.

The second element of safety benefits is avoided additional emergency response time during flooding events. These benefits were calculated using the FEMA methodology noted above. The potentially impacted population was estimated based on Census population data for areas impacted by the east-west and north-south connections. During major flooding events in existing conditions, emergency responders must travel longer distances to access populations impacted by either fires or cardiac events. The probability of these events was generated in accordance with the FEMA methodology. These additional delays only occur during flooding events, which may not happen every year. To determine the expected frequency of these events (and associated annual probability of occurrence), historic major flood events were identified. Data collected as part of a BRIC scoping study indicates that 7 such events occurred from June 2002 to June 2024 (resulting in a 31.8% annual probability of an event occurring).

The magnitude of anticipated crash reduction brought about by the Enhancing Multimodal Connections in Dyersville project was then monetized according to crash valuation parameters by severity, per USDOT BCA Guidance.

### 6.1.2 Assumptions

The assumptions used in the estimation of safety benefits are summarized in the table below.

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<sup>9</sup> "FEMA Benefit-Cost Analysis Re-engineering (BCAR): Development of Standard Economic Values." December 2011. Accessed at: <https://files.hudexchange.info/course-content/ndrc-nofa-benefit-cost-analysis-data-resources-and-expert-tips-webinar/FEMA-BCAR-Resource.pdf>

<sup>10</sup> Iowa Motor Vehicle Crash History, <https://iowadot.gov/mvd/stats/crashhistory.pdf>. Accessed January 2026.

**Table 4. Parameters Used in the Estimation of Safety Benefits**

Variable Name	Unit	Value	Source
<b>Reduced Crashes</b>			
Value of Averted Fatality (K)	\$ per event	\$13,700,000	USDOT, <i>Benefit-Cost Analysis Guidance for Discretionary Grant Programs</i> , December 2025.
Value of Averted Incapacitating Injury (A)	\$ per event	\$1,302,300	(ibid)
Value of Averted Non-Incapacitating Injury (B)	\$ per event	\$256,300	(ibid)
Value of Averted Possible Injury (C)	\$ per event	\$122,400	(ibid)
Value of No Injury (O)	\$ per event	\$5,500	(ibid)
Value of Injury, Severity Unknown (U)	\$ per event	\$238,500	(ibid)
Value of Averted Property Damage	\$ per event	\$5,480	(ibid)
Crash Rate	crashes per 100 million VMT	162.2	Iowa Motor Vehicle Crash History, 1925 to 2024. Average 2019-2024. <a href="https://iowadot.gov/mvd/stats/crashhistory.pdf">https://iowadot.gov/mvd/stats/crashhistory.pdf</a> Accessed 15 January 2026
<b>EMS Benefits</b>			
Probability of Major Event Occurring Each Year	probability	31.8%	7 major events identified between June 2002 and June 2024 in Dyersville BRIC Scoping Study (p. 13)
East-West Component			

Variable Name	Unit	Value	Source
Population Affected	people	1300	Approximate Population of West Dyersville based on 2020 Census Block data
Reduced distance from improvements	miles	1.00	Approximate reduction in driving distance from Dyersville Fire Station to West Dyersville
North-South Component			
Population Affected	people	600	Approximate Population of Dyersville north of train tracks based on 2020 Census Block data
Reduced distance from improvements	miles	1.2	Equivalent to average of 2-minute emergency vehicle delay at train tracks.

### 6.1.3 Benefit Estimates

Safety benefits resulting the construction of new bridges to divert traffic along safer routes, reducing VMT and the statistical probability of crashes, is valued at \$5.59 million over the 20-year period of analysis, when discounted at 7 percent. Additionally, the project will generate significant savings in emergency services costs from faster response times, accounting for \$3.76 million when discounted at 7 percent. Total discounted safety benefits of the project are \$9.35 million.

**Table 5: Estimates of Safety Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Crash Safety Benefits	\$16,103,268	\$5,591,960
Emergency Services Benefits	\$10,641,775	\$3,756,142
<b>Total Safety Benefits</b>	<b>\$26,745,043</b>	<b>\$9,348,101</b>

## 6.2 Environmental Sustainability

The project will contribute to environmental sustainability by reducing vehicle emissions. This comes from creating connections that result in more direct travel, and also inducing

some drivers to travel by non-automotive modes on these new connections. Additionally, the project enhances infrastructure resiliency by providing vehicular bridges elevated above the 100-year flood plain to avoid impacts of flood events on roadways, though this benefit is not monetized.

### 6.2.1 Methodology

Reduced vehicle miles travelled as a result of the new affordable transportation connections and more direct car routes was also calculated from the demand forecasts previously discussed in Section 5. These projections of reduced VMT in the Build scenario were combined with emissions rates for vehicles, in grams per mile, sourced from the EPA MOVES model to calculate total reduced emissions. Total quantities of reduced emissions from both sources, by pollutant, were further monetized according to USDOT BCA Guidance.

### 6.2.2 Assumptions

The assumptions used in the estimation of environmental sustainability benefits are summarized in the table below.

Note that emissions rates sourced from the EPA MOVES database are time series data. The values represented in the table below correspond with emissions rates as of 2030, which are generally representative for summary purposes of the more detailed time series emissions rates employed in the BCA model.

**Table 6: Assumptions Used in the Estimation of Environmental Sustainability Benefits**

Variable Name	Unit	Value	Source
Value of Reduced Emissions: NOx	\$ per metric ton	variable, by year	USDOT, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025
Value of Reduced Emissions: PM2.5	\$ per metric ton	variable, by year	(ibid)
Value of Reduced Emissions: SO2	\$ per metric ton	variable, by year	(ibid)
<b>Passenger Vehicles</b>			
Emissions Factor: NOx	grams per mile	0.015	EPA MOVES Database, for speeds from 30 mph. Values shown for year 2030

Variable Name	Unit	Value	Source
Emissions Factor: PM2.5	grams per mile	0.001	(ibid)
Emissions Factor: SO2	grams per mile	0.001	(ibid)
<b>Trucks</b>			
Emissions Factor: NOx	grams per mile	1.615	EPA MOVES Database, for speeds from 30 mph. Values shown for year 2030
Emissions Factor: PM2.5	grams per mile	0.018	(ibid)
Emissions Factor: SO2	grams per mile	0.002	(ibid)

### 6.2.3 Benefit Estimates

The project improvements are estimated to decrease air contaminant emissions over the study period, as drivers divert to biking and walking trips. This minor monetized benefit is estimated to total \$0.01 million over twenty years when discounted by 7 percent.

**Table 7: Estimates of Environmental Sustainability Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Emissions Reduction Benefits	\$34,812	\$12,567

### 6.3 Quality of Life

The project will generate quality of life benefits by encouraging new pedestrians and cyclists to use the improved sidewalk facilities. These new pedestrians and cyclists will enjoy increased health benefits from the additional exercise.

In terms of monetized quality of life benefits, the proposed project is expected to generate health benefits for these cyclists and pedestrians. Health benefits are monetized as reduced mortality risk, per USDOT BCA Guidance.

### 6.3.1 Methodology

Pedestrian and cyclist trips in the project study area are estimated based on local population statistics and the portion of residents who walk and cycle to school and to work as described in Section 5. The project improvements are expected to generate new pedestrian and cyclist trips, who will benefit from reduced mortality risk. These additional trips are monetized based on USDOT BCA Guidance. Health benefits are not monetized for school-based trips that shift from vehicles to walking or cycling as primary school students will not fall in the USDOT age ranges.

### 6.3.2 Assumptions

The assumptions and parameters used in the estimation of quality of life benefits are summarized in the table below.

**Table 8: Assumptions Used in the Estimation of Quality of Life Benefits**

Variable Name	Unit	Value	Source
Percent population 20-74	%	64%	HDR Calculation based on 2023 ACS 5-year population estimates for City of Dyersville
Percent population 20-64	%	57%	(ibid)
Percent of induced trips from non-AT	%	89%	USDOT, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025
Value per pedestrian trip	\$/trip	\$8.36	(ibid)
Value per cyclist trip	\$/trip	\$7.45	(ibid)
<b>Annualization Factors</b>			
Walk/Bike to School	days per year	120	HDR Assumption. 2/3rds of full 180 day school year.
Walk/Bike to Work	days per year	173	HDR Assumption. 2/3rds of 260 day work year.

Walk/Bike to Services	days per year	104	HDR Assumption. Two trips per week.
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### 6.3.3 Benefit Estimates

Quality of life benefits achieved through improved active transportation infrastructure are estimated to total \$0.05 million over 20 years of project operations, discounted at 7 percent.

**Table 9: Estimates of Quality of Life Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Mortality Reduction Benefits to New Cyclists and Pedestrians	\$136,802	\$48,286

## 6.4 Mobility and Community Connectivity

The focus of this project is to improve mobility in the City of Dyersville by constructing new east-west and north-south connections through town. This improves mobility for vehicles (as captured through reduced travel time, vehicle operating costs, and emissions) as well as for pedestrians and cyclists. These benefits are discussed in this section and are monetized through the facility amenity benefits as per USDOT BCA Guidance.

### 6.4.1 Methodology

As discussed in Sections 5 and 6.3, pedestrian and cyclist trips in the project study area are estimated based on local population statistics and the portion of residents who walk and cycle to school and to work. Both existing and new pedestrians and cyclists will enjoy benefits from the sidewalks as part of the new east-west and north-south connections, as well as in the Full Build with the community trails components. Benefits are calculated based on the length of the facility improvements, and monetization values provided in USDOT BCA Guidance. In particular, if the length of the facility improvement is greater than the average trip distance advised in the USDOT BCA Guidance, then the improved facility length is capped by the average trip length.

### 6.4.2 Assumptions

The assumptions and parameters used in the estimation of mobility and community connectivity benefits are summarized in the table below.

**Table 10: Assumptions Used in the Estimation of Mobility and Community Connectivity Benefits**

Variable Name	Unit	Value	Source
Additional feet of sidewalk added - bridges	feet	10	HDR assumption based on minimum sidewalk width. Sidewalk is planned for both sides of the new bridge
Value per foot of expanded sidewalk - bridges	\$/foot per mile	\$0.13	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025
Value of new sidewalk - bridges & trails	\$ per mile	\$1.30	HDR Calculation based on project width
Additional feet of sidewalk added - trails	feet	10	Project design plans
Value of new sidewalk - trails	\$ per mile	\$2.60	HDR Calculation based on project width
Value of new cycling path	\$ per mile	\$1.76	USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025
<b>Length of Facility Improvement- Pedestrians</b>			
East-West Component	miles	0.63	Improved pedestrian path length capped by average trip length
North-South Component	miles	0.86	Improved pedestrian path length capped by average trip length
Full Project Trails	miles	1.49	Total improved trip length, both segments
<b>Length of Facility Improvement- Cyclists</b>			
East-West Component	miles	0.63	Improved cyclist path length capped by average trip length
North-South Component	miles	1.05	Improved cyclist path length capped by average trip length

Variable Name	Unit	Value	Source
Full Project Trails	miles	2.11	Total improved trip length, both segments

### 6.4.3 Benefits Estimate

Mobility benefits of the project are estimated to be \$0.46 million over 20 years of project operations, discounted at 7 percent.

**Table 11: Estimates of Mobility Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Facility Improvement Benefits to Cyclists and Pedestrians	\$1,299,285	\$458,598

## 6.5 Economic Competitiveness and Opportunity

The Connections for Economic Freedom project will contribute to enhancing economic competitiveness and opportunity through increased access to jobs and vehicle operating cost savings for travelers in the study area. The project is expected to result in travel time savings for all users on the roads of Dyersville.

### 6.5.1 Methodology

As discussed in Section 5, projections of daily vehicle hours and vehicle miles saved for autos and trucks were estimated in the Full Build, East-West and North-South component as part of the Traffic Model data from the City of Dyersville. Savings were interpolated between the base and forecast year and monetized based on USDOT BCA Guidance.

For pedestrians and cyclists, the travel distance avoided due to the project east-west and north-south connections was multiplied by existing trips to estimate the avoided miles traveled. This was applied to an average speed of travel for pedestrians and cyclists to get person-hours saved due to the project. Avoided travel time was monetized based on USDOT BCA Guidance.

### 6.5.2 Assumptions

The assumptions and parameters used in the estimation of economic competitiveness and opportunity benefits are summarized in the table below.

**Table 12: Assumptions Used in the Estimation of Economic Competitiveness Benefits**

Variable Name	Unit	Value	Source
Average Vehicle Occupancy - Passenger Vehicles (All Travel)	persons/vehicle	1.52	USDOT, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025. Appendix A, Table A-3
Average Vehicle Occupancy - Trucks	persons/vehicle	1.00	HDR Assumption
Travel Time Cost - Local Travel (All Purposes)	\$ / person-hour	\$21.80	USDOT, Benefit-Cost Analysis Guidance for Discretionary Grant Programs, December 2025.
Travel Time Cost - Truck Drivers	\$ / person-hour	\$37.20	(ibid)
Travel Time Cost - Walkers and Cyclists	\$ / person-hour	\$40.20	(ibid)
Average Cycling Speed	mph	9.80	(ibid)
Average Walking Speed	mph	3.20	(ibid)
Vehicle Operating Cost - Light Duty Vehicles	\$/ mile	\$0.56	(ibid)
Vehicle Operating Cost - Commercial Trucks	\$/ mile	\$1.23	(ibid)

### 6.5.3 Benefits Estimate

Economic competitiveness benefits of the project associated with travel time savings are estimated to be \$7.74 million over 20 years of project operations, discounted at 7 percent. Benefits related to vehicle operating cost savings are estimated at \$3.81 million over the same horizon. Thus, total economic competitiveness benefits are estimated to be \$11.55 million over 20 years of project operations, discounted at 7 percent.

**Table 13: Estimates of Economic Competitiveness & Opportunity Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Travel Time Savings	\$22,865,317	\$7,742,252
Vehicle Operating Cost Savings	\$10,963,268	\$3,807,473
<b>Total Economic Competitiveness Benefits</b>	<b>\$33,828,585</b>	<b>\$11,549,725</b>

## 6.6 State of Good Repair

The project will contribute to the state of good repair by reducing the vehicle miles traveled both through the reduced trip lengths due to the new connections and through diversion of users to non-auto modes. The project will also generate residual value benefits from the new bridges constructed, which will each have a useful life longer than the 20-year operations period used in the BCA.

### 6.6.1 Methodology

To estimate the reduced pavement maintenance costs, total reduced VMT was calculated. As discussed during Section 6.5, vehicle miles saved for autos and trucks was estimated in the Full Build, East-West and North-South component as part of the Traffic Model data from the City of Dyersville. These reduced miles were monetized based on the marginal external costs of pavement damage by vehicle class, as estimated by the 1997 Federal Highway Cost Allocation Study (inflated to 2024 dollars per USDOT Guidance).

The residual value of investment was calculated by applying straight line depreciation to the capital value of structure items constructed across the Connections for Economic Freedom project area according to the minimum years of service life for these infrastructure assets and the analysis period of the BCA.

### 6.6.2 Assumptions

The assumptions used in the estimation of state of good repair benefits are summarized in the table below.

**Table 14: Assumptions Used in the Estimation of State of Good Repair Benefits**

Variable Name	Unit	Value	Source
External cost of pavement damage by autos on a rural interstate	\$/mile	\$0.000	Addendum to the 1997 Federal Highway Cost Allocation Study Final Report, May 2000. Inflated to \$ 2024 based on GDP implicit price deflators.
External cost of pavement damage by trucks on a rural interstate	\$/mile	\$0.017	(ibid)
Service life of bridges	years	100	City of Dyersville

### 6.6.3 Benefit Estimates

Total discounted state of good repair benefits are estimated to be approximately \$2.34 million over the period of analysis, with the majority of benefits associated with the remaining value of the infrastructure.

**Table 15: Estimates of State of Good Repair Benefits, 2024 Dollars**

	Over the Project Lifecycle	
	Undiscounted	Discounted
Pavement Maintenance Cost Savings	\$6,514	\$2,262
Residual Infrastructure Value	\$13,601,467	\$2,342,111
<b>Total State of Good Repair Benefits</b>	<b>\$13,607,981</b>	<b>\$2,344,373</b>

## 7 Summary of Findings and BCA Outcomes

The table below summarizes the BCA findings. Annual costs and benefits are computed over the lifecycle of the project and as stated earlier, construction is expected to be completed in 2030, with a first full year of benefits in 2031. Benefits accrue during the full operation of the project, for twenty years through 2050.

Additionally, results of considering the North-South and East-West components separately are provided. These components have their own independent utility, and the

outcomes from analyzing them apart from the Full Build overall results are shown for brevity.

**Table 16: Full Build Overall Results of the Benefit Cost Analysis, 2024 Dollars**

Project Evaluation Metric	Undiscounted	Discounted
Total Net Benefits (\$ millions)	\$72.99	\$22.82
Total Costs (\$ millions)	\$29.62	\$20.67
Net Present Value (\$ millions)	\$3.37	\$2.15
Benefit / Cost Ratio	2.46	1.10
Internal Rate of Return (%)	8.0%*	
Payback Period (years)	16	25

\* IRR is based on undiscounted series

**Table 17: Full Build Monetized Benefit Estimates by BUILD Merit Criteria**

BUILD Merit Criteria	Benefit Categories	Discounted
Safety	Crash Safety Benefits	\$9,348,101
	Emergency Services Benefits	
Environmental Sustainability	Emissions Reduction Benefits	\$12,567
Quality of Life	Mortality Reduction Benefits to New Cyclists and Pedestrians	\$48,286
Mobility and Community Connectivity	Facility Improvement Benefits to Cyclists and Pedestrians	\$458,598
Economic Competitiveness and Opportunity	Travel Time Savings	\$11,549,725
	Vehicle Operating Cost Savings	
State of Good Repair	Pavement Maintenance Cost Savings	\$2,344,169
	Residual Infrastructure Value	
Disbenefits	Incremental O&M Costs	-\$941,232
<b>Total Benefit Estimates</b>		<b>\$22,820,420</b>

Considering all monetized benefits and costs, the estimated internal rate of return of the project is 8.0 percent. With a 7 percent real discount rate, the investment would result in

a \$2.15 million Net Present Value (discounted benefits in excess of discounted costs) and a benefit-cost ratio of approximately 1.10.

**Table 18: Results of the North-South Component Benefit Cost Analysis, 2024 Dollars**

Project Evaluation Metric	Undiscounted	Discounted
Total Net Benefits (\$ millions)	\$14.10	\$3.45
Total Costs (\$ millions)	\$15.87	\$10.98
Net Present Value (\$ millions)	(\$1.77)	(\$7.53)
Benefit / Cost Ratio	0.89	0.31
Internal Rate of Return (%)	-0.7% *	
Payback Period (years)	N/A	N/A

\* IRR is based on undiscounted series

**Table 19: North-South Component Monetized Benefit Estimates by BUILD Merit Criteria**

BUILD Merit Criteria	Benefit Categories	Discounted
Safety	Crash Safety Benefits	\$1,341,509
	Emergency Services Benefits	
Environmental Sustainability	Emissions Reduction Benefits	\$413
Quality of Life	Mortality Reduction Benefits to New Cyclists and Pedestrians	\$34,490
Mobility and Community Connectivity	Facility Improvement Benefits to Cyclists and Pedestrians	\$118,959
Economic Competitiveness and Opportunity	Travel Time Savings	\$1,219,354
	Vehicle Operating Cost Savings	
State of Good Repair	Pavement Maintenance Cost Savings	\$1,244,884
	Residual Infrastructure Value	
Disbenefits	Incremental O&M Costs	-\$509,402
<b>Total Benefit Estimates</b>		<b>\$3,450,206</b>

Considering monetized benefits and costs associated with the North-South component of the project, discounted costs are expected to outweigh benefits. This is associated

with a negative internal rate of return (-0.7 percent), a negative net present value of -\$7.53 million, and a benefit-cost ratio of 0.31.

**Table 20: Results of the East-West Component Benefit Cost Analysis, 2024 Dollars**

Project Evaluation Metric	Undiscounted	Discounted
Total Net Benefits (\$ millions)	\$43.69	\$14.16
Total Costs (\$ millions)	\$10.43	\$7.32
Net Present Value (\$ millions)	\$3.26	\$6.84
Benefit / Cost Ratio	4.19	1.94
Internal Rate of Return (%)	15.1% *	
Payback Period (years)	11	14

\* IRR is based on undiscounted series

**Table 21: East-West Component Monetized Benefit Estimates by BUILD Merit Criteria**

BUILD Merit Criteria	Benefit Categories	Discounted
Safety	Crash Safety Benefits	\$5,403,592
	Emergency Services Benefits	
Environmental Sustainability	Emissions Reduction Benefits	\$9,183
Quality of Life	Mortality Reduction Benefits to New Cyclists and Pedestrians	\$34,490
Mobility and Community Connectivity	Facility Improvement Benefits to Cyclists and Pedestrians	\$86,914
Economic Competitiveness and Opportunity	Travel Time Savings	\$8,113,741
	Vehicle Operating Cost Savings	
State of Good Repair	Pavement Maintenance Cost Savings	\$839,117
	Residual Infrastructure Value	
Disbenefits	Incremental O&M Costs	-\$325,501
<b>Total Benefit Estimates</b>		<b>\$14,161,535</b>

Considering monetized benefits and costs associated with the East-West component of the project, the estimated internal rate of return is 15.1 percent. With a 7 percent real discount rate, the \$7.32 million investment would result in \$14.16 million in benefits.

These results lead to a Net Present Value of \$6.84 million and a benefit-cost ratio of 1.94.

## 8 BCA Sensitivity Analysis

The BCA outcomes presented in the previous sections rely on a large number of assumptions and long-term projections, both of which are subject to considerable uncertainty.

The primary purpose of the sensitivity analysis is to help identify the variables and model parameters whose variations have the greatest impact on the BCA outcomes: the “critical variables.”

The sensitivity analysis can also be used to:

- Evaluate the impact of changes in individual critical variables – how much the final results would vary with reasonable departures from the “preferred” or most likely value for the variable; and
- Assess the robustness of the BCA and evaluate, in particular, whether the conclusions reached under the “preferred” set of input values are significantly altered by reasonable departures from those values.

The BCA results of the Full Build scenario as described throughout this report are compared in the table below to various sensitivity testing scenarios. The table provides the percentage changes in project NPV associated with variations in variables or parameters or calculations (listed in row), as indicated in the column headers.

**Table 22. Sensitivity Analysis Results**

Parameters	Change in Parameter Value	New NPV	% Change in NPV	New B/C Ratio
Benefits Period	Benefits Period of 25 Years	\$3.8 MM	75.2%	1.18
Independent Components	Set Model to "North-South" Only	\$-7.5 MM	-449.9%	0.31
	Set Model to "East-West" Only	\$6.8 MM	218.0%	1.94
Traffic Forecast	"Low" Traffic Projections	-\$2.0 MM	-190.7%	0.91
	"Middle" Traffic Projections	\$0.1 MM	-95.4%	1.00
Annual Additional O&M Expenses	50% Reduction in Annual Additional O&M Expense	\$1.7 MM	-21.9%	1.08

Parameters	Change in Parameter Value	New NPV	% Change in NPV	New B/C Ratio
Bridge Service Life	Bridge Service Life of 75 Years	\$2.0 MM	-8.9%	1.09