

Memorandum

Date: 2/24/2026

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RE: CSAH 100 (Main Street) Railroad Crossing (DOT #252305T) Grade Separation 2026
BUILD Grant Application

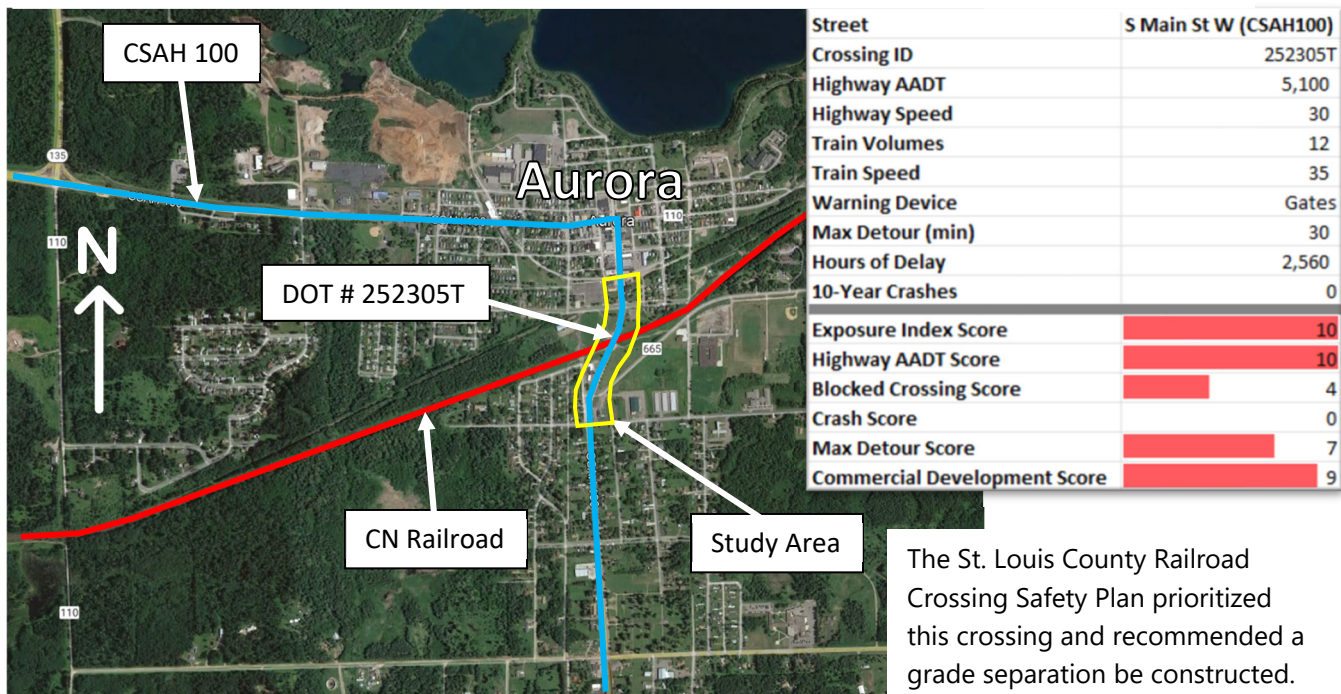
Existing Conditions Context

Main Street (County State Aid Highway 100 or CSAH 100) in Aurora, MN crosses a single-track Wisconsin Central, a Canadian National (CN) subsidy, owned railroad with an existing at-grade railroad crossing (DOT #252305T), as a two-lane highway with curb and gutter and a posted speed of 30 mph (see location map on the next page). The railroad crossing traffic control is accomplished with two quad gate active warning devices across the approaching roadway driving lanes. The crossing includes a 6-foot-wide sidewalk on both the east and west sides of the roadway without active crossing controls. The CN railroad bisects the City of Aurora with the crossing as the only connection between the north and south halves of Aurora. This crossing used by pedestrians, bicyclists, ATVs, and snowmobiles, as well as personal, commercial, and emergency vehicles. There are 12 total trains per day traveling up to 35 mph through this crossing with 4,400 average daily vehicles using the crossing on Main Street and averages 43 school bus crossings per day. Main Street serves as the primary route to access the City of Hoyt Lakes from the cities to the west, is a primary truck route that services this region, and is critical for school-related trips for Mesabi East Schools.

1. If this railroad crossing were closed due to an emergency condition (e.g. train derailment) or maintenance, the minimum detour length is 18.8 miles which includes gravel surfaced roads and township roads owned/maintained by Biwabik and White Townships. The minimum detour that exclusively includes paved roads that support truck traffic is 29.1 miles in length. The length of these detours was measured by using common origin and destination points on the immediate north and south side of the railroad crossing.
2. CSAH 100 is a regionally significant route that serves the cities of Aurora and Hoyt Lakes, as well as the surrounding townships and communities. The primary connection for the City of Hoyt Lakes to the rest of the Iron Range is CSAH 100.
3. A grade separation will improve safety for CSAH 100 traffic (passenger cars, school busses, trucks, pedestrians, bicyclists, ATVs and snowmobiles) by eliminating the opportunity for a crash involving a train and vehicle. According to the FRA Highway-Rail Grade Crossing Accident Prediction System for St. Louis County, Minnesota, this railroad crossing on CSAH 100 (USDOT #252305T) ranks 45 out of 226 crossings which places this railroad crossing in the top 20 percent by risk for a future crash involving a train and vehicle. This ranking includes the fact that this is an active crossing controlled by gates and signals.
4. A grade separation will ensure access for emergency services and the Essentia Northern Pines Hospital which includes a staffed emergency room. The Aurora fire hall is located on the north side of the railroad crossing and the Aurora hospital is located on the south side of the railroad crossing. The East Range EMS is located in the City of Hoyt Lakes which means access to the north side of Aurora would be blocked if the railroad crossing is blocked. Approximately two-thirds of Aurora's population lives on the north side of the railroad crossing.

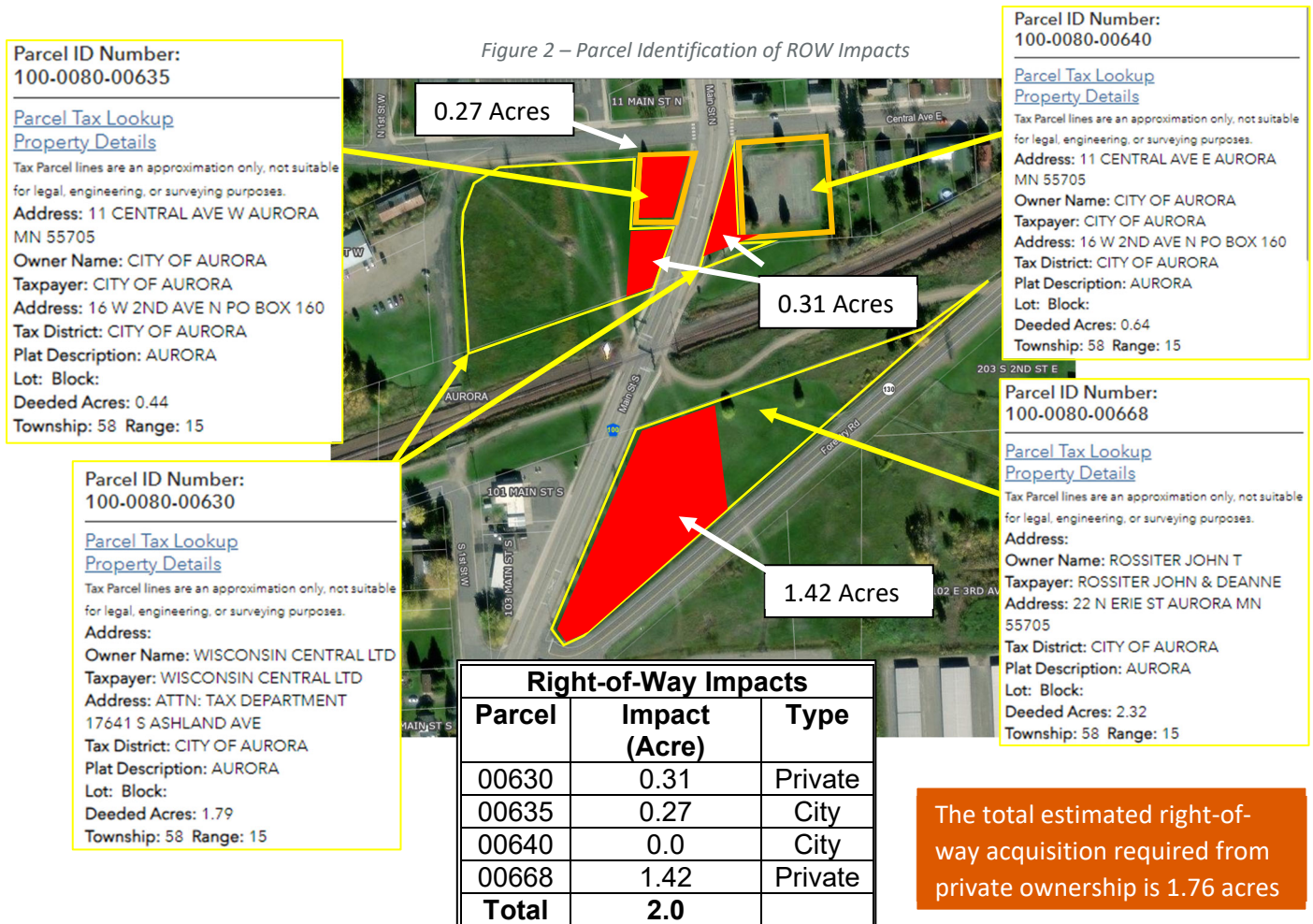
5. A grade separation will improve CSAH 100 for trucks and freight. CSAH 100 will serve as the future primary access to the NewRange Copper Nickel mine which will likely include trucks transporting hazardous materials. Additionally, CSAH 100 serves as the primary route to access the City of Hoyt Lakes' Laskin Industrial Park located on CR 633.
6. A grade separation will ensure ATVs and snowmobiles can continue to safely cross the railroad track. ATVs and snowmobiles currently utilize this railroad crossing through an unplanned routing network. The CN Railroad has expressed concerns about ATVs and snowmobiles crossing the railroad track.
7. The Mesabi Trail plans to extend from the City of Aurora to the City of Hoyt Lakes and routed over this railroad crossing.
8. The St. Louis County Railroad Crossing Safety Plan prioritizes this railroad crossing for a grade separation.

Figure 1 – Study Area and St Louis County Railroad Crossing Inventory Summary



Right-Way Impacts

The City of Aurora owns two parcels north of the CN railroad, adjacent to the alignment. Private parcels with anticipated impacts from a grade separation include property owned by Wisconsin Central LTD and John Rossiter.



Constraints

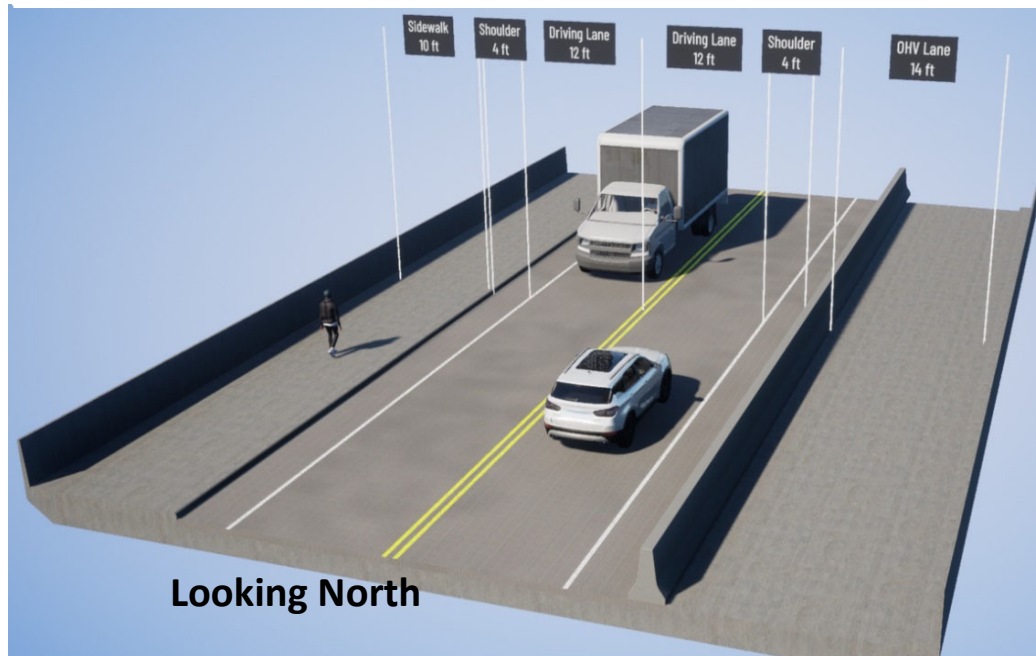
The following constraints were used in this study to provide criteria with which a feasible corridor would have to function.

- Do not impact building structures.
- Avoid impacts to the pickleball court.
- Avoid Impacts to A&W and the Car Wash properties southwest of the crossing.
- Provide consolidated access to A&W and the Car Wash (101/103 Main Street South).
- Provide a 14' ATV/Snowmobile trail on the bridge deck.
- Provide a 10' Shared Use Path on the bridge deck.
- Per Minnesota Administrative Rules 8820.9956 "Minimum Vertical Clearances for Underpasses" 22 feet of vertical clearance is needed above the rail tracks.
- 35 mph design speed.
- 5% maximum approaching grade. The AASHTO Policy on Geometric Design of Highways and Streets, Table 7-4a, Maximum Grades for Arterials in Urban Areas provides a maximum grade of 7% for level terrain and a design speed of 35 mph.

Typical Section

The typical section utilized in the study included two 12-foot vehicular travel lanes with 4-foot shoulders, a 10-foot shared use path west of the roadway and a 14-foot ATV/snowmobile (OHV) trail separated by a barrier east of the roadway (see below). The 14-foot OHV lane is intended to accommodate a snowmobile trail groomer.

Figure 3 – CSAH 100 Bridge Cross Section

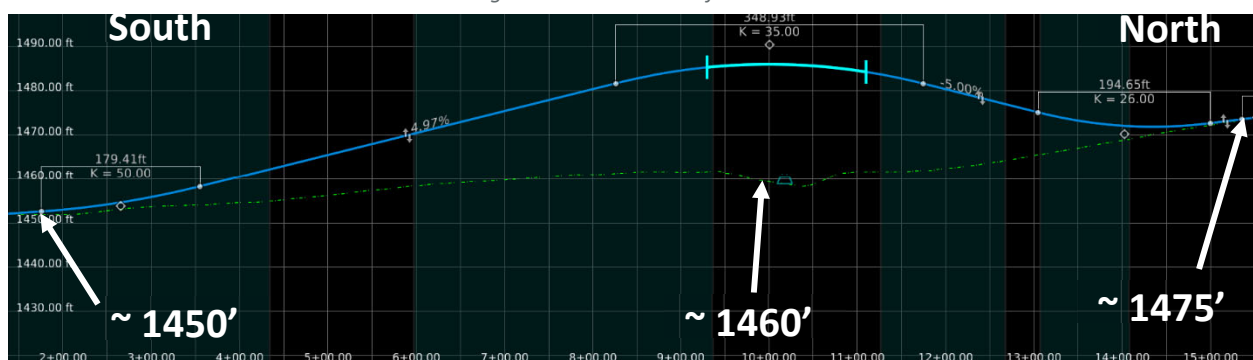


Profile View

The proposed plan view layout shown on page 5 accomplishes the maximum 5% approaching grade to the railroad separation while providing a 25-foot grade difference between the top of the tracks and the top of the bridge deck. Assuming the bridge deck and beam section will be less than 3 feet thick, as a conservative estimate, there will be greater than a 22-foot separation provided (see below).

The left side of the profile represents the approach south of the railroad crossing, and the right side represents the north approach near downtown Aurora. Please note that the natural elevation increase from south to north lends itself well to accommodate a shorter tie-in north of the railroad, minimizing impacts to the developed area north of Central Avenue.

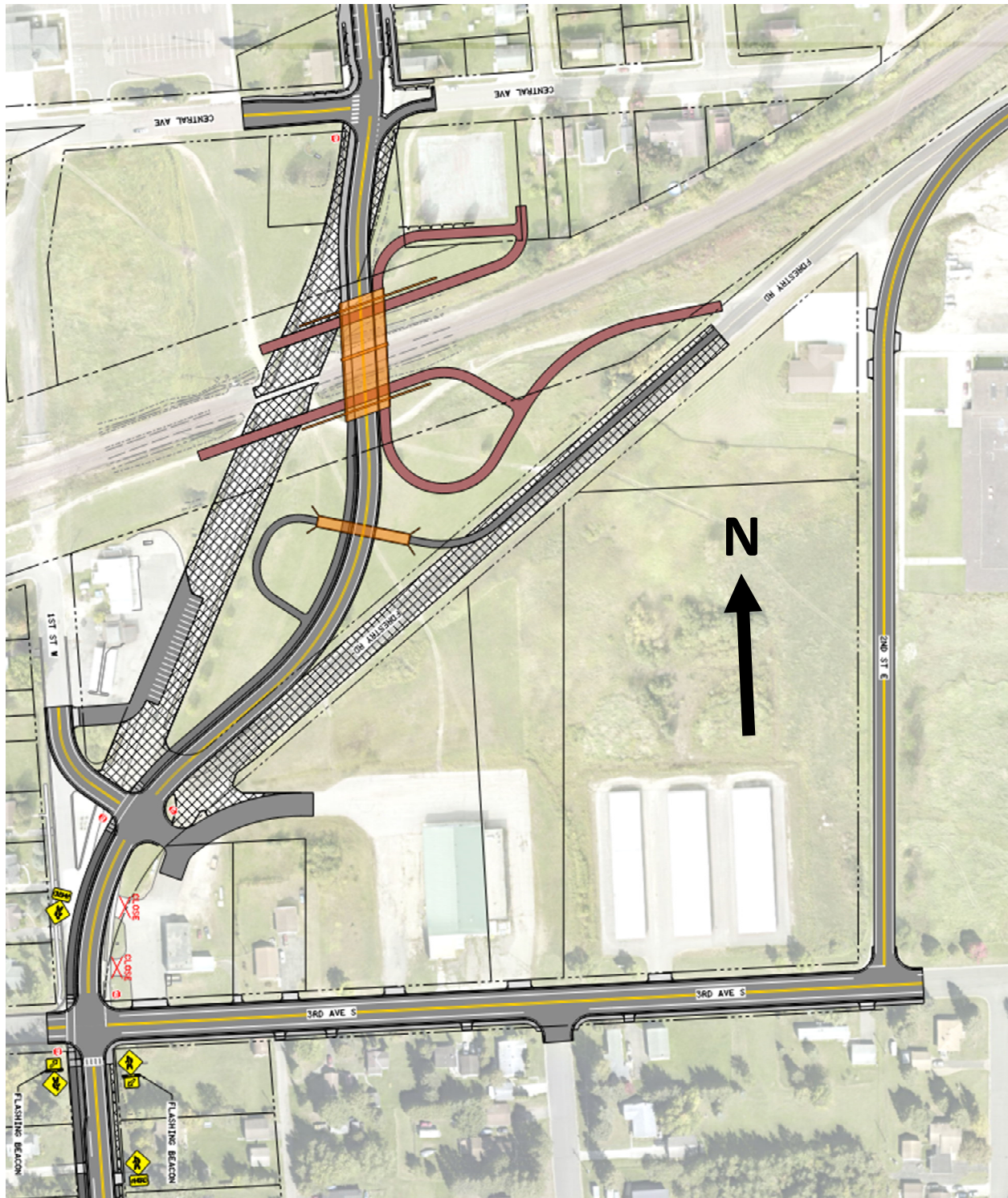
Figure 4 – CSAH 100 Profile View



Plan View Layout

The preliminary layout accommodates the proposed typical section and all the constraints previously identified. As shown below, the east leg of Central Avenue will be disconnected at Main Street and Forestry Road (CSAH 130) and would be rerouted along 2nd Street East to 3rd Avenue South. The reroute of CSAH 130 (Forestry Road) would require St. Louis County to acquire ownership of 2nd Street East and a portion of 3rd Avenue South.

Figure 5 – CSAH 100 Grade Crossing Layout



Perspective Layout

The perspective view allows for a more intuitive visual of the footprint and impacts of the proposed grade separation.

Figure 6 – Perspective Layout



Bridge Design Assumptions

The following assumptions were made in the bridge design to limit footprint impacts and provide a continuous transportation network that was impacted by the railroad grade separation.

- Utilize retaining walls north of Central Avenue to eliminate impacts to building structures and ROW.
- Forestry Road will be rerouted along 2nd Street East and 3rd Avenue South to CSAH 100 (Main Street).
- Pavement, aggregate base, and lighting will be approximately the same between the existing at-grade crossing and the grade separation crossing and will not be included in the cost analysis assuming a reconstruct as the base condition.
- Shall meet the minimum vertical and horizontal clearances required by the railroad. Comply with railroad requirements and dimensions for protection walls, fencing, bridge barrier walls, aerial utilities, pier walls, and routing of the ATV and Snowmobile trails.

Benefit-Cost Approach:

A 30-year Benefit-Cost Analysis (BCA) was completed to justify implementing the grade separation crossing over the existing at-grade crossing. The methodology is in accordance with U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs. The BCA compared various costs and benefits between keeping the existing at-grade crossing (named the No-Build Scenario) and constructing the grade-separated crossing (named the Build Scenario). The BCA does not include any improvements that would be included beyond the grade-separation study area referenced in **Figure 1** above (i.e., road pavement, lighting, aggregate base). **Figure 7** and **Table 1** details the categories and methodologies used in this BCA to calculate the Benefit-Cost Ratio.

Figure 7 – Summary of Benefit/Cost Monetized Categories

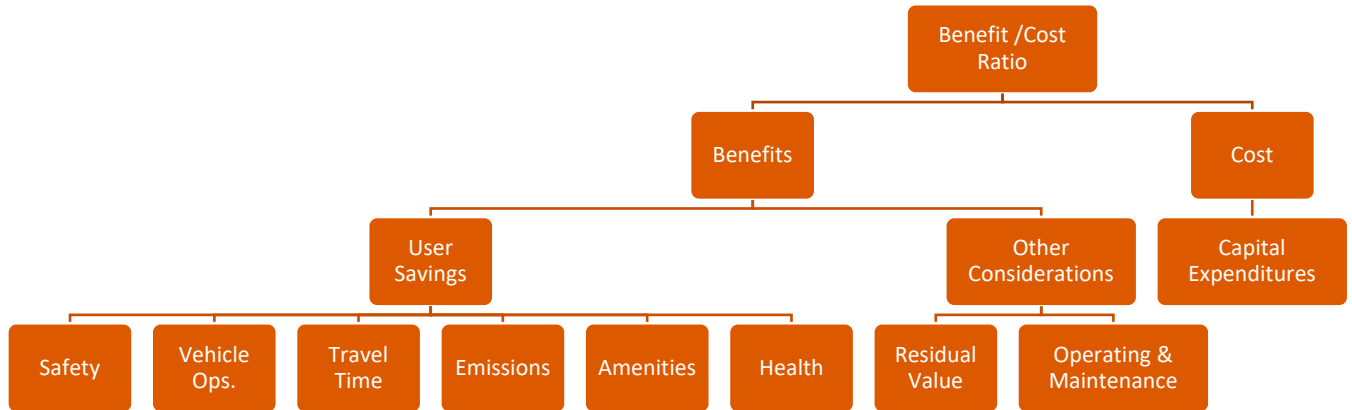


Table 1 – Summary of Benefit/Cost Analysis Methodology

Category	Methodology Overview
Safety	Twelve-year crash data gathered from MnDOT and Federal Railroad Administration to analyze historical train-multimodal crashes. Future crash costs were calculated with the annual average crash rate over the 12-year history. Estimated crash modification factors were used to estimate future benefits.
Travel Time	Benefits estimated without need to detour for 7 days of maintenance and delay due to train crossing blockage time.
Emissions	Benefits estimated with reduced vehicle miles travel due to detours and reduced idling time for train crossings.
Amenities	Benefits estimated with proposed extended multimodal path. Trips estimated with counts along other segments of Mesabi Trail.
Health	Benefits estimated by total active transportation trips induced by reduction of vehicle trips. Trips are estimated by Streetlight Insight trips under 1 mile long.
Residual Value	Appraisal of remaining value at the design year based on expected infrastructure life and linear approximation of loss in value.
Operating & Maintenance	Estimate of yearly operating and maintenance costs based on daily estimated multimodal facility maintenance.
Capital Expenditures	Preliminary layouts and straightforward quantity takeoff methods

Results Summary

The results of the BCA analysis indicate a positive Benefit-Cost Ratio of 6.01:1. All costs in this summary are discussed in 2024 dollars and account for the appropriate discount rate of 7 percent.

The results of the three primary categories used to monetize user benefit in the benefit/cost analysis are described below and shown in **Table 2**:

- **Safety Benefits** – All crashes involving crossing the railroad tracks are eliminated with a grade separated crossing. No other crashes were assumed to be reduced with this project. All railroad crashes involved multimodal users and this project will greatly improve mobility and safety within the City of Aurora. The Mesabi Trail is planned to extend through Aurora, providing significantly higher multimodal traffic in which this project would provide

much benefit to those users. Total safety savings are expected to create over \$26.1M in benefits.

- **Vehicle Operations/Emissions Benefits** – The proposed Build Condition will reduce operations and emissions by eliminating need to detour to maintain the existing at-grade crossing and delay time due to trains blocking the at-grade crossing. Vehicle operating benefits are derived from the travel time from detours due to maintenance of the existing at-grade crossing. Benefits were calculated to be over \$1,800,000 for train crossing delay savings, over \$2,400,000 for detour travel time savings, and over \$2,700,000 for vehicle operating savings.
- **Amenities/Health Benefits** – Benefits for amenities are focused on users crossing the grade-separated multimodal path. User volumes were derived from other nearby sections of the Mesabi Trail. First year after construction in 2031, 28,000 users are estimated to use the grade-separated crossing and dropping down to 14,000 the next year. One-fifth of short trips of under one mile derived from Streetlight Insight were estimated to be induced multimodal trips used for health benefits calculations. Amenities benefits were calculated to be \$41,000 and health benefits to be \$582,000.

Table 2 – Sum of User Benefits

Type	Safety	Vehicle Ops. / Emissions	Amenities / Health	Total User Benefits
Un-discounted	\$98,345,277	\$24,725,941	\$2,340,580	\$125,411,798
Discounted	\$26,185,177	\$6,582,985	\$623,996	\$33,392,157

In addition to user benefits, operating & maintenance costs, and residual value are included in the numerator of the benefit/cost ratio. Maintenance costs are expected to increase by \$5,800 per year in present value for the build condition compared to no build over 30 years accumulating to (\$48,000) in discounted dollars of cost. The expected discounted residual value of the project infrastructure at the final analysis year is \$356,000.

When user benefits are added to operating & maintenance costs, economic development, and residual value, the total benefits from the completion of the project are expected to be \$40.3 million as shown in **Table 3** below. Total Capital Costs are estimated to be \$8.6 million discounted to \$5.6M, producing a benefit/cost ratio of **6.01:1**.

Table 3 – Summary of Total Benefits and Costs

Year	Safety	Travel Time Savings	Vehicle Operating Savings	Emission Reduction	Amenity Benefits	Health Benefits	Residual Value	Operations and Maintenance	Total Benefits
2031	\$1,829,804	\$296,676	\$159,177	\$4,085	\$5,525	\$40,684	\$0	-\$3,614	\$2,332,336
2032	\$1,723,741	\$279,494	\$149,945	\$3,847	\$2,579	\$38,308	\$0	-\$3,378	\$2,194,535
2033	\$1,623,723	\$263,291	\$141,239	\$3,622	\$2,428	\$36,070	\$0	-\$3,157	\$2,067,217
2034	\$1,529,415	\$248,011	\$133,031	\$3,411	\$2,287	\$33,963	\$0	-\$2,950	\$1,947,168
2035	\$1,440,497	\$233,604	\$125,292	\$3,212	\$2,153	\$31,979	\$0	-\$2,757	\$1,833,980
2036	\$1,356,668	\$220,020	\$117,997	\$3,024	\$2,027	\$30,112	\$0	-\$2,577	\$1,727,271
2037	\$1,277,641	\$207,214	\$111,120	\$2,847	\$1,909	\$28,353	\$0	-\$2,408	\$1,626,675
2038	\$1,203,149	\$195,142	\$104,637	\$2,680	\$1,797	\$26,697	\$0	-\$2,251	\$1,531,851
2039	\$1,132,935	\$183,762	\$98,528	\$2,523	\$1,692	\$25,137	\$0	-\$2,104	\$1,442,473
2040	\$1,066,758	\$173,037	\$92,769	\$2,375	\$1,594	\$23,669	\$0	-\$1,966	\$1,358,235
2041	\$1,004,391	\$162,928	\$87,343	\$2,235	\$1,500	\$22,286	\$0	-\$1,837	\$1,278,847
2042	\$945,619	\$153,401	\$82,229	\$2,104	\$1,413	\$20,985	\$0	-\$1,717	\$1,204,034
2043	\$890,238	\$144,423	\$77,411	\$1,980	\$1,330	\$19,759	\$0	-\$1,605	\$1,133,537
2044	\$838,056	\$135,964	\$72,871	\$1,864	\$1,253	\$18,605	\$0	-\$1,500	\$1,067,113
2045	\$788,892	\$127,993	\$68,594	\$1,754	\$1,179	\$17,518	\$0	-\$1,402	\$1,004,529
2046	\$742,573	\$120,483	\$64,565	\$1,651	\$1,111	\$16,495	\$0	-\$1,310	\$945,567
2047	\$698,939	\$113,408	\$60,769	\$1,553	\$1,046	\$15,531	\$0	-\$1,224	\$890,022
2048	\$657,835	\$106,744	\$57,194	\$1,461	\$985	\$14,624	\$0	-\$1,144	\$837,698
2049	\$619,118	\$100,465	\$53,826	\$1,375	\$927	\$13,770	\$0	-\$1,069	\$788,412
2050	\$582,652	\$94,552	\$50,654	\$1,294	\$873	\$12,966	\$0	-\$999	\$741,991
2051	\$548,307	\$88,982	\$47,667	\$1,217	\$822	\$12,208	\$0	-\$934	\$698,269
2052	\$515,962	\$83,736	\$44,854	\$1,145	\$774	\$11,495	\$0	-\$873	\$657,094
2053	\$485,503	\$78,796	\$42,205	\$1,077	\$729	\$10,824	\$0	-\$816	\$618,317
2054	\$456,820	\$74,144	\$39,710	\$1,013	\$686	\$10,191	\$0	-\$762	\$581,803
2055	\$429,813	\$69,763	\$37,362	\$953	\$646	\$9,596	\$0	-\$713	\$547,421
2056	\$404,384	\$65,638	\$35,150	\$897	\$608	\$9,036	\$0	-\$666	\$515,047
2057	\$380,443	\$61,754	\$33,069	\$843	\$573	\$8,508	\$0	-\$622	\$484,567
2058	\$357,904	\$58,098	\$31,109	\$793	\$539	\$8,011	\$0	-\$582	\$455,872
2059	\$336,685	\$54,655	\$29,264	\$746	\$508	\$7,543	\$0	-\$544	\$428,857
2060	\$316,711	\$51,415	\$27,527	\$702	\$478	\$7,102	\$356,275	-\$508	\$759,701
Discounted Total	\$26,185,177	\$4,247,591	\$2,277,109	\$58,285	\$41,972	\$582,024	\$356,275	-\$47,991	\$33,700,440
						Capital Expenditure Benefit/Cost Ratio		\$5,607,674	
								6.01	

Methodology

A Benefit-Cost Analysis (BCA) is a conceptual framework that quantifies, in monetary terms, costs and benefits of a project. Benefits are broadly defined and represent the extent to which users impacted by the project are made better-off.

Key Assumptions

Key assumptions for the benefit/cost analysis include parameters that apply to all categories and elements of the analysis. All monetary assumptions are consistent with the U.S. Department of Transportation (USDOT), Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2026. These key assumptions include:

- **Analysis Period:** The benefit/cost analysis assumes a construction year of 2029-2030. The BCA is evaluating a 30-year period resulting in the first analysis year of 2031 to the final analysis year of 2060. The project is considering brand new construction in which USDOT suggests a 30-year analysis period.
- **Discounting:** A 7% discount was applied to all monetized values to express values in 2024 dollars.
- **User Benefit Unit Values:** USDOT guidance for the valuation of benefits was used unless noted.
- **Growth Rate:** KLJ completed an Intersection control evaluation report on E 3rd Ave N and N Main St in 2024 which assumed a 0.75% rate to account for future mining industry boom in the area around Aurora. All vehicular and active transportation traffic are calculated with this rate for future years.

Safety Benefits Methodology

Crash and incident history was gathered for 2012 through 2021 and averaged for an average annual crash cost. A long crash history was required to capture the best representative of the safety risk of the railroad crossing in town. All railroad crashes were reduced to zero with the proposed grade separated crossing. Two railroad-related incidents were reported in this time frame occurring within a month of each other in 2012. Both incidents were non-motorized users which resulted in fatalities. An adult bicyclist crashed at the railroad crossing and a high school student travelling to school crossed the tracks 300 yards east of the crossing. Five other crashes occurred within the study area but are not related to the railroad and were not calculated into the savings of the project. One single vehicle crash resulted in a minor injury and the remaining four crashes were property damage only crashes. Of those crashes, 9 total vehicles were involved.

Table 4 – Safety Benefits

Year	No Build	Build	Savings	Discounted
2031	\$2,956,109	\$17,844	\$2,938,265	\$1,829,804
2060	\$3,640,059	\$21,973	\$3,618,087	\$316,711
Total	\$98,942,527	\$597,250	\$98,345,277	\$26,185,177

Benefits related to user travel time and vehicle operating costs were broken down into categories: time saved to bypass train crossings with the proposed grade separated bridge and travel time/vehicle operating costs saved due to no detour required for railroad crossing maintenance. Key assumptions are list in **Table 8** below. Vehicle crossings are derived from MnDOT counts while truck percentages are taken from the previous Aurora Intersection Study.

Variable	Value
Railroad crossings (trains/day)	12
Blockage time per train (min.)	5
Vehicle crossings (vehicles/day)	4,400
School Busses per day	43
Traffic Growth rate	0.75%
Heavy Vehicle Percentage	3.3%
Railroad maintenance (days/year)	7
Average travel time - Detour (min.)	23.3
Average travel time - No Detour (min.)	8.4
Average travel distance – Detour (mi.)	19.3
Average travel distance – No Detour (mi.)	5.9

For seven days of the year, Saint Louis County is accounting for full closure of the crossing while traffic requires a long detour to get to the other side of the city. Closures are expected outside of the school year, therefore not included in this calculation. Vehicle operating costs and travel time costs are calculated with this portion of the BCA. Summary of results are

Year	Daily Vehicle Trips	Annual Vehicle Hours Traveled		VHT Saved	Annual Vehicle Miles Traveled		VMT Saved	Annual Benefit
		No Build	Build		No Build	Build		
2031	4,651	17,166	4,567	12,599	629,929	190,831	439,097	\$732,000
2060	5,722	21,119	5,581	15,538	774,992	234,777	540,215	\$901,822
Total	-	574,267	152,222	422,045	21,073,811	6,384,122	14,689,689	\$24,507,317
					Total Discounted			\$6,524,700

Emissions Benefits Methodology

Emissions benefits were calculated from the vehicle miles traveled from the Vehicle Operations Methodology in the above section for non-CO2 emissions and estimated fuel consumption. All emissions were monetized using urban VMT-based values given in Benefit-Cost Analysis Guidance for Discretionary Grant Programs, January 2026. Summary of emissions benefits are in detailed non-CO2 costs and savings.

Table 7 – Annual Emissions Cost and Benefits

Year	Emissions Savings	Fuel Savings	Benefits	Discounted
2031	\$419	\$5,886	\$6,559	\$4,085
2060	\$72	\$7,193	\$8,016	\$702
Total	\$5,984	\$196,179	\$218,624	\$58,285

Amenities & Health Benefits Methodology

The usage of the extended Mesabi Trail via the grade separated Main Street crossing is the source of amenities benefits for this project. Both pedestrian trips and bicyclist trips factor into quantifying benefits. The proposed build condition contains about 0.2 miles long portion of the Mesabi Trail extension. Usage of the trail within the project area will have users with short commuter trips from Mesabi East Schools and the Commercial core of Aurora along with long recreational trips traveling outside the city limits. Overall trips were estimated with trail counts on existing Mesabi Trail segments and induced trips for health benefits were calculated with Streetlight Insight trips under 1 mile long. Active trips are assumed to be primarily in March through November in any given year due to the brutal winter of Northern Minnesota. Assumptions for active transportation are shown in **Table 8** and **Table 9** has the breakdown of results.

Table 8 – Active Transportation Assumptions

Assumption	Value
Vehicle crossings 2024 (vehicles/day)	4,400
Trips under 1 mile	3.4%
Induced trips portion of <1 mile trips	20%
Traffic Growth rate	0.75%
Bike Trail users 1 st year	28,200
Bike Trail users 2 nd year	14,086
Pedestrian/Bike Ratio	70/30

Table 9 – Health Benefits Summary

Year	Induced Pedestrian Trips	Induced Bicycle Trips	Benefits	Discounted
2031	5,655	2,424	\$65,330	\$40,684
2060	7,023	3,010	\$81,137	\$7,102
Total	189,455	81,195	\$2,188,745	\$582,024

Operating & Maintenance Costs Benefits Methodology

The operating and maintenance costs for the proposed project are expected to increase compared to the No Build. Existing at grade maintenance costs of \$1,000 per year are expected to increase to \$6,804 in Build conditions based on increasing bridge maintenance using 2024 dollars.

Table 10 – Maintenance Breakdown

Year	No Build	Build	Difference	Discounted
2031	\$1,000	\$6,804	(\$5,804)	(\$3,614)
2060	\$1,000	\$6,804	(\$5,804)	(\$508)
Total	\$30,000	\$204,120	(\$174,120)	(\$47,991)

Capital Expenditure & Residual Value

Capital expenditures were calculated using preliminary layouts and straightforward quantity takeoff methods. The costs are broken down by specific unit prices and quantities. This project is expected to split construction costs evenly in 2029 and 2030 for a 2-year construction seasons, starting benefits in 2031. Cost estimates are given in year-of-expenditure dollars discounted by 7.0% to be consistent with benefits.

Table 11 – Grade Separation Cost Estimates (2024)

Bid Item	Unit	Unit Bid Price	Estimated Quantity	Estimated Cost (2026\$)	Estimated Cost (2024\$)
Approach Embankment Earthwork	Cu Yd	\$15	61,500	\$922,500	\$869,545
Retaining Wall	Sq Ft	\$150	2,100	\$315,000	\$296,918
Bridge	Sq Ft	\$350	11,160	\$3,906,000	\$3,681,780
Railroad Protective Services	LSum	\$330,000	1	\$330,000	\$28,278
CSAH 130 Reconstruction	Lin Ft	\$550	2400	\$1,320,000	\$282,779
Forestry Road Obliteration	LSum	\$75,000	1	\$75,000	\$1,244,227
Box Culvert Pedestrian Underpass	Lin Ft	\$2500	128	\$320,000	\$70,695
Subtotal				\$7,188,500	\$6,775,851
Contingency		20%	-	\$1,437,700	\$1,355,170
Total				\$8,626,200	\$8,131,021
Discounted Total					\$5,607,674

The residual value in the final analysis year of 2060 was estimated by breaking the project into the elements of preliminary engineering, right-of-way, major structures, roadway grading and drainage, roadway sub-base and base, and roadway surface for its benefit/cost processes. Error! Reference source not found. shows the useful life for the categories listed. Any capital expenditures that do not fit into these categories will assume to have a useful life less than 30 years and will not be included in the residual value calculation.

Table 12 – Residual Value Breakdown and Value

Expenditure Category	Asset Life (years)		2060 Remaining Value	Discounted Value
Final Design Engineering	\$186,634	0	\$0	\$0
Right-of-Way	\$28,278	100	\$19,795	\$2,271
Major Structures	\$4,280,328	80	\$2,675,205	\$306,956
Excavation/Removals	\$195,117	0	\$0	\$0
Grading and Drainage	\$869,545	50	\$347,818	\$39,909
Sub-base and Base	\$248,845	40	\$62,211	\$7,138
Surface	\$684,325	30	\$0	\$0
Remaining "Other" Project Cost	\$1,637,949	0	\$0	\$0
Total Project Cost	\$8,131,021			
Residual Value			\$3,105,029	\$356,275

Table 13 – Benefit-Cost Analysis: User Discounted Benefit Totals (2024 \$)

Safety Benefits	Vehicle Operating Benefits	Detour Travel Time Benefits	Railroad Crossings Delay Benefits	Emissions Benefits	Amenities / Health Benefits	Total User Benefits
\$26,185,177	\$2,277,109	\$1,851,758	\$2,395,833	\$58,285	\$623,996	\$33,392,157

Residual Value	Net Maintenance Cost	Total Benefit	Estimated Construction Cost	Benefit Cost Ratio
\$356,275	(\$47,991)	\$33,700,440	\$5,607,674	6.01