Excelsior Springs Safe Streets and Sidewalks Improvement

2022 RAISE Grant Application

Benefit Cost Analysis Technical Memorandum

April 14, 2022

What follows is a summary of the assumptions and references made within the Excelsior Springs Safe Streets and Sidewalks Improvement April 2022 RAISE Grant application. The information relates to the different sections/tabs in the BCA spreadsheet. The base year for benefits, costs, and discounts is 2020 per guidance from USDOT staff webinar presentations.

Sections 3 and 4 – Costs

The project is divided into three phases over four years:

- Engineering and initial property acquisition to occur in 2023
- Phase 1 is scheduled for 2024
    - Wornall Road reconstruction from Crown Hill to Leslie Lane
    - S McCleary Road sidewalk from Arbor to Highway 69
    - Highway 69 trail, ADA, and traffic signal improvements from Patsy Lane to McCleary Road
    - Highway 69 trail from McCleary Road to Jesse James Road split
    - Dunbar Avenue advanced train notification for EMS at the railroad crossing
    - Highway 69 trail from McCleary to Crown Hill
    - Highway 69 trail from Crown Hill to Century Park and Wornall Road
    - Highway 69 overpass at Wornall Road
- Phase 2 is scheduled for 2025
    - Old Quarry Road reconstruction from Madison to Arbor
    - Corum Road sidewalk from Coronado to Fiskars Building
    - Route 10 sidewalk from Corum Road to Old Orchard
    - Crown Hill sidewalk and intersection improvements from Route 10 to Highway 69
    - Crown Hill reconstruction from Highway 69 to Wornall Road
- Phase 3 is scheduled for 2026

- Wornall and Old Quarry Road reconstruction
- Route 10/Jesses James Split pavement rehabilitation, sidewalk, and trail
- Crest Drive sidewalk from Crown Hill to Lodwick
- Tracy Avenue sidewalk from Lynn to Highway 69
- Wornall Road sidewalk and road improvements from Westview School Drive to Titus

A preliminary engineer's opinion of probable costs was determined using recent bid prices converted to cost per foot for each proposed improvement.

Section 4 – Property Values

Per the USDOT BCA Guidance, most of this benefit is accounted for in the reduction of travel time and emissions. This benefit calculation is reduced by 80% to eliminate double counting. There are unique benefits to property value created by the project above and beyond reductions in travel time. They include improved streetscaping and multimodal access to properties. Improving street lighting, walking, and biking access to schools and businesses from neighborhoods increases the area's property values.

FHWA University Course on Bicycle and Pedestrian Transportation, Lesson 9: Walkways, Sidewalks, and Public Spaces (2006) was referenced for this benefit calculation. See https://safety.fhwa.dot.gov/ped_bike/univcourse/pdf/swless13.pdf

The reference notes sidewalks can increase property values $3,000-$5,000 (2006) per residential lot. The analysis includes properties within two or three blocks of the proposed improvements.

Section 5 – Environmental (Storm Water)

After recent costly flood events in Excelsior Springs, this project includes treatments designed to reduce flood events. Bioswales and rain gardens will be constructed to slow and reduce storm water from areas prone to flooding. A dedicated storm sewer system will also reduce the amount and costs of storm water undergoing wastewater treatment.

Precipitation average amounts were referenced from the US Climate Data website for the neighboring City of Kearney at: https://www.usclimatedata.com/climate/kearney/missouri/united-states/usmo1219

The USGS calculator was used to determine storm water quantities.

Costs to repair flood damage has not been included in this benefit calculation.

Sections 6 through 8 – Crashes

Crash data was collected for the Excelsior Springs area using the State of Missouri STARS Reporting website: https://www.mshp.dps.missouri.gov/TR15Map/Search

Reports were downloaded and reviewed to find crashes on the specific corridors in the project area. Attached to this technical memorandum is a spreadsheet that shows total crashes by year for Excelsior Springs with applicable crashes highlighted. A summary tab includes just the applicable crashes and summarizes types and severity of the crashes.

The STARS Reporting website does not distinguish between the severity of injuries. For this BCA, half of the injury crashes are coded as "non-incapacitating" and one quarter coded each to "possible injury" and "incapacitating injury."

Crash calculations are based on guidance by the USDOT.

Section 9 – Maintenance

Maintenance costs were provided by the City of Excelsior Springs for local streets, sidewalks, and sewers.

Section 10 – Vehicle Operating Costs

Vehicle operating costs from the USDOT Benefit Cost Analysis Guidelines. Estimation of walk/bike to work based on the Excelsior Springs Comprehensive Plan (2009): https://cityofesmo.com/pdflibrary/exspgsmasterplan.pdf

Section 11 – Vehicle Hours Cost

Vehicle Hours Cost from the 2022 USDOT BCA guidance.

AADT taken for one direction of McCleary Road between Highway 69 and Kearney Road.

SimTraffic was used to model travel time before and after constructing a roundabout.

Section 12 – Social Benefits

Improvements to storm water drainage to reduce flooding will provide a benefit of not closing down businesses affecting consumers and employees. The 2021 flooding

event in Excelsior Springs was used as an example of economic impact caused by such flood events.

Section 13 – Emissions

Annual Vehicle hours travels is calculated in Section 11 – Vehicle Hours Cost. Iowa DOT emissions data from 2008 was used to calculate emissions savings: https://iowadot.gov/systems_planning/pdf/2008%20Arterial%20Street%20Vehicle%20Emissions.PDF

Other factors and rates were calculated based on information provided in the USDOT Benefit Cost Analysis Guidance with supplemental information from the EPA: http://www.epa.gov/cleanenergy/energy-resources/refs.html and http://www.epa.gov/oms/climate/regulations/scc-tsd.pdf