

# DETOUR NEED DETERMINATION REPORT

Date: August 17, 2021

In accordance with Standard Operations Procedure OPS-103 dated July 1, 1993, the detour need determination report on the following pages is being circulated for the consideration of the individual ODOT representatives listed below and for the determination by the District Deputy Director.

**PROJECT:** MAD-70-10.27 Phase 2, PID #93605

**DETOUR LOCATION:** MAD-29 SLM 10.63 (I-70 interchange at SR-29)

**PROJECT DESCRIPTION:** Interchange modification project that builds roundabout at SR-29/I-70 EB ramps, new bridge over I-70, and converts ex. roundabout at WB ramps to a 2-lane.

**RECOMMENDATION:**

- Detour as indicated  \_\_\_\_\_
- Run-around \_\_\_\_\_
- Construct under traffic \_\_\_\_\_ (Provide Description)
- Other \_\_\_\_\_ (Provide Description)

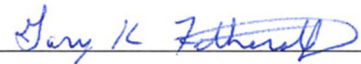
**SIGNATURES:**

Approved: Yes  No \_\_\_\_\_ Date: 10/6/2021  
District Capital Programs Administrator: 

Remarks: \_\_\_\_\_

Approved: Yes  No \_\_\_\_\_ Date: 10/1/21  
District Construction Engineer: 

Remarks: \_\_\_\_\_

Approved: Yes  No \_\_\_\_\_ Date: 9-28-21  
District Work Zone Traffic Manager: 

Remarks: \_\_\_\_\_

Approved: Yes  No \_\_\_\_\_ Date: 10/7/2021  
District Deputy Director: 

Remarks: \_\_\_\_\_

**SUMMARY:**

The following options were analyzed as part of this Detour Need Determination:

X Detour, \_\_\_Run-around, X Construct under traffic, \_\_\_Other.

A detour and constructing under traffic were both considered to complete the construction of the roundabout. **Based on this analysis a Detour is being recommended because it provides the lowest sum of Construction and Adjusted User Costs.**

**Traffic Data**

Traffic data for 2023 (construction year) is given below. SR-29 ADT is based off a SHIFT forecast with an opening day of 2023.

To forecast the ADT for each ramp movement in 2023, there were some assumptions made:

1. Growth rate from 2020 to 2023 will be in line with recent trends of previous 3 years.
2. Truck % in 2023 would be the same as 2020.
3. The *ADT per movement / Total ADT of ramp* forecasted for 2030 on the Certified Traffic provided with the IR-70 at SR-29 IMS (approved 1/18/21) and reevaluated/verified with the IOS (approved Nov. 2018) can be used to conservatively model the *ADT per movement / Total ADT of ramp* for 2023.

ADT for each ramp was developed by taking the 2020 traffic counts from TIMS, and applying a growth rate consistent with recent trends to estimate the ADT for 2023. The growth rate was calculated by averaging the past 3 years. The ADT for each movement on and off the ramps was calculated by taking the ADT of the movement divided by the Total ADT of ramp (from the Certified Traffic for design year 2030, performed in 2007 for the IR-70 at SR-29 IMS) and multiplying it by the projected 2023 ADT. The truck % from the 2020 traffic count was applied as the 2023 truck %.

SR-29 ADT (two-way):	5100	Number of B & C Trucks:	867
I-70 EB to SR-29 NB ADT:	42	Number of B & C Trucks:	11
I-70 EB to SR-29 SB ADT:	1353	Number of B & C Trucks:	365
SR-29 SB to I-70 EB ADT:	1296	Number of B & C Trucks:	272
SR-29 NB to I-70 EB ADT:	3024	Number of B & C Trucks:	635

**Proposed Detours**

In coordination with impacted Local Officials the proposed detour for SR-29 and designated local detour route are shown in Appendix A-1. The proposed detour routes for the I-70 EB to SR-29 exit ramp (Ramp D) is shown in Appendix A-2. The proposed detour routes for the SR-29 to I-70 EB entrance ramp (Ramp C) is shown in Appendix A-3.

The proposed closures are for 45 days for Ramp D, and during that 45 day closure SR-29 & Ramp C may be closed for the last 30 of 45 days.

Day 1 through Day 15	Day 16 through Day 45
Ramp D closed	Ramp D closed and SR-29 Closed

### **Adjusted User Costs**

Road user costs are calculated in accordance with guidelines established in the ODOT Innovative Contracting Manual and are given in Appendices B-1, & B-2. The adjusted user cost is 10% of the calculated user cost. This adjustment factor lowers the weight of user costs and accounts for alternate routes used during construction to allow for a more realistic comparison of total costs.

Adjusted User Costs for Ramp D and for SR-29 traffic are summed and shown in Appendix B-3 under sum of Adjusted User Costs for each condition. The summation of the user costs allows for a comprehensive comparison of a full-closure condition of SR-29, Ramp C, and Ramp D versus a part-width phasing condition to complete each segment.

Adjusted User Costs for the part-width condition are based off the assumption that motorists would be delayed 1-minute on average to traverse the work zone due to signal adjustments, narrower lanes, presence of portable barrier, etc.

### **Designated Local Detour Route**

The designated local detour route is shown in Appendix A-1, and the maintenance agreement is given in Appendix C. Upon review and approval by ODOT personnel this document will be forwarded to the appropriate Local Officials for their approval.

### **Part-Width Construction**

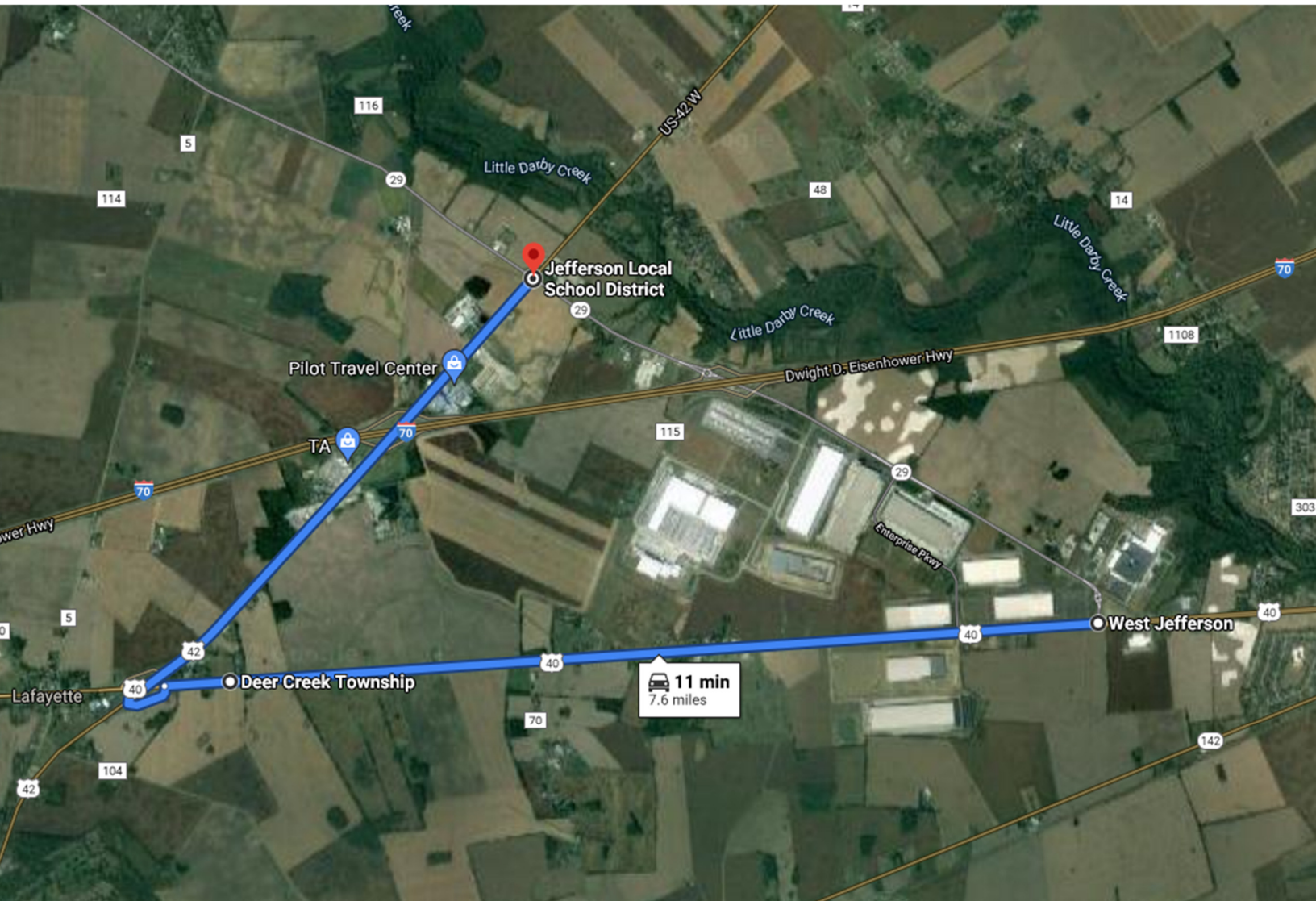
To complete the roundabout under part-width, temporary pavement would be required as the existing roadway width is not sufficient. This would require the contractor to build temporary pavement for each side of the roadway in phases. Additionally, part-width construction would include MOT phasing of signals, signage, portable barrier, and other incidental MOT items.

The estimated construction cost to complete work under a part-width condition includes: Pavement for Maintaining Traffic, Work Zone Impact Attenuators, Portable Barrier and incidentals, Work Zone Striping, and additional Labor costs associated with prolonging the duration of work. See Appendix B-3 for a detailed estimate of costs for part-width construction.

### **Additional Closures (Nightly Closures of SR-29 during Overhead Bridge work on I-70)**

Additionally, the project will have short term closures of SR-29 nightly from 12AM-5AM during beam erection for the proposed overhead bridge on I-70. Short duration closures of I-70 will direct traffic up and over utilizing the interchange exit/entrance ramps. During the up and over operation, SR-29 will be closed at the interchange. MOTEC has approved the nightly, short duration closures.

## Appendix A-1 – SR-29 Detour



**State Detour Map: SR-29**

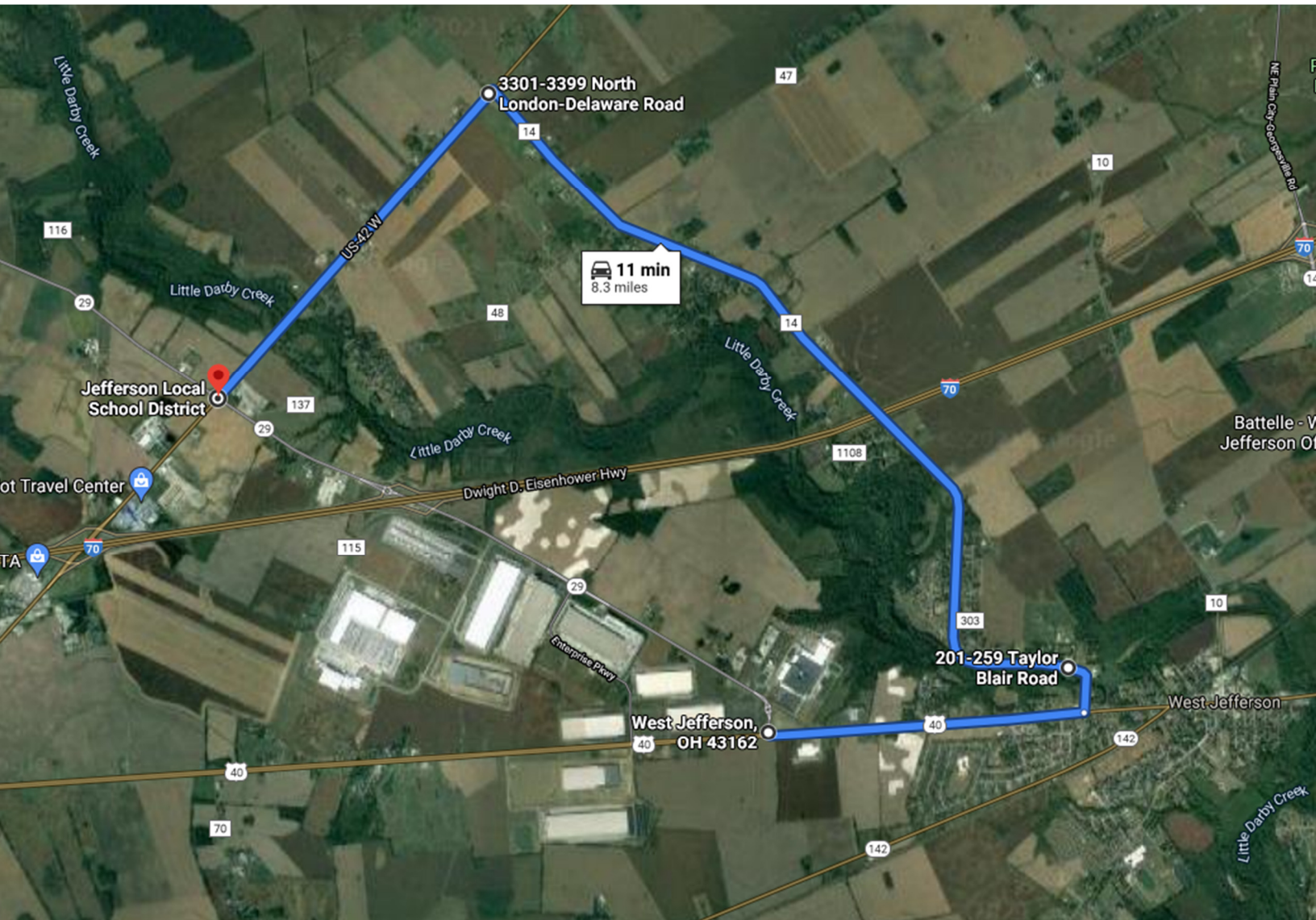
### State Detour Information

Description: Starting at the intersection of SR-29 and US-40, WB on US-40 to US-42, NB on US-42 to SR-29

Length of Detour Route: 7.6 Miles

Added Length: 4.3 Miles

Period of Detour Use: 30 Days



**Local Detour Map: SR-29**

**Local Detour Information**

Description: Starting at intersection of SR-29 and US-40, EB on US-40 to CR-14 (Taylor Blair Rd), NB on CR-14 (Taylor Blair Rd) to US-42, SB on US-42 to SR-29

Length of Detour Route: 8.3 Miles

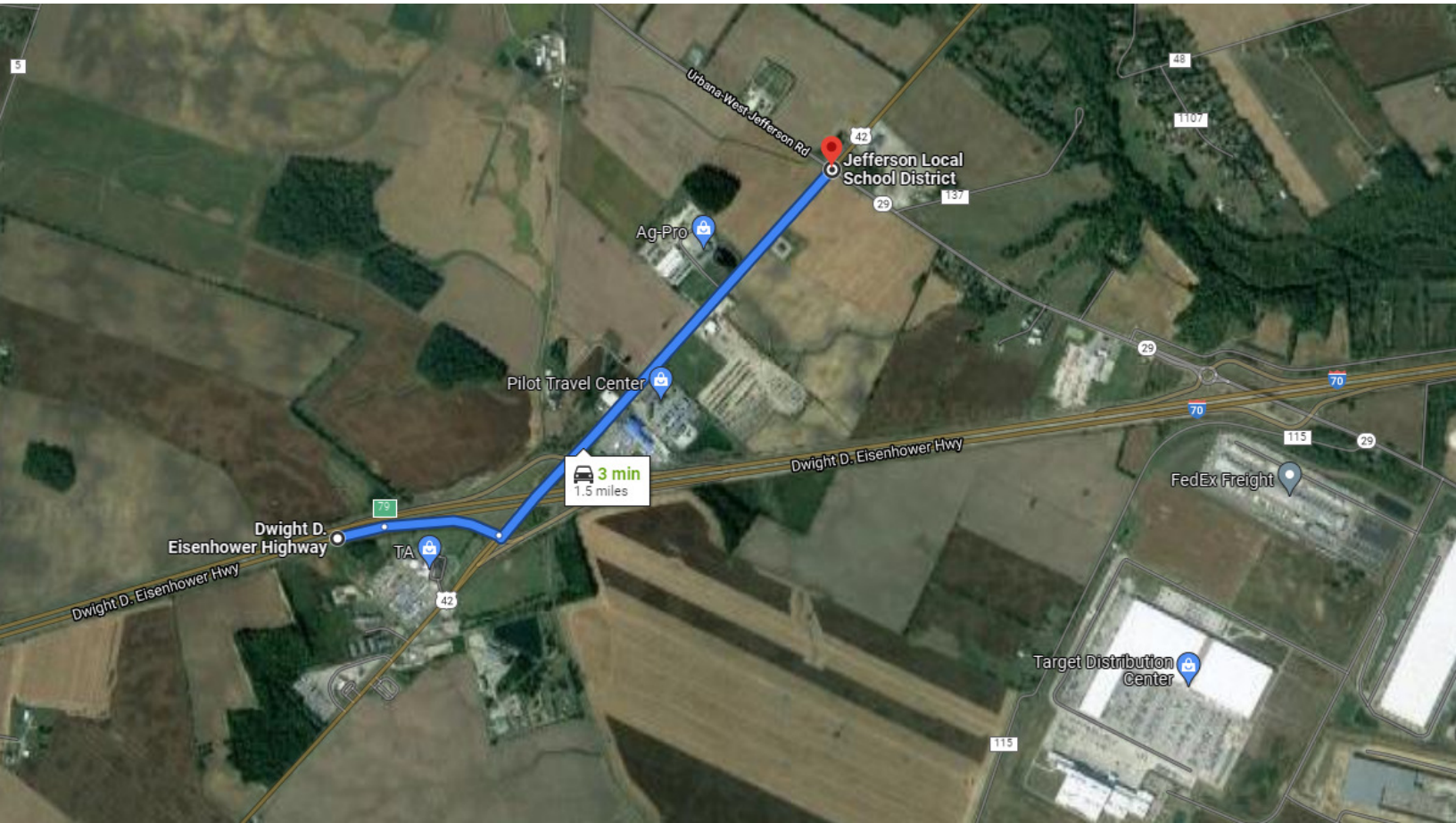
Added Length: 5 Miles

Period of Detour Use: 30 Days

**DESIGNATED LOCAL DETOUR ROUTE MAINTENANCE**

In Addition to the Official, Signed Detour Route, a Local Route Has Been Determined to be the Secondary, Unsigned Detour Route or "Designated Local Detour Route". This Route Provides an Alternative Travel Way For the Pavement Repair Closure and Can Be Seen Above. Once the Detour Is Removed and Traffic Returned to its Normal Pattern, the Designated Local Detour Route Shall Be Restored to a Condition That Is Equivalent to That Which Existed Prior to its Use for this Purpose. All Work Will Be as Agreed to by Involved Parties.

## Appendix A-2 – I-70 EB to SR-29 (Ramp D) Detours



**Detour Map: I-70 EB to SR-29 NB**

### **Detour Information**

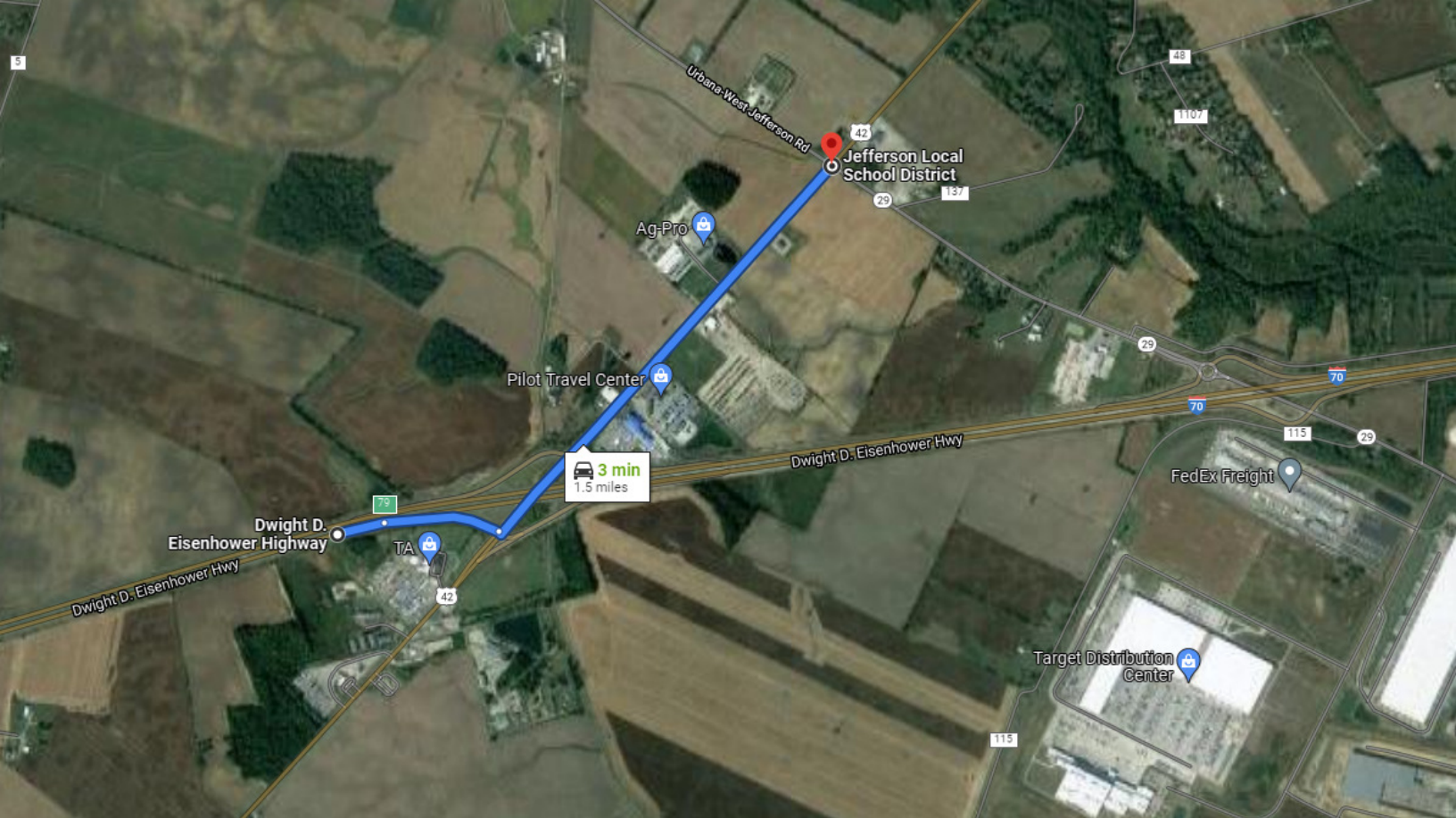
Description: Starting on I-70, I-70 EB exit ramp to US-42, US-42 NB to SR-29

Length of Detour Route: 1.5 Miles

Added Length: .2 Miles

Period of Detour Use: 45 Days

## Appendix A-2 – I-70 EB to SR-29 (Ramp D) Detours



### Detour Map: I-70 EB to SR-29 SB (Day 1-15)

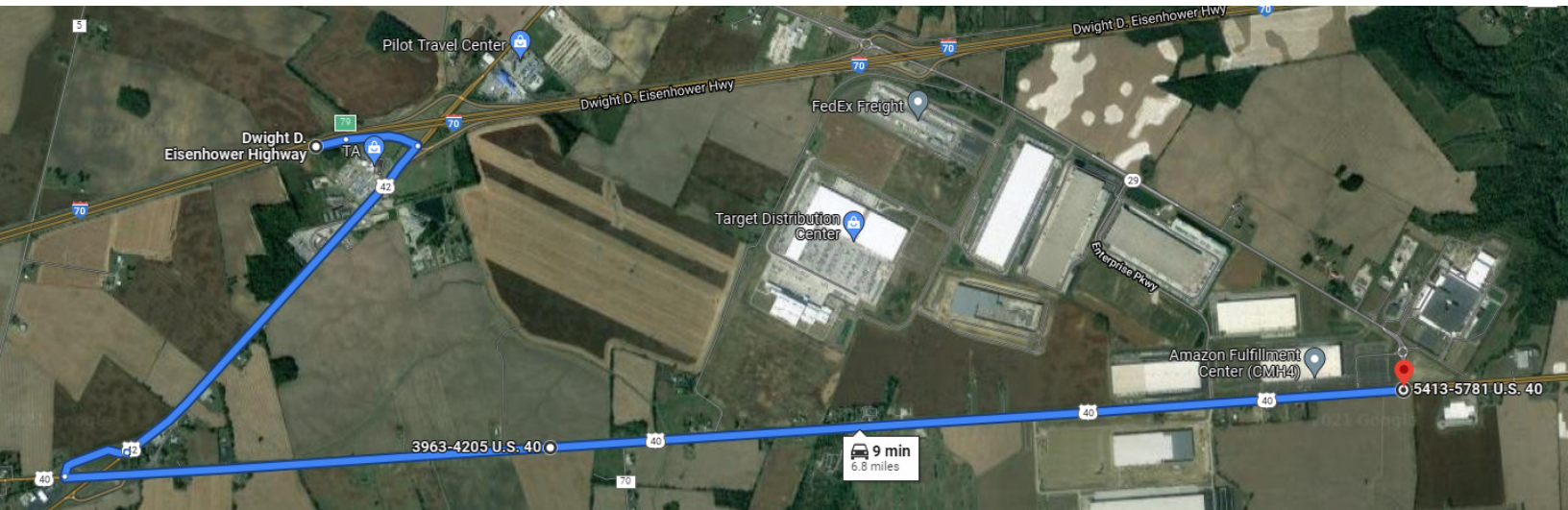
#### Detour Information

Description: Starting on I-70, I-70 EB exit ramp to US-42, US-42 NB to SR-29

Length of Detour Route: 1.5 Miles

Added Length: .2 Miles

Period of Detour Use: 15 Days



### Detour Map: I-70 EB to SR-29 SB (Day 16-46)

#### Detour Information

Description: Starting on I-70, I-70 EB exit ramp to US-42, SB on US-42 to US-40, EB on US-40 to SR-29.

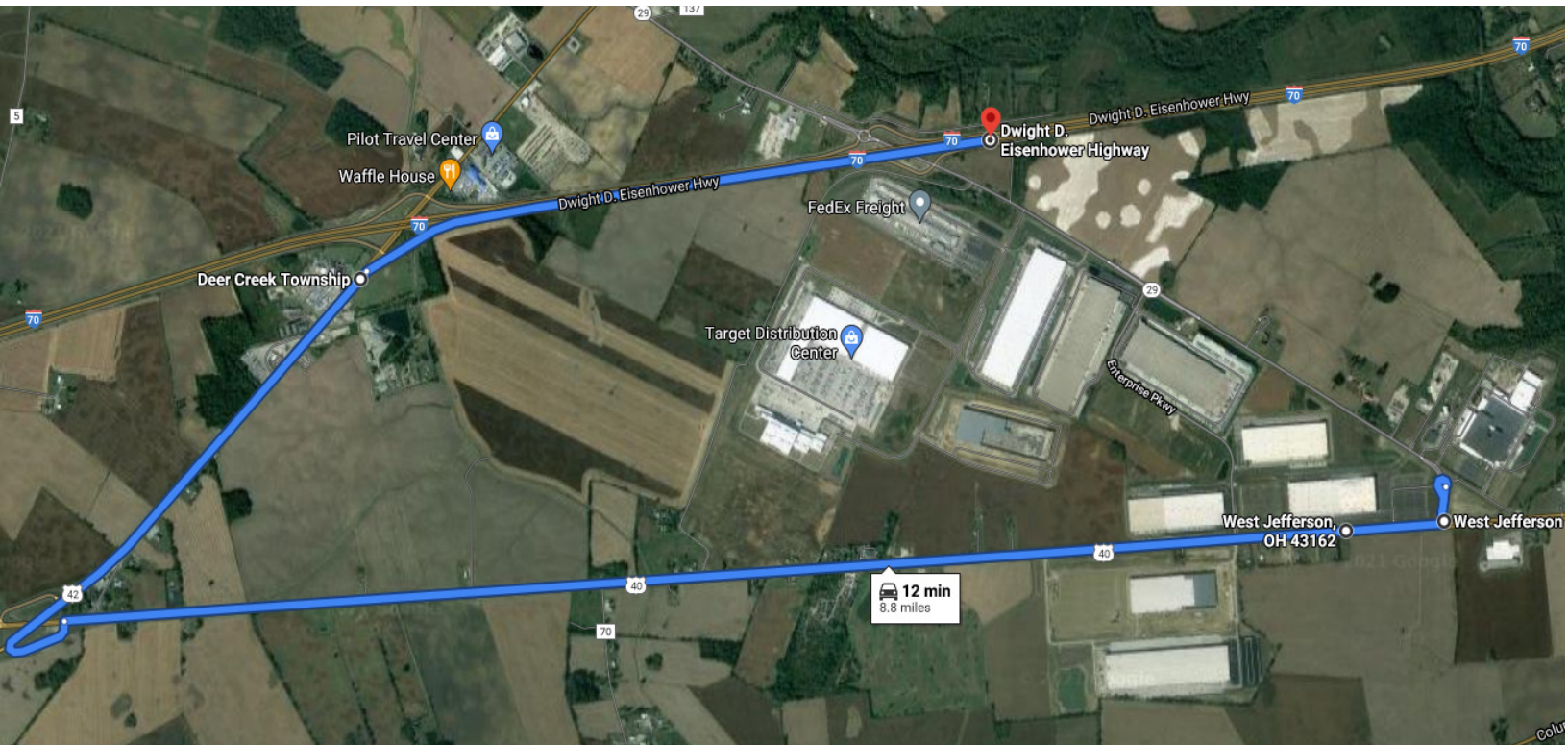
Length of Detour Route: 6.8 Miles

Added Length: 4.4 Miles

Period of Detour Use: 30 Days



## Appendix A-3 – SR-29 to I-70 EB (Ramp C) Detours



**Detour Map: SR-29 NB to I-70 EB**

### **Detour Information**

Description: Starting at the intersection of US-40 and SR-29, WB on US-40 to US-42, NB on US-42 to I-70 EB entrance ramp.

Length of Detour Route: 8.8 Miles

Added Length: 6.2 Miles

Period of Detour Use: 30 Days



## Appendix B-1 – SR-29 User Costs

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	Car	B/C Truck
<b>ADT of Detoured Section:</b>	<b>4,233</b>	<b>867</b>
<b>Time to Drive Normal Route (Min):</b>	<b>6</b>	<b>6</b>
<b>Time to Drive Detour Route (Min):</b>	<b>11</b>	<b>11</b>
<b>Duration of Closure (Days):</b>	<b>30</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	5	5
Delay (Hours):	0.083	0.083
Delay Cost per Vehicle:	\$2.02	\$5.46
Delay Cost per Day:	\$8,559.13	\$4,732.03
Delay Cost for Closure Duration:	\$256,774	\$141,961
<b>Total Delay Cost for Closure Duration:</b>	<b>\$398,735</b>	
<b>Average Delay Cost per Day:</b>	<b>\$13,291</b>	

**Table 1 – SR-29 Full-Closure User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	Car	B/C Truck
<b>ADT of Detoured Section:</b>	<b>4,233</b>	<b>867</b>
<b>Time to Drive Normal Route (Min):</b>	<b>6</b>	<b>6</b>
<b>Time to Drive Detour Route (Min):</b>	<b>7</b>	<b>7</b>
<b>Duration of Closure (Days):</b>	<b>30</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$1,711.83	\$946.41
Delay Cost for Closure Duration:	\$51,355	\$28,392
<b>Total Delay Cost for Closure Duration:</b>	<b>\$79,747</b>	
<b>Average Delay Cost per Day:</b>	<b>\$2,658</b>	

**Table 2 – SR-29 Part-Width User Costs**

## Appendix B-2 – Ramp D User Costs

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	Car	B/C Truck
<b>ADT of Detoured Section:</b>	<b>31</b>	<b>11</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>3</b>	<b>3</b>
<b>Duration of Closure (Days):</b>	<b>45</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$12.54	\$12.01
Delay Cost for Closure Duration:	\$564	\$540
<b>Total Delay Cost for Closure Duration:</b>	<b>\$1,104</b>	
<b>Average Delay Cost per Day:</b>	<b>\$25</b>	

**Table 3 – I-70 EB to SR-29 NB Full-Closure User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	Car	B/C Truck
<b>ADT of Detoured Section:</b>	<b>31</b>	<b>11</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>3</b>	<b>3</b>
<b>Duration of Closure (Days):</b>	<b>45</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$12.54	\$12.01
Delay Cost for Closure Duration:	\$564	\$540
<b>Total Delay Cost for Closure Duration:</b>	<b>\$1,104</b>	
<b>Average Delay Cost per Day:</b>	<b>\$25</b>	

**Table 4 – I-70 EB to SR-29 NB Part-Width User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	<b>Car</b>	<b>B/C Truck</b>
<b>ADT of Detoured Section:</b>	<b>988</b>	<b>365</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>3</b>	<b>3</b>
<b>Duration of Closure (Days):</b>	<b>15</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$399.55	\$398.43
Delay Cost for Closure Duration:	\$5,993	\$5,976
<b>Total Delay Cost for Closure Duration:</b>	<b>\$11,970</b>	
<b>Average Delay Cost per Day:</b>	<b>\$798</b>	

**Table 5 – I-70 EB to SR-29 SB (Day 1-15) Full-Closure User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	<b>Car</b>	<b>B/C Truck</b>
<b>ADT of Detoured Section:</b>	<b>988</b>	<b>365</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>3</b>	<b>3</b>
<b>Duration of Closure (Days):</b>	<b>15</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$399.55	\$398.43
Delay Cost for Closure Duration:	\$5,993	\$5,976
<b>Total Delay Cost for Closure Duration:</b>	<b>\$11,970</b>	
<b>Average Delay Cost per Day:</b>	<b>\$798</b>	

**Table 6 – I-70 EB to 29 SB (Day 1-15) Part-Width User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	<b>Car</b>	<b>B/C Truck</b>
<b>ADT of Detoured Section:</b>	<b>988</b>	<b>365</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>9</b>	<b>9</b>
<b>Duration of Closure (Days):</b>	<b>30</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	7	7
Delay (Hours):	0.117	0.117
Delay Cost per Vehicle:	\$2.83	\$7.64
Delay Cost per Day:	\$2,796.83	\$2,789.00
Delay Cost for Closure Duration:	\$83,905	\$83,670
<b>Total Delay Cost for Closure Duration:</b>	<b>\$167,575</b>	
<b>Average Delay Cost per Day:</b>	<b>\$5,586</b>	

**Table 7 – I-70 EB to SR-29 SB (Day 16-45) Full-Closure User Costs**

<b>Work Zone User Cost Calculations</b>		
Detour (Using Actual Drive Time)		
<b>Project ID:</b>	<b>93605</b>	
<b>County-Route-Section:</b>	<b>MAD-70-10.27</b>	
User Input:		
<b>Construction Calendar Year:</b>	<b>2023</b>	
	<b>Car</b>	<b>B/C Truck</b>
<b>ADT of Detoured Section:</b>	<b>988</b>	<b>365</b>
<b>Time to Drive Normal Route (Min):</b>	<b>2</b>	<b>2</b>
<b>Time to Drive Detour Route (Min):</b>	<b>3</b>	<b>3</b>
<b>Duration of Closure (Days):</b>	<b>45</b>	
Calculated Values:		
User Cost per Vehicle per Hour:	\$24.26	\$65.50
Delay (Min):	1	1
Delay (Hours):	0.017	0.017
Delay Cost per Vehicle:	\$0.40	\$1.09
Delay Cost per Day:	\$399.55	\$398.43
Delay Cost for Closure Duration:	\$17,980	\$17,929
<b>Total Delay Cost for Closure Duration:</b>	<b>\$35,909</b>	
<b>Average Delay Cost per Day:</b>	<b>\$798</b>	

**Table 8 – I-70 EB to SR-29 SB (Day 16-45) Part-Width User Costs**

### Appendix B-3

Item	Description	Unit	Total Quantity	Estimated Unit Price	Total Cost	Additional Remarks
614	MAINTAINING TRAFFIC	LS	1	\$ 5,000.00	\$ 5,000.00	Labor for erecting and removing signage and work zone
614	LAW ENFORCEMENT OFFICER WITH PATROL CAR	HOUR	40	\$ 70.00	\$ 2,800.00	
614	DETOUR SIGNING	LS	1	\$ 25,000.00	\$25,000.00	Includes cost of maintaining signage
614	ASPHALT CONCRETE FOR MAINTAINING TRAFFIC	CY	70	\$ 245.00	\$17,150.00	Maintaining local roads
632	SIGNALIZATION, MISC: MAINTAINING EXISTING SIGNAL	LS	1	\$ 3,500.00	\$ 3,500.00	Adjusting signal timing once
<b>SUB-TOTAL</b>					\$53,450.00	
<b>10% CONTINGENCY</b>					\$ 5,345.00	
<b>TOTAL COST</b>					<b>\$58,795.00</b>	

**Table 9 – Full-Closure Estimated Construction Costs**

Item	Description	Unit	Total Quantity	Estimated Unit Price	Total Cost	Additional Remarks
614	MAINTAINING TRAFFIC	LS	1	\$ 75,000.00	\$ 75,000.00	Increased cost due to maintenance of work zone, additional labor hours b/c work is prolonged, mitigation of safety risks
614	LAW ENFORCEMENT OFFICER WITH PATROL CAR	HOUR	100	\$ 70.00	\$ 7,000.00	Additional quantity for MOT phasing shifts
614	WORK ZONE IMPACT ATTENUATORS	EACH	4	\$ 2,000.00	\$ 8,000.00	
615	PAVEMENT FOR MAINTAINING TRAFFIC, CLASS A	SY	250	\$ 52.00	\$ 13,000.00	
615	ROADS FOR MAINTAINING TRAFFIC	LS	1	\$ 10,750.00	\$ 10,750.00	
622	PORTABLE BARRIER, 32"	FT	3000	\$ 15.00	\$ 45,000.00	
614	WORK ZONE STRIPING	LS	1	\$ 1,000.00	\$ 1,000.00	Rough estimate of edge line, stop line, and center line WZ striping
632	SIGNALIZATION, MISC: MAINTAINING EXISTING SIGNAL	LS	1		\$ 10,000.00	Multiple adjustments to signal timing, locations, etc. throughout phasing
<b>SUB-TOTAL</b>					\$ 169,750.00	
<b>10% CONTINGENCY</b>					\$ 16,975.00	
<b>TOTAL COST</b>					<b>\$ 186,725.00</b>	

**Table 10 – Part-Width Estimated Construction Costs**

	Full-Closure	Part- Width
MOT Construction Costs	\$ 58,795.00	\$ 186,725.00
Sum of Adjusted User Costs*	\$ 57,938.40	\$ 12,873.00
<b>TOTAL</b>	<b>\$ 116,733.40</b>	<b>\$ 199,598.00</b>

\*Adjustment = 10

**Table 11 – Cost Comparison of Full-Closure vs. Part-Width**

**Appendix C**  
**STATE OF OHIO**  
**DEPARTMENT OF TRANSPORTATION**

**AGREEMENT COVERING MAINTENANCE OF LOCAL  
ROADS FOR LOCAL DETOUR PURPOSES**

Whereas, the State of Ohio contemplates the improvement of the Interstate Route 70 interchange at State Route 29 in Madison County.

And whereas, the Director of Transportation has determined that it is necessary to detour traffic during construction of this improvement and --

Whereas, the Director of Transportation wishes to obtain concurrence of affected authorities prior to establishment of detour --

Now therefore, the Director of Transportation agrees to maintain this local detour in passable condition and return it to as good condition as it was prior to its use as a local detour as indicated on attached detour need determination report.

Signed Jack Marchbanks Date 10/7/2021  
Director

I, The Madison County Engineer have reviewed the above agreement, detour report and map and concur in detour use and proposed work.

Signed Bryan D Dume Date 11-17-21  
Madison County Engineer

I, Village of West Jefferson Public Service Director have reviewed the above agreement, detour report and map and concur in detour use and proposed work.

Signed Joe [Signature] Date 10-07-2021  
Public Service Director of West Jefferson