



## memorandum

**Date:** May 24, 2024

**To:** D. Anders Samuelson, PE

**From:** Craig Schripsema, PE

**Re:** Hillard Rome Road Grade Separation Project – BCA Executive Summary

Late fall 2023, OHM Advisors was engaged to develop conceptual plans and estimated costs to relocate Hillard Rome Road to a new alignment within right of way that the City has been acquiring over the past several years. The goal was to facilitate a new overpass over the railroad and eliminate the existing at-grade crossing.

This area has seen significant growth over the past several years and is anticipated to continue to grow with the opening of the Intel Chip plant in the region. The existing at-grade crossing is a 2-lane, 3-track crossing that can back up traffic significantly due to railroad operations. The currently available crash data is through 2022. While the 2023 crash data is still being processed for release, the City has been made aware of a severe motorcycle crash at the tracks that happened fall 2023, which is attached just for reference. The Benefit Cost Analysis (BCA) does not include this crash in the benefits calculations, since the 2023 crash data has not yet been made available by ODOT.

The BCA looked at Ten (10) years of crash data and travel time delays to develop the benefits value \$1,512,559.76 per year to be used over the analysis period. **Over the 20-year analysis period (see below) the total safety and travel time benefits equates to \$30,251,195.20 in 2022 dollars.** The travel time delays only included normal delays from train traffic moving through the crossing. More detailed information on how these values were developed is included in the back up documentation included herein. It does not account for longer duration delays due to railroad operations related to track switching or car manipulation for commercial customers in the vicinity. There was not a good way to quantify this delay, so we elected to stay conservative in our calculation by not including.

The estimated construction (capital) costs were based on the conceptual design of the roadway and overpass bridge as depicted in the back up documentation included herein. The Engineer's Estimate of Construction was developed using 2024 dollars and then increased to the anticipated construction year's 2032 dollars using ODOT's inflation calculator. This was compared to USDOT inflation calculations and the larger of the 2 numbers was selected to convert back to **\$28,211,355.58 in 2022 dollars** for comparison with the calculated benefits.

The analysis period of 20 years was used based on the anticipated pavement life of the roadway. However, since the overpass bridge and MSE wall have a design life of 75 years, there will be residual value of those two components of **\$6,589,267.47 in 2022 dollars** at the end of the analysis period that was added to the benefits total per section 6.3 of the BCA guidance.

In summary, the Benefit-Cost Ratio is calculated as (Total Discounted Benefits/Total Discounted Costs), which calculates to be  **$(\$30,251,195.20 + \$6,589,267.47)/\$28,211,355.58 = 1.31$  using 2022 dollars** per BCA guidance. The complete BCA and supporting documentation is included herein for review and validation.



# TRAFFIC CRASH REPORT

Document #: 20233171191

<input type="checkbox"/> PHOTOS TAKEN <input type="checkbox"/> OH-2 <input type="checkbox"/> OH-3 <input type="checkbox"/> SECONDARY CRASH <input type="checkbox"/> OH-1P <input type="checkbox"/> OTHER <input type="checkbox"/> PRIVATE PROPERTY		LOCAL INFORMATION 151 REPORTING AGENCY NAME* <b>COLUMBUS POLICE</b>	NCIC* <b>COP0</b>	HIT/SKIP 1 - SOLVED 2 - UNSOLVED	NUMBER OF UNITS <b>1</b>	UNIT IN ERROR 98 - ANIMAL 99 - UNKNOWN
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COUNTY* <b>25</b>	LOCALITY* 1 - CITY 2 - VILLAGE 3 - TOWNSHIP <b>1</b>	LOCATION: CITY, VILLAGE, TOWNSHIP* <b>Columbus</b>	ODPS FIPS <b>18000</b>	CRASH DATE / TIME* <b>9/24/2023 12:43:00 AM</b>	CRASH SEVERITY 2-SERIOUS INJURY SUSPECTED
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ROUTE TYPE	ROUTE NUMBER	PREFIX	N - NORTH S - SOUTH E - EAST W - WEST	LOCATION ROAD NAME <b>Hilliard Rome</b>	ROAD TYPE <b>RD</b>	ODPS LATITUDE <b>39.962364</b>	ODPS LONGITUDE <b>-83.146581</b>
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ROUTE TYPE	ROUTE NUMBER	PREFIX	N - NORTH S - SOUTH E - EAST W - WEST	REFERENCE ROAD NAME (ROAD, MILEPOST, HOUSE#) <b>Gabriel</b>	ROAD TYPE <b>CT</b>	ODOT LATITUDE <b>39.962391</b>	ODOT LONGITUDE <b>-83.146555</b>
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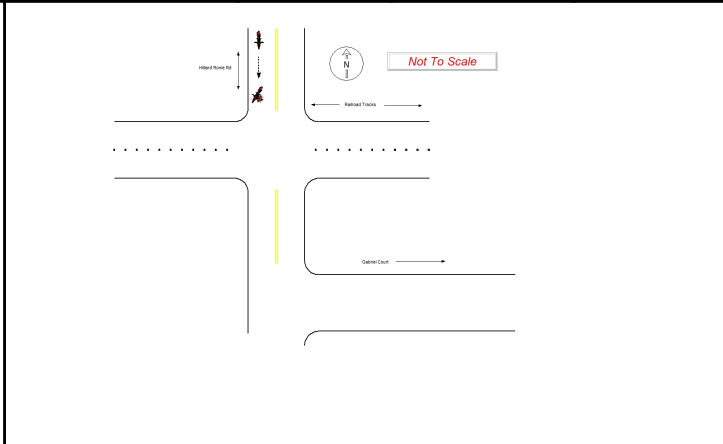
REFERENCE POINT <b>1</b> 1 - INTERSECTION 2 - MILE POST 3 - HOUSE NUMBER	DIRECTION FROM REFERENCE <b>N</b> N - NORTH S - SOUTH E - EAST W - WEST	ROUTE TYPE IR - INTERSTATE ROUTE (TP) US - FEDERAL US ROUTE SR - STATE ROUTE CR - NUMBERED COUNTY ROUTE TR - NUMBERED TOWNSHIP ROUTE	ROAD TYPE AL - ALLEY AV - AVENUE BL - BOULEVARD CR - CIRCLE CT - COURT DR - DRIVE HE - HEIGHTS HW - HIGHWAY LA - LANE MP - MILEPOST PK - PIKE PL - PLACE RD - ROAD SQ - SQUARE ST - STREET TE - TERRACE TL - TRAIL WA - WAY	ODOT GOOGLE MAP LINK <a href="https://www.google.com/maps?q=39.962391,-83.146555">https://www.google.com/maps?q=39.962391,-83.146555</a>
DISTANCE FROM REFERENCE <b>503.000</b>	DISTANCE UNIT OF MEASURE <b>2</b> 1 - MILES 2 - FEET 3 - YARDS	<input type="checkbox"/> WITHIN INTERSECTION OR ON APPROACH <input type="checkbox"/> WITHIN INTERCHANGE AREA ROADWAY <input type="checkbox"/> ROADWAY DIVIDED		INTERSECTION RELATED NUMBER OF APPROACHES

LOCATION OF FIRST HARMFUL EVENT <b>1</b> 1 - ON ROADWAY 2 - ON SHOULDER 3 - IN MEDIAN 4 - ON ROADSIDE 5 - ON GORE 6 - OUTSIDE TRAFFIC WAY 7 - ON RAMP 8 - OFF RAMP 9 - CROSSOVER 10 - DRIVEWAY/ALLEY ACCESS 11 - RAILWAY GRADE CROSSING 12 - SHARED USE PATHS OR TRAILS 13 - BIKE LANE 14 - TOOL BOOTH 99 - OTHER / UNKNOWN	MANNER OF CRASH COLLISION/IMPACT <b>1</b> 1 - NOT COLLISION BETWEEN TWO VEHICLES IN TRANSPORT 2 - REAR-END 3 - HEAD-ON 4 - REAR-TO-REAR 5 - BACKING 6 - ANGLE 7 - SIDESWIPE, SAME DIRECTION 8 - SIDESWIPE, OPPOSITE DIRECTION 9 - OTHER/UNKNOWN	DIRECTION OF TRAVEL <input type="checkbox"/> N - NORTH <input type="checkbox"/> S - SOUTH <input type="checkbox"/> E - EAST <input type="checkbox"/> W - WEST	MEDIAN TYPE <input type="checkbox"/> 1 - DIVIDED FLUSH MEDIAN (LESS THAN 4 FEET) <input type="checkbox"/> 2 - DIVIDED FLUSH MEDIAN (4 FEET AND GREATER) <input type="checkbox"/> 3 - DIVIDED, DEPRESSED MEDIAN <input type="checkbox"/> 4 - DIVIDED, RAISED MEDIAN (ANY TYPE) <input type="checkbox"/> 9 - OTHER/UNKNOWN
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<input type="checkbox"/> WORK ZONE RELATED <input type="checkbox"/> WORKERS PRESENT <input type="checkbox"/> LAW ENFORCEMENT PRESENT <input type="checkbox"/> ACTIVE SCHOOL ZONE	WORK ZONE TYPE <input type="checkbox"/> 1 - LANE CLOSURE 2 - LANE SHIFT/CROSSOVER 3 - WORK ON SHOULDER OR MEDIAN 4 - INTERMITTENT OR MOVING WORK 5 - OTHER	LOCATION OF CRASH IN WORK ZONE <input type="checkbox"/> 1 - BEFORE THE FIRST WORK ZONE WARNING SIGN 2 - ADVANCE WARNING AREA 3 - TRANSITION AREA 4 - ACTIVITY AREA 5 - TERMINATION AREA	CONTOUR <b>1</b> 1 - STRAIGHT LEVEL 2 - STRAIGHT GRADE 3 - CURVE LEVEL 4 - CURVE GRADE 9 - OTHER/UNKNOWN	CONDITIONS <b>1</b> 1 - DRY 2 - WET 3 - SNOW 4 - ICE 5 - SAND, MUD, DIRT, OIL, GRAVEL 6 - WATER (STANDING, MOVING) 7 - SLUSH 9 - OTHER/UNKNOWN	SURFACE <b>2</b> 1 - CONCRETE 2 - BLACKTOP, BITUMINOUS, ASPHALT 3 - BRICK/BLOCK, STONE 4 - SLAG, GRAVEL, STONE 5 - DIRT 9 - OTHER/UNKNOWN
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LIGHT CONDITION <b>4</b> 1 - DAYLIGHT 2 - DAWN/DUSK 3 - DARK - LIGHTED ROADWAY 4 - DARK - ROADWAY NOT LIGHTED 5 - DARK - UNKNOWN ROADWAY LIGHTING 9 - OTHER/UNKNOWN	WEATHER <b>1</b> 1 - CLEAR 2 - CLOUDY 3 - FOG, SMOG, SMOKE 4 - RAIN 5 - SLEET, HAIL 6 - SNOW 7 - SEVERE CROSSWINDS 8 - BLOWING SAND, SOIL, DIRT, SNOW 9 - OTHER/UNKNOWN
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**NARRATIVE**  
 UNIT #1 WAS TRAVELING SOUTH IN THE SOUTHBOUND LANE OF HILLIARD ROME RD, APPROACHING THE RAILROAD TRACKS NORTH OF GABRIEL COURT. OFFICERS OBSERVED SKID MARKS THAT WERE CONSISTENT UNIT #1 CRASHING ONTO ITS SIDE AND SKIDDING ALONG THE ROADWAY. OFFICERS ALSO OBSERVED A POOL OF BLOOD NEXT TO UNIT #1 AND CFD PERSONEL CONVEYED TO OFFICERS THAT THE RIDER WAS NOT WEARING A HELMET. THE RIDER WAS TRANSPORTED TO GRANT HOSPITAL BY CFD MEDIC 26 IN CRITICAL CONDITION. CITIZENS WHO LOCATED THE CRASH STATED THAT THEY SAW FUEL LEAKING FROM UNIT #1 AND STOOK IT UP TO ITS PROPER RESTING POSITION. AIU ARRIVED AT THE SCENE AND CONDUCTED AN INVESTIGATION. AT THE TIME OFFICERS OPENED THE ROAD WAY, THE RIDER WAS STILL IN LIFE THREATENING CONDITION.



CRASH REPORTED DATE / TIME <b>9/24/2023 12:43:00 AM</b>	DISPATCH DATE / TIME <b>9/24/2023 12:43:00 AM</b>	ARRIVAL DATE / TIME <b>9/24/2023 12:48:00 AM</b>	SCENE CLEARED DATE / TIME <b>9/24/2023 3:21:00 AM</b>	REPORT TAKEN BY <input checked="" type="checkbox"/> POLICE AGENCY <input type="checkbox"/> MOTORIST <input type="checkbox"/> SUPPLEMENT CORRECTION OR ADDITION TO AN EXISTING REPORT SENT TO ODPs
TOTAL TIME ROADWAY CLOSED <b>150</b>	OTHER INVESTIGATION TIME <b>20</b>	TOTAL MINUTES <b>178</b>	OFFICER'S NAME* <b>BELL, NATHAN</b> OFFICER'S BADGE NUMBER* <b>3429</b>	CHECKED BY OFFICER'S NAME* <b>Eagon, Todd</b> CHECKED BY OFFICER'S BADGE NUMBER* <b>240</b>

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<b>UNIT #</b>	<b>OWNER NAME:</b> LAST, FIRST, MIDDLE ( ) SAME AS DRIVER		<b>OWNER PHONE:</b> INCLUDE AREA CODE ( ) SAME AS DRIVER		
<b>1</b>					
<b>OWNER ADDRESS:</b> STREET, CITY, STATE, ZIP ( ) SAME AS DRIVER					
<b>COMMERCIAL CARRIER:</b> STREET, CITY, STATE, ZIP ( ) SAME AS DRIVER	<b>COMMERCIAL CARRIER PHONE:</b> INCLUDE AREA CODE				
<b>LP STATE</b>	<b>LICENSE PLATE #</b>	<b>VEHICLE IDENTIFICATION #</b>	<b>VEHICLE YEAR</b>	<b>VEHICLE MAKE</b>	
		JS1VX51L1W2100881	1998	SUZUKI	
<input type="checkbox"/> <b>INSURANCE VERIFIED</b>	<b>INSURANCE COMPANY</b>	<b>INSURANCE POLICY #</b>	<b>COLOR</b>	<b>VEHICLE MODEL</b>	
			RED	VS1400GLP	
<b>TYPE OF USE</b>		<b>US DOT #</b>	<b>TOWED BY:</b> COMPANY NAME		
<input type="checkbox"/> <b>COMMERCIAL</b> <input type="checkbox"/> <b>GOVERNMENT</b> <input type="checkbox"/> <b>IN EMERGENCY RESPONSE</b>					
<input type="checkbox"/> <b>INTERLOCK DEVICE EQUIPPED</b>	<input type="checkbox"/> <b>HIT/SKIP UNIT</b>	<b>#OCCUPANTS</b>	<b>HAZARDOUS MATERIAL</b>		
		1	<input type="checkbox"/> <b>MATERIAL RELEASED</b> <input type="checkbox"/> <b>PLACARD</b> <b>CLASS #</b> <b>PLACARD ID #</b>		
<b>7</b>	1 - PASSENGER CAR 2 - PASSENGER VAN (MINIVAN) 3 - SPORT UTILITY VEHICLE 4 - PICK UP 5 - CARGO VAN 6 - VAN (9-15 SEATS)	7 - MOTORCYCLE 2 WHEELED 8 - MOTORCYCLE 3 WHEELED 9 - AUTOCYCLE 10 - MOPED OR MOTORIZED BICYCLE 11 - ALL TERRAIN VEHICLE(ATV/UTV)	12 - GOLF CART 13 - SNOWMOBILE 14 - SINGLE UNIT TRUCK 15 - SEMI-TRACTOR 16 - FARM EQUIPMENT 17 - MOTORHOME	18 - LIMO (LIVERY VEHICLE) 19 - BUS (16+ PASSENGERS) 20 - OTHER VEHICLE 21 - HEAVY EQUIPMENT 22 - ANIMAL WITH RIDER OR ANIMAL DRAWN VEHICLE	23 - PEDESTRIAN/SKATER 24 - WHEELCHAIR (ANY TYPE) 25 - OTHER NON-MOTORIST 26 - BICYCLE 27 - TRAIN 99 - UNKNOWN OR HIT/SKIP
<b>0</b>	<b># OF TRAILING UNITS</b>				
<b>2</b>	WAS VEHICLE OPERATING IN AUTONOMOUS MODE WHEN CRASH OCCURRED? 1-YES 2-NO 9-OTHER/UNKNOWN	<b>0</b> <b>AUTONOMOUS MODE LEVEL</b> 1 - NO AUTOMATION 2 - PARTIAL AUTOMATION	3 - CONDITIONAL AUTOMATION 4 - HIGH AUTOMATION 5 - FULL AUTOMATION	99 - OTHER/UNKNOWN	
<b>1</b>	<b>SPECIAL FUNCTION</b> 1 - NONE 2 - TAXI 3 - ELECTRONIC RIDE SHARING 4 - SCHOOL TRANSPORT 5 - BUS - TRANSIT/COMMUTER	6 - BUS - CHARTER/TOUR 7 - BUS - INTERCITY 8 - BUS - SHUTTLE 9 - BUS - OTHER 10 - AMBULANCE	11 - FIRE 12 - MILITARY 13 - POLICE 14 - PUBLIC UTILITY 15 - CONSTRUCTION EQUIPMENT	16 - FARM 17 - MOWING 18 - SNOW REMOVAL 19 - TOWING 20 - SAFETY SERVICE PATROL	21 - MAIL CARRIER 99 - OTHER/UNKNOWN
<b>1</b>	<b>CARGO BODY TYPE</b> 1 - NO CARGO BODY TYPE/NOT APPLICABLE 2 - BUS	3 - VEHICLE TOWING ANOTHER MOTOR VEHICLE 4 - LOGGING	5 - INTERMODAL CONTAINER CHASSIS 6 - CARGO VAN/ENCLOSED BOX 7 - GRAIN/CHIPS/GRAVEL	8 - POLE 9 - CARGO TANK 10 - FLAT BED 11 - DUMP	12 - CONCRETE MIXER 13 - AUTO TRANSPORTER 14 - GARBAGE/REFUSE 99 - OTHER/UNKNOWN
<b>99</b>	<b>VEHICLE DEFECTS</b> 1 - TURN SIGNALS 2 - HEAD LAMPS 3 - TAIL LAMPS	4 - BRAKES 5 - STEERING 6 - TIRE BLOWOUT	7 - WORN OR SLICK TIRES 8 - TRAILER EQUIPMENT DEFECTIVE	9 - MOTOR TROUBLE 10 - DISABLED FROM PRIOR ACCIDENT 99 - OTHER/UNKNOWN	
	<b>NON-MOTORIST LOCATION AT IMPACT</b> 1 - INTERSECTION - MARKED CROSSWALK 2 - INTERSECTION - UNMARKED CROSSWALK	3 - INTERSECTION - OTHER 4 - MIDDLEBLOCK - MARKED CROSSWALK 5 - TRAVEL LANE - OTHER LOCATION	6 - BICYCLE LANE 7 - SHOULDER/ROADSIDE 8 - SIDEWALK	9 - MEDIAN/CROSSING ISLAND 10 - DRIVEWAY ACCESS 11 - SHARED USE PATHS OR TRAILS	12 - FIRST RESPONDER AT INCIDENT SCENE 99 - OTHER/UNKNOWN
<b>1</b>	<b>ACTION</b> 1 - NON-CONTACT 2 - NON-COLLISION 3 - STRIKING 4 - STRUCK 5 - BOTH STRIKING ACTION AND STRUCK 9 - OTHER/UNKNOWN	<b>1</b> 1 - STRAIGHT AHEAD 2 - BACKING 3 - CHANGING LANES 4 - STRUCK PRE-CRASH 5 - OVERTAKING/PASSING 6 - MAKING LEFT TURN	7 - MAKING U-TURN 8 - ENTERING TRAFFIC LANE 9 - LEAVING TRAFFIC LANE 10 - PARKED 11 - SLOWING OR STOPPED IN TRAFFIC 12 - DRIVERLESS	13 - NEGOTIATING A CURVE 14 - ENTERING OR CROSSING SPECIFIED LOCATION 15 - WALKING, RUNNING, JOGGING, PLAYING 16 - WORKING 17 - PUSHING VEHICLE	18 - APPROACHING OR LEAVING VEHICLE 19 - STANDING 20 - OTHER NON-MOTORIST 21 - STANDING OUTSIDE DISABLED VEHICLE 99 - OTHER/UNKNOWN
<b>22</b>	<b>CONTRIBUTING CIRCUMSTANCE</b> 1 - NONE 2 - FAILURE TO YIELD 3 - RAN RED LIGHT 4 - RAN STOP SIGN 5 - UNSAFE SPEED 6 - IMPROPER TURN	7 - LEFT OF CENTER 8 - FOLLOWING TOO CLOSE / ACDA 9 - IMPROPER LANE CHANGE 10 - IMPROPER PASSING 11 - DROVE OFF ROAD 12 - IMPROPER BACKING	13 - IMPROPER START FROM A PARKED POSITION 14 - STOPPED OR PARKED ILLEGALLY 15 - SWERVING TO AVOID 16 - WRONG WAY	17 - VISION OBSTRUCTION 18 - OPERATING DEFECTIVE EQUIPMENT 19 - LOAD SHIFTING/FALLING/SPILLING 20 - IMPROPER CROSSING	21 - LYING IN ROADWAY 22 - NOT DISCERNIBLE 23 - OPENING DOOR INTO ROADWAY 24 - VIOLATING LICENSE RESTRICTION 99 - OTHER IMPROPER ACTION
<b>SEQUENCE OF EVENTS</b>					
<b>13</b>	1 - OVERTURN/ROLLOVER 2 - FIRE/EXPLOSION 3 - IMMERSION 4 - JACKKNIFE 5 - CARGO/EQUIPMENT LOSS OR SHIFT	<b>NON-COLLISION</b> 6 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC) 7 - SEPARATION OF UNITS 8 - RAN OFF ROAD RIGHT 9 - RAN OFF ROAD LEFT 10 - CROSS MEDIAN	11 - CROSS CENTERLINE - OPPOSITE DIRECTION OF TRAVEL 12 - DOWNHILL RUNAWAY 13 - OTHER NON-COLLISION 14 - PEDESTRIAN 15 - PEDALCYCLE	16 - RAILWAY VEHICLE (E.G. TRAIN, ENGINE) 17 - ANIMAL - FARM 18 - ANIMAL - DEER 19 - ANIMAL - OTHER 20 - MOTOR VEHICLE IN TRANSPORT 21 - PARKED MOTOR VEHICLE	22 - WORK ZONE MAINTENANCE EQUIPMENT 23 - STRUCK BY FALLING, SHIFTING CAR, OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE 24 - OTHER MOVABLE OBJECT COLLISION WITH FIXED OBJECT - STRUCK
<b>COLLISION WITH FIXED OBJECT - STRUCK</b>					
	25 - IMPACT ATTENUATOR/ CRASH CUSHION 26 - BRIDGE OVERHEAD STRUCTURE 27 - BRIDGE PIER OR ABUTMENT 28 - BRIDGE PARAPET 29 - BRIDGE RAIL 30 - GUARDRAIL FACE	31 - GUARDRAIL END 32 - PORTABLE BARRIER 33 - MEDIAN CABLE BARRIER 34 - MEDIAN GUARDRAIL BARRIER 35 - MEDIAN CONCRETE BARRIER 36 - MEDIAN OTHER BARRIER	37 - TRAFFIC SIGN POST 38 - OVERHEAD SIGN POST 39 - LIGHT/LUMINARIES SUPPORT 40 - UTILITY POLE 41 - OTHER POST, POLE OR SUPPORT 42 - CULVERT	43 - CURB 44 - DITCH 45 - EMBANKMENT 46 - FENCE 47 - MAILBOX 48 - TREE 49 - FIRE HYDRANT	50 - WORK ZONE MAINTENANCE EQUIPMENT 51 - WALL 52 - BUILDING 53 - TUNNEL 54 - OTHER FIXED OBJECT 99 - OTHER/UNKNOWN
<b>1</b>	<b>FIRST HARMFUL EVENT</b>	<b>1</b>	<b>MOST HARMFUL EVENT</b>		

<b>DAMAGE</b>	
<b>DAMAGE SCALE</b>	
<b>3</b> 1 - NONE 2 - MINOR	3 - FUNCTIONAL DAMAGE 4 - DISABLING DAMAGE 9 - OTHER/UNKNOWN
<b>DAMAGED AREAS</b> INDICATE ALL THAT APPLY	
<b>8,9,10</b>	
<input type="checkbox"/> <b>- NO DAMAGE [0]</b>	<input type="checkbox"/> <b>- UNDERCARRIAGE [14]</b>
<input type="checkbox"/> <b>- TOP [13]</b>	<input type="checkbox"/> <b>- ALL AREAS [15]</b>
<input type="checkbox"/> <b>- UNIT NOT AT SCENE [16]</b>	
<b>INITIAL POINT OF CONTACT</b>	
<b>9</b> 0 - NON-COLLISION 1-12 - REFER TO UNIT DIAGRAM 13 - TOP	14 - UNDERCARRIAGE 15 - VEHICLE NOT AT SCENE 99 - UNKNOWN
<b>TRAFFIC</b>	
<b>TRAFFICWAY FLOW</b>	<b>TRAFFIC CONTROL</b>
<b>2</b> 1 - ONE-WAY 2 - TWO-WAY	<b>6</b> 1 - ROUNDABOUT 2 - SIGNAL 3 - FLASHER 4 - STOP SIGN 5 - YIELD SIGN 6 - NO CONTROL
<b># OF THROUGH LANES ON ROAD</b>	<b>RAIL GRADE CROSSING</b>
<b>2</b>	<b>2</b> 1 - NOT INVOLVED 2 - INVOLVED-ACTIVE CROSSING 3 - INVOLVED-PASSIVE CROSSING
<b>UNIT / NON-MOTORIST DIRECTION</b>	
<b>FROM 1</b>	<b>TO 2</b> 1 - NORTH 2 - SOUTH 3 - EAST 4 - WEST 5 - NORTHEAST 6 - NORTHWEST 7 - SOUTHEAST 8 - SOUTHWEST 9 - OTHER/UNKNOWN
<b>UNIT SPEED</b>	<b>DETECTED SPEED</b>
<input type="text"/>	<b>3</b> 1 - STATED/ESTIMATED SPEED 2 - CALCULATED/EDR 3 - UNDETERMINED
<b>POSTED SPEED</b>	
<input type="text"/>	



# MOTORIST / NON-MOTORIST

Document #: 20233171191

Local Report #: 230744977

Motorist/Non-Motorist

UNIT #	PERSON TYPE	NAME: LAST, FIRST, MIDDLE				DATE OF BIRTH			AGE	GENDER			
1	D								40	M			
ADDRESS: STREET, CITY, STATE, ZIP						CONTACT PHONE - INCLUDE AREA CODE							
INJURIES	INJURED TAKEN BY	EMS AGENCY (NAME)	INJURED TAKEN TO: MEDICAL FACILITY (NAME,CITY)		SAFETY EQUIPMENT USED	<input type="checkbox"/> DOT-COMPLIANT MC HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED			
2	1	CFD	GRANT		1		1	5	2	1			
OL STATE	OPERATOR LICENSE NUMBER		OFFENSE CHARGED		LOCAL CODE	OFFENSE DESCRIPTION			CITATION NUMBER				
OH													
OL CLASS	ENDORSEMENTS SELECT UP TO 2	RESTRICTION: SELECT UP TO 3		DRIVER DISTRACTED BY	ALCOHOL / DRUG SUSPECTED		CONDITION		ALCOHOL TEST		DRUG TEST(S)		
4	M	3 9		9	<input type="checkbox"/> ALCOHOL <input type="checkbox"/> MARIJUANA <input type="checkbox"/> OTHER DRUG		1		STATUS TYPE VALUE STATUS TYPE RESULT SELECT UP TO 4		1 1 1 1 1 1		
INJURIES		SEATING POSITION		AIR BAG		OL CLASS		OL RESTRICTION(S)		DRIVER DISTRACTION		TEST STATUS	
1 - FATAL 2 - SUSPECTED SERIOUS INJURY 3 - SUSPECTED MINOR INJURY 4 - POSSIBLE INJURY		1 - FRONT SEAT - LEFT SIDE (MOTORCYCLE DRIVER) 2 - FRONT SEAT - MIDDLE 3 - FRONT SEAT - RIGHT SIDE 4 - SECOND SEAT - LEFT SIDE (MOTORCYCLE PASSENGER) 5 - SECOND SEAT - MIDDLE 6 - SECOND SEAT - RIGHT SIDE 7 - THIRD - LEFT SIDE (MOTORCYCLE SIDE CAR) 8 - THIRD - MIDDLE 9 - THIRD - RIGHT SIDE 10 - SLEEPER SECTION OF TRUCK CAB 11 - PASSENGER IN OTHER ENCLOSED CARGO AREA (NON TRAILING UNIT, BUS, PICK-UP WITH CAP) 12 - PASSENGER IN UNENCLOSED CARGO AREA 13 - TRAILING UNIT 14 - RIDING ON VEHICLE EXTERIOR (NON-TRAILING UNIT) 15 - NON-MOTORIST 99 - OTHER/UNKNOWN		1 - NOT-DEPLOYED 2 - DEPLOYED-FRONT 3 - DEPLOYED-SIDE 4 - DEPLOYED BOTH FRONT/SIDE 5 - NOT APPLICABLE		1 - CLASS A 2 - CLASS B 3 - CLASS C 4 - REGULAR CLASS (OHIO IS 'D') 5 - M/C MOPEO ONLY 6 - NO VALID OL		1 - ALCOHOL INTERLOCK DEVICE 2 - CDL INTRASTATE ONLY 3 - CORRECTIVE LENSES 4 - FARM WAIVER 5 - EXCEPT CLASS A BUS 6 - EXCEPT CLASS A AND CLASS B BUS 7 - EXCEPT TRACTOR-TRAILER 8 - INTERMEDIATE LICENSE RESTRICTIONS 9 - LEARNER'S PERMIT RESTRICTIONS 10 - LIMITED TO DAYLIGHT ONLY 11 - LIMITED TO EMPLOYMENT 12 - LIMITED - OTHER 13 - MECHANICAL DEVICES (SPECIAL BRAKES, HAND CONTROLS, OR OTHER ADAPTIVE DEVICES) 14 - MILITARY VEHICLES ONLY 15 - MOTOR VEHICLES WITHOUT AIR BRAKES 16 - OUTSIDE MIRROR		1 - NOT DISTRACTED 2 - MANUALLY OPERATING AN ELECTRONIC COMMUNICATION DEVICE (TESTING, TYPING, DIALING) 3 - TALKING ON HANDS FREE COMMUNICATION DEVICE 4 - TALKING ON HAND HELD COMMUNICATION DEVICE 5 - OTHER ACTIVITY WITH AN ELECTRONIC DEVICE 6 - PASSENGER 7 - OTHER DISTRACTION INSIDE THE VEHICLE 8 - OTHER DISTRACTION OUTSIDE THE VEHICLE 9 - OTHER/UNKNOWN		1 - NONE GIVEN 2 - TEST REFUSED 3 - TEST GIVEN, CONTAMINATED SAMPLE/UNUSABLE 4 - TEST GIVEN, RESULTS KNOWN 5 - TEST GIVEN, RESULTS UNKNOWN	
INJURED TAKE BY		EJECTION		OL ENDORSEMENT		GENDER		ALCOHOL TEST TYPE		DRUG TEST TYPE		DRUG TEST RESULT(S)	
1 - NOT TRANSPORTED/ TREATED AT SCENE 2 - EMS 3 - POLICE 9 - OTHER/UNKNOWN		1 - NOT EJECTED 2 - PARTIALLY EJECTED 3 - TOTALLY EJECTED 4 - NOT APPLICABLE		H - HAZMAT M - MOTORCYCLE P - PASSENGER N - TANKER Q - MOTOR SCOOTER R - THREE-WHEEL MOTORCYCLE S - SCHOOL BUS T - DOUBLE AND TRIPLE TRAILERS X - TANKER / HAZMAT		F - FEMALE M - MALE U - OTHER/UNKNOWN		1 - NONE 2 - BLOOD 3 - URINE 4 - BREATH 5 - OTHER		1 - NONE 2 - BLOOD 3 - URINE 5 - OTHER		1 - AMPHETAMINES 2 - BARBITURATES 3 - BENZODIAZEPINES 4 - CANNABINOIDS 5 - COCAINE 6 - OPIATES / OPIOIDS 7 - OTHER 8 - NEGATIVE RESULTS	
SAFETY EQUIPMENT		TRAPPED		CONDITION		MEDICATIONS/DRUGS/ALCOHOL							
1 - NONE USED 2 - SHOULDER BELT ONLY USED 3 - LAP BELT ONLY USED 4 - SHOULDER AND LAP BELT USED 5 - CHILD RESTRAINT SYSTEM - FORWARD FACING 6 - CHILD RESTRAINT SYSTEM - REAR FACING 7 - BOOSTER SEAT 8 - HELMET USED 9 - PROTECTIVE PADS USED (ELBOW, KNEES, ETC.) 10 - REFLECTIVE CLOTHING 11 - LIGHTING - PEDESTRIAN/ BICYCLE ONLY 99 - OTHER/UNKNOWN		1 - NOT TRAPPED 2 - EXTRICATED BY MECHANICAL MEANS 3 - FREED BY NON-MECHANICAL MEANS		1 - APPARENTLY NORMAL 2 - PHYSICAL IMPAIRMENT 3 - EMOTIONAL (E.G., DEPRESSED, ANGRY, DISTURBED) 4 - ILLNESS 5 - FELL ASLEEP, FAINTED, FATIGUED, ETC. 6 - UNDER THE INFLUENCE OF		MEDICATIONS/DRUGS/ALCOHOL							

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Client: City of Columbus  
 Project: Hillard Rome Road Grade Separation Project  
 Subject: Benefit Cost Analysis  
 Date: May 21, 2024



**Hillard Rome Road Grade Separation Project - Benefit-Cost Analysis (BCA) Calculations Comparisons**

Year	Costs		Benefits			
	Capital Cost (2032)	Discounted Costs (\$2022) using 3.1% per sec.4.3 **	Safety Benefits (\$2022)	Vehicle Travel Time Savings (\$2022)	Total Benefits (\$2022)	Residual Value (\$2022) of Bridge & MSE walls
2032	\$38,283,409.40	\$28,211,355.58	\$0.00	\$0.00	\$0.00	\$0.00
2033	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2034	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2035	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2036	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2037	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2038	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2039	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2040	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2041	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2042	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2043	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2044	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2045	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2046	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2047	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2048	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2049	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2050	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2051	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$0.00
2052	\$0.00	\$0.00	\$1,175,206.76	\$337,353.00	\$1,512,559.76	\$6,589,267.47
<b>Total Discounted Costs =</b>		<b>\$28,211,355.58</b>	<b>Total Discounted Benefits =</b>		<b>\$30,251,195.20</b>	<b>+ \$6,589,267.47</b>

\* Per USDOT BCA Guidance December 2023 Update, projects to address operating deficiencies should use a service life of 20 years, which is intended to correspond with the typical "design" year" for such improvements

\*\* Discounted Costs is based on reducing the estimated value of the Capital Cost in 2032 (based on inflationary calculations on Supporting Calculations page) to recommended year 2022 per section 4.3 of the USDOT BCA Guidance December 2023 update. Formula is  $PV = FV / (1+i)^t = PV(2022) = FV(2032) / ((1+.031)^{(2032-2022)})$

<b>Net Present Value (NPV) = (Total Discounted Benefits - Total Discounted Costs)</b>	<b>\$8,629,107.09</b>	<b>Note:</b> This includes the residual value of the bridge and MSE wall portions beyond the 20 year analysis period per section 6.3 of BCA guidance. Even with that value is removed, still ends up with <b>positive Residual Value of \$2,039,839.62.</b>
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<b>Benefit-Cost Ratio (BCR) = (Total Discounted Benefits / Total Discounted Costs)</b>	<b>1.31</b>	<b>Note:</b> This includes the residual value of the bridge and MSE wall portions beyond the 20 year analysis period per section 6.3 of BCA Guidance. Even with that value is removed, still ends up with <b>positive BCR Ratio of 1.07.</b>
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Client: City of Columbus  
 Project: Hillard Rome Road Grade Separation Project  
 Subject: Benefit Cost Analysis  
 Date: May 22, 2024



**Total Costs and Total Benefits - Scenarios and Supporting Calculations**

The Benefit-Cost Analysis Guidance for Discretionary Grants issued by the U.S. Department of Transportation ,December 2023 shall be used as the basis for this BCA.

FOR FY 2024, USDOT recommends presenting all cost and benefit values in 2022 dollars

Per USDOT BCA Guidance December 2023 Update, projects to address operating deficiencies should use a service life of 20 years, which is intended to correspond with the typical "design year" for such improvements

**Scenarios to be compared**

**No-Build Scenario:** The current at-grade railroad crossing at Hillard Rome Rd will remain as is and regular planned maintenance would continue.

**Build Scenario:** Hillard Rome Rd would have cul-da sacs installed, eliminating the current at grade crossing. Galloway Rd would be extended and a new bridge constructed. Shared use path and pedestrian facilities would be added.

**Cost and Benefit Calculations**

**Capital Cost - based on Construction Build 2032 (Denominator)**

**No-Build Scenario:** None

**Build Scenario:**

Design Engineering:	\$2,443,337.50	Estimated at 10% of the 2024 Construction Cost
Construction Engineering:	\$3,248,642.90	Estimated at 10% of 2032 Construction Cost
ROW Acquisition:	\$105,000.00	Estimated at 7 parcels impacted at \$15,000 per parcel
* 2032 Construction:	\$32,486,429.00	(see business plan inflation calculator attached)

**\$38,283,409.40 = Total Capital Costs (2032)**

\* 2032 Construction Costs was calculated using the 2024 Engineer's Estimate of Probable Cost of \$27,899,490 (see attached) and calculating the estimated inflation increase to March 2032 which is estimated to be the approximate mid-point of the anticipated construction of this project. See attached ODOT and USDOT Inflation Calculator.

2024 Construction Costs = \$ 24,433,375.00	2032 Construction Costs = \$ 32,486,429.00
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**Maintenance Cost (Denominator)**

**No-Build Scenario:** Pavement repair and repaving of the existing road would be needed.

**Build Scenario:** Similar maintenance of the existing Hillard Rome pavement would be needed. Little maintenance is anticipated for the new build portion during the BCA time period. Therefore, maintenance costs would be similar for both scenarios

**Residual Value (Numerator)**

**No-Build Scenario:** None

**Build Scenario:** The proposed structure and MSE walls have a minimum service life of 75 years. This exceeds the 20 year analysis period and would have 73.3% useful service life remaining at the end of this period. New pavement has a design life of 20 years. Any residual value of Hillard Rome Rd would be the same for the no-build scenario and therefore not included

		(\$) 2032 *	(\$) 2022	Residual Value	(\$) 2022 **
Bridge Construction Estimate	\$	4,339,096.00	\$ 3,197,515.11	\$	2,344,844.42
MSE Wall Construction Estimate	\$	7,854,235.00	\$ 5,787,849.62	\$	4,244,423.05
<b>Total Residual Value = \$</b>					<b>6,589,267.47</b>

\* 2032 Construction Cost for Bridge and MSE Wall was calculated the same as the Capital Costs above but just using the 2024 Engineer's Estimate of Probable Costs for the Bridge and MSE sections.

\*\* The Residual Value equates to 73.3% of the 2022 Construction Costs since the minimum service life of the Bridge and MSE walls is 75 years. The 73.3% value is calculated  $[(75-20 \text{ (analysis period)})/75] \times 100 = 73.3\%$

**Benefits (Numerator)**

**No-Build Scenario:** None

**Build Scenario:** There is both Travel time savings and Safety Benefits

**Vehicle Travel Time Savings:** (see Railroad Information insupporting documentation)

**Total = \$337,353.00 per year (\$ 2022)**

**Safety Benefits:** (see crash analysis in supporting documentation)

Safety Benefits - Grade seperation: \$330,740.00 per year (\$ 2022)

Safety Benefits - Roundabout: \$332,568.00 per year (\$ 2022)

Safety Benefits-Ped/Bike Facilities: \$511,898.76 per year (\$ 2022)

**Total = \$1,175,206.76 per year (\$ 2022)**

**Hillard Rome Road Grade Separation Project (CIP 531054-910001) - Engineer's Estimate of Probable Cost (2024)**

Group Number	Group Name	Ref. No.	Item No.	DESCRIPTION	UNITS	QUANTITY	UNIT COST	EXTENDED TOTAL
1	ROADWAY	1	201	CLEARING AND GRUBBING	LS	1	\$100,000.00	\$100,000.00
		2	202	PAVEMENT REMOVED	SY	5170	\$14.50	\$74,965.00
		3	203	EXCAVATION	CY	3250	\$30.00	\$97,500.00
		4	203	EMBANKMENT	CY	192500	\$10.00	\$1,925,000.00
		5	204	SUBGRADE COMPACTION	SY	44025	\$1.80	\$79,245.00
		6	606	GUARDRAIL, TYPE MGS	FT	850	\$22.00	\$18,700.00
		7	606	ANCHOR ASSEMBLY, TYPE T	EA	4	\$3,000.00	\$12,000.00
		8	606	BRIDGE TERMINAL ASSEMBLY, TYPE 1	EA	4	\$3,000.00	\$12,000.00
		9	608	CURB RAMP	EA	22	\$200.00	\$4,400.00
		10	608	DETECTABLE WARNINGS	SF	330	\$30.00	\$9,900.00
		11	608	4" CONCRETE WALK	SF	25400	\$7.00	\$177,800.00
		12	608	8" CONCRETE WALK	SF	1400	\$12.50	\$17,500.00
		13	622	CONCRETE BARRIER, SINGLE SLOPE, TYPE D	FT	2145	\$120.00	\$257,400.00
		14	606	SPECIAL - NOISE MITIGATION LANDSCAPING TREES	LS	1	\$250,000.00	\$250,000.00
<b>ROADWAY Total</b>								<b>\$3,036,410.00</b>
2	PAVEMENT	15	301	ASPHALT CONCRETE BASE, PG64-22	CY	6975	\$150.00	\$1,046,250.00
		16	304	AGGREGATE BASE	CY	6655	\$61.00	\$405,955.00
		17	407	NON-TRACKING TACK COAT	GAL	2015	\$4.00	\$8,060.00
		18	441	ASPHALT CONCRETE SURFACE COURSE, TYPE 1 (446), PG64-22	CY	970	\$250.00	\$242,500.00
		19	441	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448)	CY	1360	\$200.00	\$272,000.00
		20	609	CURB, STRAIGHT	FT	290	\$35.00	\$10,150.00
		21	609	COMBINATION CURB AND GUTTER	FT	11190	\$25.00	\$279,750.00
		22	609	COMBINATION CURB AND GUTTER, TYPE MOUNTABLE	FT	290	\$29.00	\$8,410.00
		23	452	8" NON-REINFORCED CONCRETE PAVEMENT	SY	700.31	\$90.00	\$63,027.90
		24	609	CONCRETE MEDIAN	SY	580	\$130.00	\$75,400.00
		25	1530	SURFACE COURSE	CY	250	\$250.00	\$62,500.00
		26	1530	INTERMEDIATE ASPHALT CONCRETE TYPE 2	CY	365	\$200.00	\$73,000.00
<b>PAVEMENT Total</b>								<b>\$2,547,002.90</b>
3	MAINTENACE OF TRAFFIC	27	614	MAINTAINING TRAFFIC	LS	1	\$30,000.00	\$30,000.00
	<b>MAINTENACE OF TRAFFIC Total</b>							
4	EROSION CONTROL	28	207	CONSTRUCTION STORM WATER POLLUTION PREVENTION	LS	1	\$200,000.00	\$200,000.00
		29	659	SEEDING AND MULCHING	SY	27500	\$0.85	\$23,375.00
<b>EROSION CONTROL Total</b>								<b>\$223,375.00</b>
5	DRAINAGE	30	604	MANHOLE, TYPE C	EA	25	\$4,244.00	\$106,100.00
		31	604	CURB & GUTTER INLET	EA	20	\$4,300.00	\$86,000.00
		32	604	DOUBLE CURB & GUTTER INLET	EA	46	\$5,130.00	\$235,980.00
		33	605	6" BASE PIPE UNDERDRAIN	FT	12650	\$10.00	\$126,500.00
		34	901	12" PIPE WITH TYPE 1 BEDDING, WITH ITEM 912 COMPACTED GRANULAR BACKFILL	FT	3200	\$136.00	\$435,200.00
		35	901	18" PIPE WITH TYPE 1 BEDDING, WITH ITEM 912 COMPACTED GRANULAR BACKFILL	FT	2000	\$160.00	\$320,000.00
		36	901	24" PIPE WITH TYPE 1 BEDDING, WITH ITEM 912 COMPACTED GRANULAR BACKFILL	FT	1500	\$180.00	\$270,000.00
		37 (blank)		PROJECT POST-CONSTRUCTION BMP (QUANTITY & QUALITY FOR 15 ACRE APPROX. EDA	LS	1	\$525,000.00	\$525,000.00
<b>DRAINAGE Total</b>								<b>\$2,104,780.00</b>
6	TRAFFIC CONTROL	38 (blank)		SIGNS AND PAVEMENT MARKINGS	LS	1	\$75,000.00	\$75,000.00
	<b>TRAFFIC CONTROL Total</b>							
7	LIGHTING	39	625	TRENCH, AS PER PLAN	FT	18320	\$20.00	\$366,400.00
		40	625	GROUND ROD	EA	80	\$350.00	\$28,000.00



Group Number	Group Name	Ref. No.	Item No.	DESCRIPTION	UNITS	QUANTITY	UNIT COST	EXTENDED TOTAL
7	LIGHTING	41	1001	13 INCH X 24 INCH PULL BOX (MIS-54)	EA	80	\$500.00	\$40,000.00
		42	1001	6' STREET LIGHT FOUNDATION (MIS-201)	EA	80	\$1,500.00	\$120,000.00
		43	1001	POST TOP POLE	EA	80	\$2,000.00	\$160,000.00
		44	1001	LIGHTING CABLE	FT	21068	\$5.00	\$105,340.00
		45	1001	POLE AND BRACKET CABLE	EA	80	\$300.00	\$24,000.00
		46	1001	LIGHTING CONTROL CENTER, CABINET, AND PAD	EA	3	\$6,000.00	\$18,000.00
		47	1001	2-INCH CONDUIT, CONCRETE ENCASED	FT	18320	\$30.00	\$549,600.00
		48	1001	LUMINAIRE	EA	80	\$1,000.00	\$80,000.00
<b>LIGHTING Total</b>								<b>\$1,491,340.00</b>
8	INTERCONNECT	49	625	CONDUIT, MISC.: ENCASED INTERCONNECT CONDUIT BANK, 4-3" & 1-1.5", TC-2, SCH 40	FT	7250	\$85.00	\$616,250.00
		50	625	TRENCH, AS PER PLAN	FT	7250	\$20.00	\$145,000.00
		51	625	PULL BOX, 32"	EA	15	\$2,200.00	\$33,000.00
		52	1620	FIBER OPTIC SPLICE ENCLOSURE	EA	2	\$1,500.00	\$3,000.00
		53	1620	FIBER OPTIC FUSION SPLICE	EA	288	\$20.00	\$5,760.00
		54	1620	MISC.: FIBER OPTIC CABLE, 144 STRAND	FT	8500	\$5.00	\$42,500.00
<b>INTERCONNECT Total</b>								<b>\$845,510.00</b>
9	LANDSCAPING	55	661	DECIDUOUS TREE, 3" CALIPER (ASSUME 30' SPACING, NO TREES IN MSE WALL AREAS)	EA	230	\$900.00	\$207,000.00
		56	661	ROUNDAABOUT CENTRAL ISLAND LANDSCAPING	LS	1	\$30,000.00	\$30,000.00
<b>LANDSCAPING Total</b>								<b>\$237,000.00</b>
10	BRIDGE	57	505	PILE DRIVING EQUIPMENT MOBILIZATION	LS	1	\$50,000.00	\$50,000.00
		58	507	STEEL PILES HP 12x53, FURNISHED	FT	3300	\$44.00	\$145,200.00
		59	507	STEEL PILES HP 12x53, DRIVEN	FT	3000	\$17.00	\$51,000.00
		60	507	STEEL POINTS OR SHOES	EA	60	\$135.00	\$8,100.00
		61	509	EPOXY COATED REINFORCING STEEL	LB	131000	\$2.00	\$262,000.00
		62	511	CLASS QC1 CONCRETE, ABUTMENT INCLUDING FOOTING	CY	143	\$625.00	\$89,375.00
		63	511	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK	CY	575	\$850.00	\$488,750.00
		64	511	CLASS QC2 CONCRETE, BRIDGE DECK (PARAPET)	CY	21	\$1,340.00	\$28,140.00
		65	512	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	SY	615	\$40.00	\$24,600.00
		66	513	STRUCTURAL STEEL MEMBERS, LEVEL 4	LB	461069	\$3.00	\$1,383,207.00
		67	513	WELDED STUD SHEAR CONNECTORS	EA	3696	\$6.00	\$22,176.00
		68	514	FIELD PAINTING OF EXISTING STRUCTURAL STEEL, PRIME COAT	SF	23000	\$5.00	\$115,000.00
		69	514	FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT	SF	23000	\$5.00	\$115,000.00
		70	514	FIELD PAINTING STRUCTURAL STEEL, FINISH COAT	SF	23000	\$5.00	\$115,000.00
		71	517	RAILING (CONCRETE PARAPET WITH TWIN STEEL TUB RAILING AND VANDAL PROTECTION FENCE)	FT	406	\$250.00	\$101,500.00
		72	518	POROUS BACKFILL WITH GEOTEXTILE FABRIC	CY	96	\$150.00	\$14,400.00
		73	518	6" PERFORATED CORRUGATED PLASTIC PIPE	FT	200	\$10.00	\$2,000.00
		74	526	REINFORCED CONCRETE APPROACH SLAB WITH QC/QA (T=17")	SY	480	\$270.00	\$129,600.00
		75	607	VANDAL PROTECTION FENCE, 12' CURVED, COATED FABRIC	FT	307	\$225.00	\$69,075.00
		76	516	1" PREFORMED EXPANSION JOINT FILLER	SF	65	\$15.00	\$975.00
77	516	2" PREFORMED EXPANSION JOINT FILLER	SF	312	\$15.00	\$4,680.00		
78	516	SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL	FT	234	\$50.00	\$11,700.00		
79	516	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)	EA	16	\$2,000.00	\$32,000.00		
<b>BRIDGE Total</b>								<b>\$3,263,478.00</b>
11	MSE WALLS	80	203	GRANULAR EMBANKMENT, TYPE B	CY	13875	\$50.00	\$693,750.00
		81	512	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	SY	4260	\$35.00	\$149,100.00
		82	840	MECHANICALLY STABILIZED EARTH WALL	SF	33920	\$45.00	\$1,526,400.00
		83	840	WALL EXCAVATION	CY	50800	\$10.00	\$508,000.00
		84	840	FOUNDATION PREPARATION	SY	6750	\$20.00	\$135,000.00

Group Number	Group Name	Ref. No.	Item No.	DESCRIPTION	UNITS	QUANTITY	UNIT COST	EXTENDED TOTAL
11	MSE WALLS	85	840	SELECT GRANULAR BACKFILL	CY	32100	\$75.00	\$2,407,500.00
		86	840	NATURAL SOIL	CY	2550	\$10.00	\$25,500.00
		87	840	6" DRAINAGE PIPE, PERFORATED	FT	4400	\$10.00	\$44,000.00
		88	840	CONCRETE COPING	FT	2200	\$180.00	\$396,000.00
		89	840	ON-SITE ASSISTANCE	DAY	15	\$800.00	\$12,000.00
		90	840	SGB INSPECTION AND COMPACTION TESTING	LS	1	\$10,000.00	\$10,000.00
<b>MSE WALLS Total</b>								<b>\$5,907,250.00</b>
12	INCIDENTALS	91	624	MOBILIZATION	LS	1	\$400,000.00	\$400,000.00
		92	623	CONSTRUCTION LAYOUT STAKES	LS	1	\$200,000.00	\$200,000.00
<b>INCIDENTALS Total</b>								<b>\$600,000.00</b>
13	Force Account	93	- - -	CONTINGENCY (20%)	PCT	1	\$4,072,229.18	\$4,072,229.18
	<b>Force Account Total</b>							
<b>Grand Total</b>								<b>\$24,433,375.08</b>

# FY 2024-2028 Business Plan Inflation Calculator:

[Not sure if you have the latest calculator? Click here.](#)

Last Modified: 7/20/2023

Today's Date:  
May 22, 2024

Please Enter Values in the Yellow Areas Only:

### Estimation Start Date:

Less than or Equal to Today's Date  
(mm/dd/yyyy)

5/22/2024

Start Date:

### Enter Construction Mid-Point Date:

(cannot exceed 05/22/2049)  
(mm/dd/yyyy)

3/30/2032

Construction Mid-Point Date:

### Present-Day Estimated Cost:

\$24,433,375.00

Estimated Dollar Amount:

Estimate Start Date to Construction Mid-Point Date:

94

Months

Inflation - Start to Mid-Point of Construction:

(compounded growth rate)

Inflated Dollar Amount:

Business Plan

33.0%

\$32,486,429.45

Estimator's Name:

County - Route - Section:

PID:

Estimator's Notes:

Comparison using example from USDOT BCA December, 2023 Guidance. **Only Construction Costs were included in inflation calculations.**

Using 3.1%

Estimate based on 2024 values

Estimated Midpoint of Construction Year is 2032

$PV = FV / (1+i)^t$

$FV = \$24,433,375 \times (1.031)^7$

$FV = \$30,254,788$

Use the higher value for "Costs" in the calculation of the Benefit-Cost Ratio which will reduce the resulting value and be a more conservative analysis.

# Ohio Railroad Information System

## Crossing Details 2638

Site Information	
<b>US DOT Number</b>	513244C
<b>Adjacent US DOT Number</b>	Not Applicable
<b>Revision Date</b>	12/06/2013

Location and Classification Information	
<b>County</b>	FRANKLIN
<b>City</b>	HILLARD
<b>Street</b>	HILLIARD ROME ROAD
<b>Highway Type And Number</b>	CR 3
<b>High Speed Corridor</b>	-1
<b>ODOT District</b>	MFRAMR01723A*C
<b>Latitude</b>	39.9622056
<b>Longitude</b>	-83.1465318
<b>Crossing Type</b>	Public
<b>Crossing Position</b>	At Grade
<b>Emergency Contact Number</b>	8009464744

Show/Hide Legend
Show/Hide Toggle

Franklin County Auditor, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA Powered by Esri

Railroad Information	
<b>Operating Railroad</b>	Norfolk Southern Corp
<b>Railroad Division or Region</b>	BLUE RIDGE
<b>Railroad Subdivision Or District</b>	DAYTON

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[Rail.ohio.gov](http://Rail.ohio.gov)

### Need Help?

[Federal Railroad Administration](#)

[Contact the PUCO Rail Division](#)

The median Class 1 per the Association of American Railroads (AAR) is 5400 ft (1.02 mi).  
 Source  
[\(https://www.aar.org/issue/freight-train-length/\)](https://www.aar.org/issue/freight-train-length/)

Assuming 25mph avg travel speed due to curvature in railway, switchover location, and proximity to CSX Intermodal Terminal.

The Federal Railroad Administration (FRA) requires AT LEAST 20 seconds of advance warning prior to the trains arrival at the crossing, or to indicate the presence of a train within the crossing area.

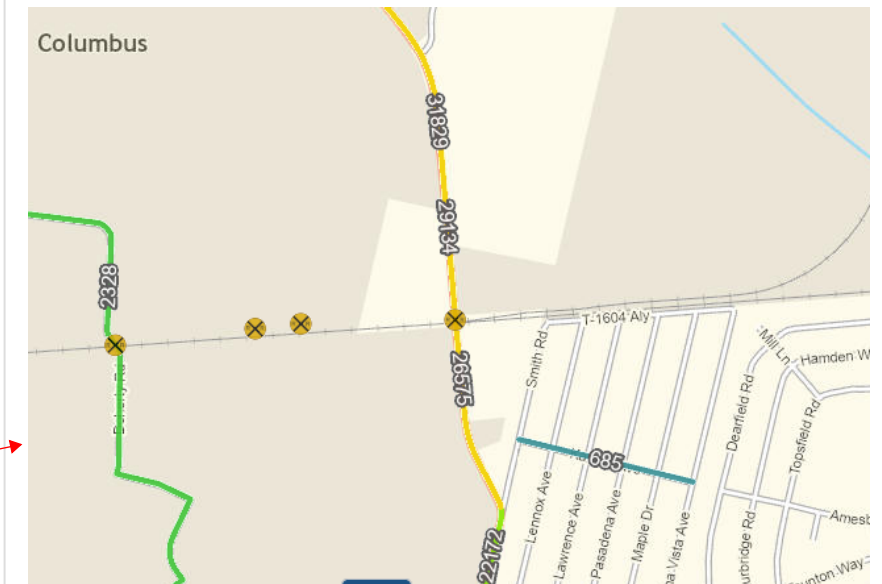
Assuming the above information is correct, the average amount of time the gates are down for this crossing equates to 187 seconds (3.1 minutes).

<b>Railroad Contact Number</b>	8009464744
<b>State Contact Number</b>	6144660407
<b>Local Highway Authority - 1</b>	CITY OF COLUMBUS
<b>Local Highway Authority - 2</b>	Not Applicable
<b>Development Type</b>	Commercial
<b>Crossing Angle</b>	60 - 90
<b>Main Track Count</b>	2
<b>Crossing Traffic Lanes Count</b>	2

<b>Branch or Line Name</b>	#N/A
<b>Milepost</b>	145.98
<b>Nearest Time Table Station</b>	WESTERVILLE
<b>Parent Railroad Company</b>	Not Applicable
<b>Crossing Owner</b>	Not Applicable

Warning Devices	
<b>Standard Crossbucks Count</b>	0
<b>Mast Mounted Lights Count</b>	1
<b>Cantilevered Lights Count</b>	0
<b>Other Lights Count</b>	0
<b>Gate Count</b>	2

Traffic Information	
<b>Total Day Through Trains</b>	7
<b>Total Switching Trains</b>	5
<b>Total Night Through Trains</b>	7
<b>Year Of Train Count</b>	2020
<b>Highway Annual Average Daily Traffic</b>	<del>41755</del> 26575
<b>Year of Average Daily Traffic</b>	<del>2004</del> 2023 (ODOT TMMS)
<b>Intersecting Roadway Distance</b>	Not Applicable



<https://www.transportation.ohio.gov/working/data-tools/resources/tmms>



Assumed K-factor based on count station north of Fisher Rd. 9%

Utilizing this, DHV assumed to be 2392 with a D-factor of 54%, 4% B&C. Assuming a PHF of 0.92, that equates to a peak 15-minute volume of 550 or 37 vehicles per minute.

With the previously calculated average delay per train, this would equate to a Delayed ADT of 2180 vehicles. Understanding that most of these trains will not be passing during the peak hours, a 50% factor will be applied to account for this equating to:

**Calculated Delayed ADT = 1090 vehicles**  
(44 Trucks & 1046 Passenger Vehicles)

East



South



West



ENS

North

For more assistance or information about the ORIS, please contact the Rail Division of the Public Utilities Commission of Ohio at (614) 466-1150 or the Ohio Rail Development Commission at (614) 644-0306.

# Travel Time Savings

$$\text{Annual Vehicle Travel Time Savings*} = \text{Avg. Delay Time} \times \text{AADT Delayed} \times \text{Hourly Value of Time} \times \text{Vehicle Occupancy} \times \text{Annualization Factor}$$

$$\text{Annual Vehicle Travel Time Savings*} = \frac{1.55 \text{ Minutes}}{60 \text{ Min/Hr}} \times 1046 \text{ VEH (P\&A)} \times 44 \text{ VEH (B\&C)} \times \$19.60 \times \$35.00 \times 1.67 \times 1.00 \times 365 \times 365$$

Calculated by dividing the total delay by 2.

See vehicular calculations/assumptions on sheet 2.

All purpose travel pulled from BCA guidance. Average between trucks and buses assumed for B&C vehicles.

All purpose travel pulled from BCA guidance, 1 is assumed for B&C vehicles.

Anticipated to have an impact every day.

# Travel Time Savings

Annual Vehicle Travel Time Savings*	=	Avg. Delay Time	x	AADT Delayed	x	Hourly Value of Time	x	Vehicle Occupancy	x	Annualization Factor
Annual Vehicle Travel Time Savings*		<u>1.55 Minutes</u>		1046 VEH (P&A)		\$19.60		1.67		365
		60 Min/Hr	X	44 VEH (B&C)		\$35.00		1.00	X	365
	=			\$322,832.72						
				+						
				\$14,520.92						= <u>\$337,353.63/Year</u>



## Safety Benefits

- Assume the grade separation project mitigates all future fatalities at the crossing:

$$\text{Annual Safety Benefits*} = \text{Average Annual Fatalities} \times \text{Value of Statistical Life}$$

There were 238 Total Crashes with approximately 500' of the at-grade crossing location between the years of 2013-2022. Each of these crashes was analyzed and it was determined that 82 of these crashes are likely influenced by the railroad crossing. The table below summarizes the results of the findings.

64	Crash Severity (Level)				
	PDO (O)	Possible Injury (C)	Visible Injury (B)	Serious Injury (A)	Fatal Injury (K)
2013	7	0	0	0	0
2014	7	2	0	0	0
2015	6	2	1	0	0
2016	9	0	1	0	0
2017	8	3	1	0	0
2018	7	0	0	0	0
2019	7	3	0	0	0
2020	7	0	3	0	0
2021	3	0	2	0	0
2022	3	0	0	0	0
Total	64	10	8	0	0
Avg Crash Rate/Year	6.4	1	0.8	0	0

Note, there are no distinguishable patterns noticed regarding positive or negative regression. Full crash rates over 10 year average are assumed for purposes of this calculation.

## Safety Benefits

Annual Safety Benefits\* = Average Annual Fatalities x Value of Statistical Life

Property Damage Only

Annual Safety Benefits = 64 Crashes/10 Years X \$5000 = \$32,000/Year

C Level Crash Only

Annual Safety Benefits = 10 Crashes/10 Years X \$111,700 = \$111,700/Year

B Level Crash Only

Annual Safety Benefits = 8 Crashes/10 Years X \$233,800 = \$187,040/Year

A Level Crash Only

Zero Crashes

K Level Crash Only

Zero Crashes

**Total Safety Benefits - Grade Separation = \$330,740/Year**

The addition of a roundabout at Summerlin Way will have safety benefits. The anticipated benefits are based on a study of similar intersection conversions of minor road stop control to a modern roundabout located in urban and suburban areas in the United States. See attached CMF ID 9403.

Crash Year	Crash Severity (Level)				
	PDO (O)	Possible Injury (C)	Visible Injury (B)	Serious Injury (A)	Fatal Injury (K)
2013	4	1	1	0	0
2014	2	1	2	0	0
2015	4	1	0	0	0
2016	4	0	0	0	0
2017	5	1	0	0	0
2018	1	2	0	0	0
2019	4	1	1	0	0
2020	9	1	0	0	0
2021	8	3	3	0	0
2022	3	1	1	1	0
<b>Total</b>	<b>44</b>	<b>12</b>	<b>8</b>	<b>1</b>	<b>0</b>
<b>Avg Crash Rate/Year</b>	<b>4.4</b>	<b>1.2</b>	<b>0.8</b>	<b>0.1</b>	<b>0</b>
<b>2022 Value per Crash</b>	<b>\$5,000</b>	<b>\$111,700</b>	<b>\$233,800</b>	<b>\$1,188,200</b>	<b>\$12,500,000</b>
<b>Benefit of 72% CRF</b>	<b>\$15,840.00</b>	<b>\$96,508.80</b>	<b>\$134,668.80</b>	<b>\$85,550.40</b>	<b>\$0.00</b>
<b>Total Annual Benefit (\$ 2022)</b>					<b>\$332,568.00</b>

# CMF / CRF Details

**CMF ID: 9403**

**CMF Name: Convert intersection with minor-road stop control to modern round**

**Description:**

**Prior Condition: Intersection with stop-control on the minor roadway.**

**Category: Intersection geometry**

**Study ID: Safety of Roundabout: The Details Matter, Sun et al. 2018**

Star Quality Rating	
Star Quality Rating:	4 Stars

Crash Modification Factor (CMF)	
Value:	0.28
Adjusted Standard Error:	
Unadjusted Standard Error:	0.054

Crash Reduction Factor	
Value:	72
Adjusted Standard Error:	
Unadjusted Standard Error:	5.4

Applicability	
Crash Type:	All
Crash Severity:	All
Roadway Types:	Not specified
Minimum Number of Lanes:	
Maximum Number of Lanes:	
Number of Lanes Direction:	
Number of Lanes Comment:	
Road Division Type:	
Minimum Speed Limit:	
Maximum Speed Limit:	
Speed Unit:	
Speed Limit Comment:	
Area Type:	Urban and suburban
Traffic Volume:	
Average Traffic Volume:	
Time of Day:	All
<i>If countermeasure is intersection-based.</i>	
Intersection Type:	
Intersection Geometry:	3-leg,4-leg
Traffic Control:	Stop-controlled
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

<b>Average Major Road Volume:</b>	
<b>Average Minor Road Volume:</b>	

### Development Details

<b>Date Range of Data Used:</b>	
<b>Municipality:</b>	
<b>State:</b>	LA
<b>Country:</b>	United States
<b>Type of Methodology Used:</b>	Before/after using empirical Bayes or full Bayes
<b>Sample Size (crashes):</b>	124 crashes before, 37 crashes after
<b>Sample Size (sites):</b>	5 sites before, 5 sites after

### Other Details

<b>Included in HSM:</b>	No
<b>Date Added to Clearinghouse:</b>	Oct 27, 2018
<b>Comments:</b>	This CMF is for converting 3- or 4-leg minor stop control intersections to roundabout.

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This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

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The addition of dedicated sidewalk and shared use path facilities for the pedestrian and cycling users. The anticipated benefits are based on a study over five years that looked at the benefits of adding sidewalks in a location the United States. See attached CMF ID 11246.

Crash Year	Crash Severity (Level)				
	PDO (O)	Possible Injury (C)	Visible Injury (B)	Serious Injury (A)	Fatal Injury (K)
2013					
2014					
2015					1
2016					
2017					
2018					
2019					
2020			1		
2021					
2022					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Avg Crash Rate/Year</b>	<b>0</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0.1</b>
<b>2022 Value per Crash</b>	<b>\$5,000</b>	<b>\$111,700</b>	<b>\$233,800</b>	<b>\$1,188,200</b>	<b>\$12,500,000</b>
<b>Benefit of 40.2% CRF</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$9,398.76</b>	<b>\$0.00</b>	<b>\$502,500.00</b>
<b>Total Annual Benefit (\$ 2022)</b>					<b>\$511,898.76</b>

# CMF / CRF Details

**CMF ID: 11246**

**CMF Name: Install sidewalk**

**Description:**

**Prior Condition: No Prior Condition(s)**

**Category: Pedestrians**

**Study ID:** [Investigating the Correlation between Sidewalks and Pedestrian Safety, Abou-Senna et al. 2022](#)

Star Quality Rating	
Star Quality Rating:	4 Stars

Crash Modification Factor (CMF)	
Value:	0.598
Adjusted Standard Error:	
Unadjusted Standard Error:	

Crash Reduction Factor	
Value:	40.2
Adjusted Standard Error:	
Unadjusted Standard Error:	



## Applicability

<b>Crash Type:</b>	Vehicle/pedestrian
<b>Crash Severity:</b>	All
<b>Roadway Types:</b>	All
<b>Minimum Number of Lanes:</b>	
<b>Maximum Number of Lanes:</b>	
<b>Number of Lanes Direction:</b>	
<b>Number of Lanes Comment:</b>	
<b>Road Division Type:</b>	
<b>Minimum Speed Limit:</b>	
<b>Maximum Speed Limit:</b>	
<b>Speed Unit:</b>	
<b>Speed Limit Comment:</b>	
<b>Area Type:</b>	
<b>Traffic Volume:</b>	
<b>Average Traffic Volume:</b>	
<b>Time of Day:</b>	All
<i>If countermeasure is intersection-based.</i>	
<b>Intersection Type:</b>	
<b>Intersection Geometry:</b>	
<b>Traffic Control:</b>	
<b>Major Road Traffic Volume:</b>	
<b>Minor Road Traffic Volume:</b>	

<b>Average Major Road Volume:</b>	
<b>Average Minor Road Volume:</b>	

<b>Development Details</b>	
<b>Date Range of Data Used:</b>	2009 to 2014
<b>Municipality:</b>	
<b>State:</b>	FL
<b>Country:</b>	USA
<b>Type of Methodology Used:</b>	

<b>Other Details</b>	
<b>Included in HSM:</b>	No
<b>Date Added to Clearinghouse:</b>	Dec 06, 2022
<b>Comments:</b>	The CMF presented here is the inverse of what was presented in the paper in order to be consistent with the countermeasures present in the CMF Clearinghouse.

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