# INTERSECTION SAFETY STUDY

# MAD US 42 14.00

US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road) Study PID #119698 Jefferson Township, Madison County ODOT District 6

#### 2021 ODOT SA – Rural Intersection Rank #69

#### **Prepared for:**

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#### 2.0 **One Page Project Summary**

MAD US 42 14.00: US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road), Jefferson Township, Madison County, ODOT District 6.



#### **Roundabout Cost Summary**

| Description   | Cost        |
|---|-------------|
| Construction Cost   | \$2,121,380 |
| Right of Way  | \$312,000   |
| Utility Relocation Allowance                                  | \$200,000   |
| Contingency (30%)   | \$790,014   |
| Design, Environment, and Construction Engineering Costs (30%) | \$790,014   |
| Inflation (24.18%)  | \$636,750   |
| TOTAL COST  | \$4,850,158 |



**Roundabout.** Construct a single lane roundabout that will accommodate the large number of heavy vehicles and agricultural equipment at the intersection.

rural intersection in the 2021 HSIP Priority Locations list.

Crashes

17

8

4

1

1

1

32

Crashes

1

2

2

10

17

32

%

53.13%

25.00%

12.50%

3.13%

3.13%

3.13% 100.00%

%

3.13%

6.25%

31.25%

6.25%

53.13%

100.00%

#### 3.0 Executive Summary

The purpose of this study is to evaluate the existing safety performance and to identify potential countermeasures to reduce injury and overall traffic crashes at the intersection of US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road). The intersection is in Jefferson Township, Madison County, Ohio, located 7-miles northeast of the City of London, 11-miles southwest of the Village of Plain City, and 19-miles west of downtown Columbus. US 42 (N London-Delaware Road) provides a direct connection between London and Plain City. The US 42 (N London-Delaware Road) corridor between London and Plain City is experiencing an increase in traffic due to several planned developments along the corridor and has been identified as a major development site in Central Ohio region in the ongoing statewide Strategic Transportation & Development Analysis (STDA) study. This is the #69 statewide ranked rural intersection in the 2021 HSIP Priority Locations list.

There was one fatal and two serious injury crashes reported within the five-year study period. Rear End (17, 53.13%), Angle (8, 25.00%), and Left Turn (4, 12.50%) were the top three crash types. These three crash types account for 90.63% (29 of 32) of all crashes at the study intersection. The following crash types and/or conditions were determined to be over-represented compared to statewide averages (shown in parenthesis).

- Fatal Crash: 3.13% (0.33%)
- Serious Injury Crash: 6.25% (2.84%)
- Minor Injury Crash: 31.25% (11.13%)
- Rear End Crash: 54.84% (33.94%)
- Angle Crashes: 25.81% (14.91%)
- Dark Roadway Not Lighted Crashes 34.38% (7.93%)

The following countermeasures are proposed to improve safety performance while balancing project costs:

- 1. **Roundabout.** Construct a single lane roundabout accommodating the large number of heavy vehicles and agricultural equipment at the intersection to mitigate the high percentage of angle crashes (25%), most of which resulted in injuries. An angle crash that occurred on November 14, 2022, was the crash type that resulted in a fatal crash at this intersection.
- 2. **Traffic Signal Improvements.** Install a near right side signal on the traffic signal pole on all approaches to the intersection. Consider extending all-red clearance intervals to better accommodate lower left-turning speeds.
- 3. **Signage Improvements.** Install "Signal Ahead" (W3-3) signs on the SR 29 (Urbana-West Jefferson Road) approaches to this intersection.
- 4. **Lighting Improvements.** Install LED roadway lighting at the intersection to improve intersection visibility during low light conditions.

An alternative long-term countermeasure that retains traffic signal operation with auxiliary left-turn lanes on all approaches was considered. However, this countermeasure would not be as effective in reducing the red light running and resulting angle crashes as a roundabout and is not recommended. Concept plans showing the proposed long-term roundabout countermeasure and the traffic signal alternative can be found in Appendix G.

#### 4.0 Purpose and Need Statement

The purpose of this study is to evaluate the existing safety performance and to identify potential countermeasures to reduce injury and overall traffic crashes at the intersection of US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road). The intersection is in Jefferson Township, Madison County, Ohio, located 7-miles northeast of the City of London, 11-miles southwest of the Village of Plain City, and 19-miles west of downtown Columbus. The intersection is approximately one mile from two interchanges with I-70: US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road). This is the #69 statewide ranked rural intersection in the 2021 HSIP Priority Locations list.

US 42 (N London-Delaware Road) provides a direct connection between London and Plain City. The US 42 (N London-Delaware Road) corridor between London and Plain City is experiencing an increase in traffic due to several planned developments along the corridor and has been identified as a major development site in the Central Ohio region in the ongoing statewide Strategic Transportation & Development Analysis (STDA) study. Figure 1 shows the study intersection's regional location. Figure 2 shows new driveway access to the development on the southwest quadrant near the study intersection on US 42 and SR 29.



#### FIGURE 1 - LOCATION MAP

FIGURE 2 - DRIVEWAY ACCESS TO DEVELOPMENT IN SW QUADRANT



#### 5.0 Existing Conditions

Existing conditions of the study intersection are shown in Figure 3. Field reviews were conducted on August 22, 2023, and December 20, 2023, to observe traffic operations and document field conditions. US 42 (N London-Delaware Road) is oriented in the northeast-southwest direction and SR 29 (Urbana-West Jefferson Road) is oriented in the northwest-southeast direction. For purposes of this study, the US 42 (N London-Delaware Road) approaches to the intersection will assume the cardinal direction to be north/south to match the current roadway signing. US 42 (N London-Delaware Road) is classified as a Principal Arterial while SR 29 (Urbana-West Jefferson Road) is classified as a Major Collector. The posted speed limit is 55 miles per hour on all approaches to the intersection. The study area included approximately a 500-foot radius from the center of the intersection and was used to capture the crash events for the 5-year period (2018-2022), which included 32 crashes.

#### FIGURE 3 - STUDY AREA



#### 5.1 Intersection Conditions

All approaches to the intersection are a single lane with shared left, though, and right movements. All crosssections approaching the intersection are two (2) lanes with a single lane in each direction.

The existing traffic signal is a traditional span wire configuration with 2-phase operation. Each approach has two (2) signal heads mounted on the far side span wire. All signal heads have reflective backplates. There are post-mounted "Signal Ahead" (W3-3) signs on the US 42 (N London-Delaware Road) approaches. There is a crest vertical curve on the westbound approach of SR 29 (Urbana-West Jefferson Road) about 400-feet east of the intersection having an approximate three (3) percent grade. This curve limits vertical sight distance of the traffic signal on SR 29 (Urbana-West Jefferson Road) when approaching from Byerly Mill Road (TR 137).

#### 5.2 Heavy Vehicles and Agricultural Equipment

The intersection is utilized by several heavy vehicles along with agricultural equipment. All approaches have a heavy vehicle percentage of at least 7.9 percent during the peak hours; the westbound SR 29 (Urbana-West Jefferson Road) approach has a heavy vehicle percentage of 32.6% in the AM peak hour.





#### 5.3 High Speed Approaches

All approaches have a posted speed limit of 55 miles per hour. The speed of vehicles approaching the intersection is a contributing factor to the severity of crashes at this intersection. See Figure 5 below for a windshield survey photo showing the posted 55 mph speed limit on US 42 (N London-Delaware Road).

FIGURE 5 - US 42 NORTHBOUND APPROACH



#### 5.4 Isolated Signalized Intersection

The closest signalized intersection south of the study intersection is located 1 mile away at the US 42 at I-70 westbound ramps intersection. Driver expectation of a signalized intersection with a stop condition may be low due to the rural area.

#### 5.5 Roundabout Installations in the Vicinity of the Study Intersection

There are several roundabouts that have been recently constructed, are under construction, or are proposed to be constructed in the vicinity of the study intersection. This will increase drivers' familiarity with navigating roundabouts. Like the study intersection, these roundabouts have high speed approaches with 55 mph speed limits. Below is a summary of roundabout intersections in the vicinity of the study intersection:

#### **Existing Roundabouts**

- SR 29 (Urbana-West Jefferson Road) at IR 70 (Interstate 70) Westbound Ramps (Figure 6).
- SR 29 (Urbana-West Jefferson Road) at SR 38 (Marysville-London Road) (Figure 6).

#### **Roundabouts under Construction**

• SR 29 (Urbana-West Jefferson Road) at IR 70 (Interstate 70) Eastbound Ramps.

#### Proposed Roundabouts

• US 42 (N London-Delaware Road) at CR 32 (Price Hilliards Road).







#### 6.0 Crash Data and Analysis

Crash data was obtained using ODOT's GIS Crash Analysis Tool (GCAT), housed within the ODOT Transportation Information Mapping System (TIMS) tool. A total of 32 crashes were reported over a five-year period between 2018 and 2022. Each crash report documented within the study limits was reviewed to confirm the accuracy and location of the crash. An excerpt of the intersection crash diagram is included as Figure 7 with the complete crash diagram included in Appendix D.

#### FIGURE 7 - CRASH DIAGRAM



ODOT utilizes AASHTOWare's Safety Analyst to prioritize safety locations within the State of Ohio and the subject intersection was the #69 statewide ranked rural intersection in the 2021 Safety Analyst Rural Intersection priority list. The following crash types and/or conditions were determined to be over-represented compared to statewide averages (shown in parenthesis).

- Fatal Crash: 3.13% (0.33%)
- Serious Injury Crash: 6.25% (2.84%)
- Minor Injury Crash: 31.25% (11.13%)
- Rear End Crash: 54.84% (33.94%)
- Angle Crashes: 25.81% (14.91%)
- Dark Roadway Not Lighted Crashes 34.38% (7.93%)

There was one fatal and two serious injury crashes reported within the five-year study period. Rear End (17, 53.13%), Angle (8, 25.00%), and Left Turn (4, 12.50%) were the top three crash types. These three crash types account for 90.63% (29 of 32) of all crashes at the study intersection. Figure 8 shows frequency by crash type at the intersection over the five-year period.



#### FIGURE 8 - FREQUENCY OF CRASHES BY TYPE OF CRASH

The rear end and angle crashes are indicative of drivers not expecting a stop condition at this signalized intersection or signal head visibility. This issue is compounded by additional stop conditions created during green intervals by left turn vehicles waiting for gaps in opposing traffic. All the angle crashes, which included the fatal crash, we a result of a vehicle running a red light.

Red-light running crashes comprise 28.13% of crashes over the 5-year period. Heavy vehicles can pose issues for signal visibility for passenger vehicles following behind them.

#### 6.1 Benefit Cost Analysis

A benefit cost analysis for the proposed countermeasures was prepared using the ODOT Economic Crash Analysis Tool (ECAT). The financial benefits of the recommended safety countermeasures were determined by comparing the net present value of the project construction costs to the safety benefits provided by the longterm countermeasures. Details of the benefit cost analysis are included in Appendix I.

The conversion of the intersection of US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road) from a signalized intersection to a 1x1 single-lane roundabout configuration means that the basic safety performance functions were modified between existing and proposed conditions. ECAT analysis using the updated version (Jan 2024) of the ECAT Tool includes the roundabout as a specific site type in lieu of applying Part D CMFs to this project.

Construction costs were estimated for the proposed safety countermeasures shown in Appendix G. Cost estimates are included in Appendix H. A summary of project costs for the Roundabout alternative and the Left-Turn Lanes Traffic Signal alternative are shown in Tables 1 and 2, respectively. Tables 3 and 4 summarize the benefit cost analysis results for the Roundabout alternative and Left-Turn Lanes Traffic Signal alternative.

| Description   | Cost         |
|---|--------------|
| *Construction Cost  | \$ 2,121,380 |
| Right of Way  | \$ 312,000   |
| Utility Relocation Allowance                                  | \$ 200,000   |
| Contingency (30%)   | \$ 790,014   |
| Design, Environment, and Construction Engineering Costs (30%) | \$ 790,014   |
| TOTAL ESTIMATED CURRENT PROJECT COST                          | \$ 4,213,408 |
| Inflation (24.18%)  | \$ 636,750   |
| TOTAL ESTIMATED PROJECT COST                                  | \$ 4,850,158 |

#### Table 1 - Cost Summary for Roundabout Alternative

\*Based upon 2023 Construction Costs

#### Table 2 - Cost Summary for Left-Turn Lanes Traffic Signal Alternative

| Description   | Cost         |  |  |
|---|--------------|--|--|
| *Construction Cost  | \$ 4,132,625 |  |  |
| Right of Way  | \$ 510,000   |  |  |
| Contingency (30%)   | \$ 1,392,788 |  |  |
| Design, Environment, and Construction Engineering Costs (30%) | \$ 1,392,788 |  |  |
| TOTAL ESTIMATED CURRENT PROJECT COST                          | \$ 7,428,201 |  |  |
| Inflation (22.0%)   | \$ 1,021,378 |  |  |
| TOTAL ESTIMATED PROJECT COST                                  | \$ 8,449,579 |  |  |

\*Based upon 2023 Construction Costs

#### Table 3 - Benefit Cost Results for Roundabout Alternative

| Description                         | Value                |  |  |
|-------------------------------------|----------------------|--|--|
| Expected annual crash adjustment    | -10.908 crashes/year |  |  |
| Net present value of project        | \$4,213,408          |  |  |
| Net present value of safety benefit | \$5,213,592          |  |  |
| BENEFIT/COST RATIO                  | 1.24                 |  |  |

#### Table 4 - Benefit Cost Results for Left-Turn Lanes Traffic Signal Alternative

| Description                         | Value               |  |  |
|-------------------------------------|---------------------|--|--|
| Expected annual crash adjustment    | -5.284 crashes/year |  |  |
| Net present value of project        | \$7,428,200         |  |  |
| Net present value of safety benefit | \$2,909,542         |  |  |
| BENEFIT/COST RATIO                  | 0.39                |  |  |

#### 7.0 Recommendations and Prioritization

Countermeasures have been developed that will improve the safety performance of the study area by focusing on crash types with the greatest potential for mitigation. The focus of the countermeasures is identifying factors that contribute to these crash types and providing measures that will mitigate these factors.

#### 7.1 Short-Term Countermeasures

- 1. Signage Improvements. Adding advance warning signs on the SR 29 (Urbana-West Jefferson Road) approaches to match the existing "Signal Ahead" (W3-3) signs on the US 42 (N London-Delaware Road) approaches can help alert drivers on this route to the upcoming signalized intersection and give them enough time to slow down or stop if necessary. Recommend the following:
  - a. Install "Signal Ahead" (W3-3) signs on the SR 29 (Urbana-West Jefferson Road) approaches to the intersection in advance of the route marker signs.

#### 7.2 Medium-Term Countermeasures

- **1. Lighting Improvements.** Install LED roadway lighting at the intersection to improve intersection visibility during low light conditions.
- **2. Traffic Signal Improvements.** The following traffic signal improvements can be performed to address the signal visibility and red-light running issues at this intersection.
  - a. Install a near right side signal on the traffic signal pole on all approaches to the intersection. An example of this type of installation at the US 42/SR 257 intersection is provided below.



b. Consider extending all-red clearance intervals to better accommodate lower left-turning speeds.

#### 7.3 Long-Term Countermeasures

1. Roundabout. A single lane roundabout is proposed as an effective, long-term countermeasure to mitigate the high percentage of angle crashes (25.81%), most of which resulted in injury, including the fatal crash that occurred on November 14, 2022. Per FHWA's Roundabouts & Rural Highways resource, roundabouts constructed at intersections along high-speed, two-lane rural highways reduced overall crashes by up to 68 percent, reduced injury crashes by up to 88 percent, and eliminated 83 percent of angle-type crashes. Furthermore, driver expectation of roundabouts is present in this area due to the two current and two planned roundabouts around this intersection.

The proposed roundabout design will need to take into consideration the large number of heavy vehicles and agricultural equipment that utilized this intersection. There are established roundabout design features that have been used to accommodate these vehicles including inside truck aprons, mountable outside curb with truck aprons, and mountable splitter islands. Several different types of vehicles should be analyzed during the design including WB-67 trucks, lowboy trucks, tractor/trailer agricultural vehicles, and combine agricultural vehicles to determine which roundabout design feature is best to accommodate these vehicles. Consideration should also be given to sign placement to avoid placing signs directly across from each vehicle and being struck by oversized agricultural vehicles.

A Concept plan showing a proposed long-term roundabout countermeasure is included in Appendix G.

- 2. Left-Turn Lanes Traffic Signal Reconstruction. An alternative long-term countermeasure that retains traffic signal operation with auxiliary left-turn lanes on all approaches was considered. However, this countermeasure would not be as effective in reducing the red light running and resulting angle crashes as a roundabout. Additionally, construction costs for a signalized intersection based on the following criteria is like a roundabout option:
  - Left turn lane lengths of 500 +/- feet. Note the deceleration length for 55 MPH is equal to 285-ft per ODOT L&D Figure 401-9.
  - Graded shoulder widths of 12 feet per ODOT L&D Figure 301-3.
  - Protected/permissive signal phasing.
  - Mast arm signal design with backplates.

This alternative was removed from further study due to its ability to mitigate the serious crash pattern and comparable construction costs.

#### 8.0 Summary of Supplemental Traffic Studies

#### 8.1 Data Collection

Turning movement counts (TMC) were collected at the study intersection on December 13, 2022, as part of the US 42 Warehouse & Altec Developments Traffic Access Studies (TAS) performed by Civil & Environmental Consultants, Inc., for two 4-hour periods from 6:00 AM to 10:00 AM and 3:00 PM to 7:00 PM. Traffic count data is included in Appendix B and a summary of the existing morning and afternoon peak hour traffic volumes is shown in Figure 9 below. The morning peak hour at the study intersection was identified from 7:45-8:45 AM and the afternoon peak hour was identified from 4:00-5:00 PM. The 2023 ADT on US 42 (N London-Delaware Road) was 6,188 vehicles per day (vpd) west of SR 29 (Urbana-West Jefferson Road) according to the ODOT Traffic Monitoring Management System (TMMS) traffic count maps (Location ID 4149). The 2023 ADT on SR 29 (Urbana-West Jefferson Road) according to the same ODOT TMMS traffic count maps (Location ID 449).

#### 8.2 Baseline and Forecasted Traffic Volumes

A 2022 baseline condition was established by adding the proposed site generated volumes from the US 42 Warehouse and Altec developments to the existing traffic volumes. These base line volumes were then projected for Design Year (2043) using TFMS growth rates, with forecasted volumes shown in Figure 9. Refer to Appendix C for Future Traffic Volume Calculations.

#### FIGURE 9 - 2022 BASELINE AND 2043 FORECASTED TRAFFIC VOLUMES



#### 8.3 Intersection Control Evaluation (ICE)

The Intersection Control Evaluation (ICE) methodology is a process through which ODOT and ODOT's partners can evaluate combinations of geometric and traffic-control strategies at intersections using quantitative and qualitative analyses. The goal of ICE is to aid the decision making of the roadway agency in identifying and selecting an intersection alternative that meets the project purpose and reflects the overall best value using performance-based criteria. The ICE process is applicable when planning new intersections or upgrading existing intersections.

ODOT provides tools to assist with the two phases of the ICE program. In Phase 1, ICE is a screening process used to identify all feasible and reasonable control strategies. The FHWA CAP-X software is used during Phase 1. The CAP-X analysis takes traffic volume and roadway geometric information into consideration. In most scenarios, multiple intersection controls may be considered reasonable for analysis.

This safety study was scoped to integrate the ICE Phase 1 process into the study framework to aid in identifying a preferred alternative for the US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road) intersection. The first step in the Phase 1 process is use of the ODOT customized versions of the CAP-X and ICE spreadsheet-based tools to rank various intersection alternatives that were identified as feasible for this location. The following alternatives were selected to be compared to the existing signalized condition that exists at the intersection: **1 X 1 Roundabout** and **Traffic Signal**.

Restricted crossing options such as a signalized or unsignalized R-CUT treatment were eliminated from consideration since both US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road) are undivided 2-lane sections and therefore not favorable to median construction for U-turn movements inherent in the RCUT design.

The CAP-X software was run using opening year traffic volumes and again with design year traffic volumes assuming the addition of traffic generated by nearby developments analyzed in 2022. Results of the CAP-X runs for Design Year AM and PM peak hours are shown in Figure 10 with detailed output provided in Appendix J.

#### FIGURE 10 - CAP-X ANALYSIS FOR US 42 AND SR 29 INTERSECTION

#### **DESIGN YEAR - AM PEAK HOUR**

| TYPE OF INTERSECTION | Overall V/C<br>V/C Ranking<br>Ratio |   | Pedestrian<br>Accommodations | Bicycle<br>Accommodations |  |
|----------------------|-------------------------------------|---|------------------------------|---------------------------|--|
| 1 X 1 Roundabout     | 0.48                                | 1 | 4.16                         | 4.37                      |  |
| Traffic Signal       | 0.58                                | 2 | 2.50                         | 4.33                      |  |

**DESIGN YEAR - PM PEAK HOUR** 

| TYPE OF INTERSECTION | Overall<br>V/C<br>Ratio | V/C<br>Ranking | Pedestrian<br>Accommodations | Bicycle<br>Accommodations |
|----------------------|-------------------------|----------------|------------------------------|---------------------------|
| Traffic Signal       | 0.68                    | 1              | 2.50                         | 4.33                      |
| 1 X 1 Roundabout     | 0.74                    | 2              | 4.12                         | 4.33                      |

Due to crash frequency and above average injury and fatality rate, retaining the Traffic Signal option does not satisfy the objective of this project to improve safety of the US 42 (N London-Delaware Road) and SR 29 (Urbana-West Jefferson Road) intersection. The single lane roundabout provides the passing v/c values in the design year and provides acceptable pedestrian and bicycle accommodation metrics. While the traffic signal alternative ranks well with respect to the V/C ratio, this alternative provides worse pedestrian accommodation metrics to the roundabout option.

The ODOT ICE Tool provides life cycle cost comparisons between different intersection treatments. The comparisons are made between safety, vehicular delay, operations and maintenance, design and construction, and right of way costs. Results of the ICE Tool analysis are included in Figure 11 and detailed outputs are included in Appendix J.

| Cost Categories                             |    | Net Present Value of Costs |    |             |  |  |
|---|----|----------------------------|----|-------------|--|--|
|   |    | Traffic Signal             |    | Roundabout  |  |  |
| Planning, Construction & Right of Way Costs | \$ | 8,550,119                  | \$ | 4,70        |  |  |
| Post-Opening Costs                          | \$ | 95,545                     | \$ | 7           |  |  |
| Auto Passenger Delay                        | \$ | 824,480                    | \$ | 72          |  |  |
| Truck Delay                                 | \$ | 556,495                    | \$ | 48          |  |  |
| Safety                                      | \$ | 1,821,133                  | \$ | 99          |  |  |
| Total cost                                  |    | \$11.847.772               |    | \$6.994.533 |  |  |

#### FIGURE 11 - ICE ANALYSIS FOR US 42 AND SR 29 INTERSECTION

If the initial cost of the roundabout and traffic signal alternatives are removed from the table presented in Figure 11, the annual operating, delay, and safety costs for the roundabout option amount to a net present value of \$2,285,262 which is approximately a million dollars less than the traffic signal alternative. In other words, if constructed, a roundabout is estimated to start providing savings after 4 years compared to maintaining the existing traffic signal condition.

9,272 2,952 4,525 9,029 8,756

#### 8.4 Capacity Analysis

Capacity analyses were performed to determine operational impacts of the proposed recommended countermeasures and traffic signal improvements. Analyses were prepared for the AM and PM peak periods for the 2022 base line, 2043 No Build, and 2043 build condition with proposed safety countermeasures. Results summarized in Table 5 and Table 6 indicate that LOS D or better is maintained for the intersection and all approaches with the proposed safety countermeasures. Details of the capacity analysis procedures and results are included in Appendix F.

|               |                                  | AM Peak Hou        | r                             | PM Peak Hour       |                    |                               |  |
|---------------|----------------------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--|
| Intersection/ | 2022<br>Baseline                 | 2043<br>No Build   | 2043<br>Build<br>(Boundabout) | 2022<br>Baseline   | 2043<br>No Build   | 2043<br>Build<br>(Boundabout) |  |
| Approach      | LOS<br>(Delay/sec)               | LOS<br>(Delay/sec) | LOS<br>(Delay/sec)            | LOS<br>(Delay/sec) | LOS<br>(Delay/sec) | LOS<br>(Delay/sec)            |  |
| US 42 &       | В                                | В                  | Α                             | В                  | В                  | С                             |  |
| SR 29         | (12.8)                           | (13.5)             | (9.6)                         | (13.0)             | (19.1)             | (19.0)                        |  |
| EB Approach   | B (16.2)                         | B (16.2)           | B<br>(10.1)                   | B<br>(15.0)        | C (22.0)           | A                             |  |
|               | (16.2)                           | (16.2)             | (10.4)                        | (15.8)             | (22.0)             | (8.9)                         |  |
| WB Approach   | B<br>(15.9)                      | B<br>(15.7)        | A<br>(8.3)                    | B<br>(16.2)        | C<br>(22.9)        | C<br>(19.4)                   |  |
| NB Approach   | A (7.4)                          | B<br>(10.5)        | A<br>(9.2)                    | A<br>(9.7)         | B<br>(17.6)        | D (27.8)                      |  |
| SB Approach   | (7. <del>4</del> )<br>A<br>(7.6) | B<br>(10.6)        | A<br>(10.4)                   | A<br>(7.7)         | B<br>(10.3)        | A<br>(9.6)                    |  |

#### Table 5 - Capacity Analysis Summary (Roundabout Alternative)

#### Table 6 – Capacity Analysis Summary (Left-Turn Lanes Traffic Signal Alternative)

|               |             | AM Peak Hour |             |             | PM Peak Hour |             |
|---------------|-------------|--------------|-------------|-------------|--------------|-------------|
|               | 2022        | 2043         | 2043        | 2022        | 2043         | 2043        |
| Intersection/ | Baseline    | No Build     | Build (Left | Baseline    | No Build     | Build (Left |
| Approach      |             |              | Turn Lanes) |             |              | Turn Lanes) |
|               | LOS         | LOS          | LOS         | LOS         | LOS          | LOS         |
|               | (Delay/sec) | (Delay/sec)  | (Delay/sec) | (Delay/sec) | (Delay/sec)  | (Delay/sec) |
| US 42 &       | В           | В            | С           | В           | В            | В           |
| SR 29         | (12.8)      | (13.5)       | (29.4)      | (13.0)      | (19.1)       | (16.1)      |
| ER Approach   | В           | В            | С           | В           | С            | В           |
| ев Арргоасн   | (16.2)      | (16.2)       | (33.4)      | (15.8)      | (22.0)       | (17.5)      |
| M/P Approach  | В           | В            | С           | В           | С            | В           |
| ир Арргоасн   | (15.9)      | (15.7)       | (33.3)      | (16.2)      | (22.9)       | (17.8)      |
| NP Approach   | А           | В            | С           | А           | В            | В           |
| мь Арргоасн   | (7.4)       | (10.5)       | (24.7)      | (9.7)       | (17.6)       | (15.9)      |
| SP Approach   | А           | В            | С           | А           | В            | В           |
| зв Арргоасн   | (7.6)       | (10.6)       | (24.6)      | (7.7)       | (10.3)       | (10.8)      |

# **APPENDIX A**

## **Existing Conditions Diagram**



# **APPENDIX B**

**Existing Traffic Data** 

#### QUALITY COUNTS REPORT

-----

| Intersection:<br>City/State:<br>QCJobNo:<br>ClientID: | N London-I<br>West Jeffer<br>1604 | Delaw U<br>rson O<br>10801 | rbana-We<br>H | est Jefferso | on Rd          |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
|---|-----------------------------------|----------------------------|---------------|--------------|----------------|----------|----------|---------|----------|---------|------------|---------|----------|----------|-------------------|---------|---------|----------|-------------------|-------|
| Date:   | 12/13,                            | 2022                       |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| Comments:   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| Latitude/Longitu                                      | 39.9665                           | 53677                      | -83.3626      |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| PEAK HOUR STAF  | 7:4                               | 5 AM                       |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| PEAK HOUR END   | 8:4                               | 5 AM                       |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
|   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| PHF   |                                   | 0.96                       |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
|   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| PEAK-HOUR VOL   | UMES                              |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
|   | NBLeft                            | N                          | BThru         | NBRight      | SBLeft         | SBThru   | SBRight  | EBLeft  | EBThru   | EBRight | WBLeft     | WBThru  | WBRight  |          |                   |         |         |          |                   |       |
| Total   |                                   | 14                         | 83            | 25           | 5              | 3 14     | 1 24     | 2       | 3 22     | 1       | 15 3       | 5 18    | 1        | 8        |                   |         |         |          |                   |       |
| Heavy Vehicles  |                                   | 3                          | 8             | 10           | )              | 2 1      | 1 2      |         | 1 5      | 8       | 5 1        | 4 5     | 8        | 1        |                   |         |         |          |                   |       |
| Passenger Vehicle                                     | (                                 | 11                         | 75            | 15           | 5              | 1 13     | 0 22     | 2       | 16       | 3       | 10 2       | 1 12    | 3        | 7        |                   |         |         |          |                   |       |
| DEDCENTUE   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| PERCENT HEAVY   | VEHICLES                          | N                          | DThru         | NDDight      | <b>CPL off</b> | CDThru   | CDDiabt  | EBLoft  | EDThru   | EDDiabt | W/PL off   | M/DThru | W/PDight |          |                   |         |         |          |                   |       |
|   | NDLeit                            | 21.4                       | 0.6           | NDRIgIIL     |                |          |          | EDLEIL  | 2 26     | 2 22    |            | 0 3     | 2 12     | F        |                   |         |         |          |                   |       |
| BUSES   |                                   | 21.4                       | 5.0           | 40           | , 00           | , ,.     | 0 0.3    | . 4     | .5 20    | 2 55    |            | .0 .3   | 2 12.    | .5       |                   |         |         |          |                   |       |
|   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
|   |                                   |                            |               |              |                |          |          |         |          |         |            |         |          |          |                   |         |         |          |                   |       |
| ALL-VEHICLE VOL                                       | UMES                              |                            | D Thurs       |              |                |          | CD 1 - 6 | CD Thu  | CD Di-1  | CD 11 - | CD DTCC    | 501.6   | CD The   |          |                   | 14/01-5 | MO The  |          | MO 11 T           | T     |
| Time Period   | NB Left                           | N                          | вIhru         | INB Right    | INB U-Tui      | n NBRIOR | SB Left  | SB Inru | SB Right | SB U-Tu | rn SB RIOR | EB Left | EB Inru  | EB Right | EB U-Turn EB RTOR | WB Left | WB Ihru | WB Right | WB U-Turn WB RTOR | rotal |

|         | <br> |    |    |   | <br> |    |    |   | <br> |    |   |   |   |    |    |   |   |     |     |
|---------|------|----|----|---|------|----|----|---|------|----|---|---|---|----|----|---|---|-----|-----|
| 6:00 AM | 1    | 9  | 1  | 0 | 1    | 24 | 2  | 0 | 0    | 23 | 0 | 0 |   | 3  | 20 | 0 | 0 | 84  |     |
| 6:15 AM | 0    | 11 | 2  | 0 | 1    | 27 | 3  | 0 | 0    | 26 | 0 | 0 |   | 4  | 24 | 0 | 0 | 98  |     |
| 6:30 AM | 2    | 12 | 0  | 0 | 0    | 20 | 5  | 0 | 1    | 26 | 1 | 0 |   | 3  | 19 | 1 | 0 | 90  |     |
| 6:45 AM | 0    | 8  | 4  | 0 | 1    | 30 | 3  | 0 | 1    | 34 | 1 | 0 |   | 6  | 25 | 1 | 0 | 114 | 386 |
| 7:00 AM | 3    | 9  | 10 | 0 | 4    | 35 | 7  | 0 | 2    | 57 | 2 | 0 | 1 | .6 | 32 | 1 | 0 | 178 | 480 |
| 7:15 AM | 5    | 18 | 11 | 0 | 1    | 46 | 10 | 0 | 5    | 34 | 3 | 0 |   | 8  | 36 | 2 | 0 | 179 | 561 |
| 7:30 AM | 1    | 8  | 6  | 0 | 3    | 46 | 7  | 0 | 6    | 46 | 4 | 0 | 1 | 1  | 44 | 3 | 0 | 185 | 656 |
| 7:45 AM | 5    | 18 | 8  | 0 | 0    | 35 | 7  | 0 | 5    | 58 | 4 | 0 |   | 6  | 42 | 1 | 0 | 189 | 731 |
| 8:00 AM | 3    | 20 | 6  | 0 | 1    | 40 | 4  | 0 | 3    | 56 | 3 | 0 |   | 9  | 40 | 1 | 0 | 186 | 739 |
| 8:15 AM | 4    | 18 | 4  | 0 | 0    | 36 | 7  | 0 | 7    | 61 | 3 | 0 | 1 | 1  | 48 | 2 | 0 | 201 | 761 |
| 8:30 AM | 2    | 27 | 7  | 0 | 2    | 30 | 6  | 0 | 8    | 46 | 5 | 0 |   | 9  | 51 | 4 | 0 | 197 | 773 |
| 8:45 AM | 7    | 18 | 5  | 0 | 5    | 24 | 10 | 0 | 6    | 46 | 8 | 0 |   | 4  | 49 | 0 | 0 | 182 | 766 |
| 9:00 AM | 5    | 17 | 5  | 0 | 1    | 25 | 9  | 0 | 5    | 45 | 7 | 0 |   | 3  | 50 | 0 | 0 | 172 | 752 |
| 9:15 AM | 5    | 15 | 3  | 0 | 2    | 20 | 9  | 0 | 5    | 41 | 6 | 0 |   | 2  | 41 | 2 | 0 | 151 | 702 |
| 9:30 AM | 3    | 11 | 2  | 0 | 1    | 19 | 7  | 0 | 3    | 35 | 4 | 0 |   | 3  | 43 | 1 | 0 | 132 | 637 |
| 9:45 AM | 3    | 9  | 3  | 0 | 1    | 21 | 5  | 0 | 2    | 30 | 2 | 0 |   | 4  | 35 | 1 | 0 | 116 | 571 |

| HEAVY-VEHICLE | VOLUMES |         |          |         |         |          |         |         |          |         |         |          |         |    |
|---------------|---------|---------|----------|---------|---------|----------|---------|---------|----------|---------|---------|----------|---------|----|
| Time Period   | NB Left | NB Thru | NB Right | SB Left | SB Thru | SB Right | EB Left | EB Thru | EB Right | WB Left | WB Thru | WB Right | t Total |    |
| 6:00 AM       |         | 2       | 0        | 1       | 0       | 1        | 0       | 0       | 4        | 0       | 1       | 3        | 0       | 12 |
| 6:15 AM       |         | 1       | 0        | 2       | 0       | 0        | 0       | 0       | 4        | 1       | 1       | 4        | 0       | 13 |
| 6:30 AM       |         | 1       | 1        | 1       | 0       | 1        | 0       | 0       | 6        | 2       | 2       | 4        | 0       | 18 |
| 6:45 AM       |         | 2       | 0        | 1       | 0       | 0        | 0       | 0       | 7        | 1       | 1       | 5        | 0       | 17 |
| 7:00 AM       |         | 1       | 0        | 5       | 1       | 3        | 0       | 0       | 14       | 0       | 3       | 7        | 0       | 34 |
| 7:15 AM       |         | 2       | 1        | 6       | 0       | 4        | 0       | 1       | 12       | 2       | 1 :     | 10       | 0       | 39 |
| 7:30 AM       |         | 0       | 1        | 1       | 0       | 1        | 1       | 1       | 6        | 1       | 3       | 8        | 0       | 23 |
| 7:45 AM       |         | 1       | 1        | 3       | 0       | 3        | 1       | 0       | 7        | 3       | 2       | 9        | 0       | 30 |
| 8:00 AM       |         | 0       | 1        | 3       | 1       | 5        | 0       | 0       | 18       | 1       | 4       | 13       | 0       | 46 |
| 8:15 AM       |         | 2       | 2        | 1       | 0       | 2        | 0       | 1       | 15       | 0       | 4       | 22       | 1       | 50 |
| 8:30 AM       |         | 0       | 4        | 3       | 1       | 1        | 1       | 0       | 18       | 1       | 4       | 14       | 0       | 47 |
| 8:45 AM       |         | 1       | 4        | 2       | 0       | 1        | 0       | 0       | 14       | 1       | 2       | 13       | 0       | 38 |
| 9:00 AM       |         | 0       | 4        | 0       | 0       | 1        | 0       | 0       | 11       | 0       | 1       | 9        | 0       | 26 |
| 9:15 AM       |         | 1       | 2        | 2       | 0       | 1        | 0       | 0       | 8        | 1       | 1       | 8        | 0       | 24 |
| 9:30 AM       |         | 1       | 3        | 1       | 1       | 1        | 1       | 1       | 3        | 1       | 0       | 5        | 1       | 19 |
| 9:45 AM       |         | 0       | 2        | 1       | 0       | 0        | 0       | 0       | 3        | 0       | 0       | 2        | 0       | 8  |

#### QUALITY COUNTS REPORT

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Intersectio N London-Del Urbana-West Jefferson Rd City/State: West Jefferso OH QCJobNo: 16040802 ClientID: Date: 12/13/2022 Comments: Latitude/Lc 39.9665368 -83.3626 PEAK HOUI 5:00 PM

#### PHF 0.96

#### PEAK-HOUR VOLUMES

|           | NBLeft |    | NBThru | NBRight | SBLeft | SBThru | SBRight | EBLeft | EBThru | EBRight | WBLeft | WBThru | WBRight |
|-----------|--------|----|--------|---------|--------|--------|---------|--------|--------|---------|--------|--------|---------|
| Total     |        | 32 | 237    | 60      | 6      | 87     | 16      | 3      | 2 208  | 18      | 28     | 246    | 10      |
| Heavy Veh | n'     | 5  | 10     | 11      | 0      | 7      | 3       |        | 6 26   | 5       | 17     | 40     | 0       |
| Passenger |        | 27 | 227    | 49      | 6      | 80     | 13      | 2      | 6 182  | 13      | 11     | 206    | 10      |

#### PERCENT HEAVY VEHICLES

 NBLeft
 NBThru
 NBRight
 SBLeft
 SBRight
 EBLeft
 EBThru
 EBRight
 WBLeft
 WBThru
 WBRight

 HEAVY VEI
 15.6
 4.2
 18.3
 0
 8
 18.8
 12.5
 27.8
 60.7
 16.3
 0

 BUSES

 4.2
 18.3
 18.8
 12.5
 27.8
 60.7
 16.3
 0

#### PEAK-HOUR VOLUMES - PEDESTRIANS

Leg/Crossv South North West East 0 0 0 0

#### ALL-VEHICLE VOLUMES

| Time Perio NB Left |    | NB Thru | NB Right | NB U-Turn N | B RTOR SB | Left | SB Thru | SB Right | SB U-Turn S | B RTOR EB | Left E | B Thru | EB Right | EB U-Turr | EB RTOR | WB Left | WB Thru | WB Right | WB U-Turn WB RTC | R Total | Ho  | urly Totals |
|--------------------|----|---------|----------|-------------|-----------|------|---------|----------|-------------|-----------|--------|--------|----------|-----------|---------|---------|---------|----------|------------------|---------|-----|-------------|
| 3:00 PM            | 3  | 40      | ) 1      | 1 0         |           | 1    | 11      | . :      | 3 0         |           | 7      | 29     | )        | 1 (       | )       | 3       | 33      | 1        | 0                | 1       | 43  |             |
| 3:15 PM            | 2  | 44      | 1 1      | 2 0         |           | 1    | 12      | : :      | L 0         |           | 6      | 33     | 3        | 1 (       | )       | 2       | 36      | 1        | 0                | 1       | 51  |             |
| 3:30 PM            | 1  | 39      | ) 1      | 5 0         |           | 2    | g       | ) :      | L 0         |           | 3      | 36     | 6        | 0 (       | )       | 2       | 45      | 0        | 0                | 1       | 53  |             |
| 3:45 PM            | 3  | 41      | L 1      | 3 0         |           | 0    | 15      | . :      | L 0         |           | 5      | 35     | 5        | 2 (       | )       | 6       | 41      | 0        | 0                | 1       | 62  | 609         |
| 4:00 PM            | 10 | 61      | L 19     | 90          |           | 3    | 19      |          | 5 0         |           | 9      | 44     | Ļ.       | 2 (       | )       | 11      | 57      | 3        | 0                | 2       | 244 | 710         |
| 4:15 PM            | 3  | 68      | 3 1      | 7 0         |           | 1    | 27      | ' !      | 5 0         |           | 10     | 53     | 3 1      | 8 (       | )       | 7       | 56      | 1        | 0                | 2       | 256 | 815         |
| 4:30 PM            | 14 | 68      | 3 1      | 2 0         |           | 2    | 16      | 6 3      | 3 0         |           | 6      | 45     | 5        | 5 (       | )       | 4       | 68      | 3        | 0                | 2       | 46  | 908         |
| 4:45 PM            | 5  | 40      | ) 1      | 2 0         |           | 0    | 25      |          | 2 0         |           | 7      | 66     | 5        | 3 (       | )       | 6       | 65      | 3        | 0                | 2       | 234 | 980         |
| 5:00 PM            | 2  | 43      | 3 1      | 5 0         |           | 5    | 20      | ) !      | 5 0         |           | 12     | 45     | 5        | 5 (       | )       | 12      | 63      | 1        | 0                | 2       | 28  | 964         |
| 5:15 PM            | 4  | 45      | 5 8      | в О         |           | 1    | 18      | : :      | 3 0         |           | 5      | 48     | 3        | 3 (       | )       | 10      | 53      | 3        | 0                | 2       | 201 | 909         |
| 5:30 PM            | 1  | 37      | 7 1      | 5 0         |           | 0    | 37      | ' :      | 3 0         |           | 7      | 43     | 3        | 5 (       | )       | 2       | 41      | 2        | 0                | 1       | 93  | 856         |
| 5:45 PM            | 2  | 36      | 5 10     | 0 0         |           | 0    | 26      | i (      | 5 0         |           | 3      | 49     | )        | 3 (       | )       | 10      | 47      | 5        | 0                | 1       | 97  | 819         |
| 6:00 PM            | 1  | 33      | 3 1      | 1 0         |           | 0    | 25      | . !      | 5 0         |           | 2      | 45     | 5        | 2 (       | )       | 8       | 41      | 3        | 0                | 1       | 76  | 767         |
| 6:15 PM            | 1  | 29      | 9 9      | ə 0         |           | 0    | 26      | j 4      | 1 0         |           | 2      | 41     |          | 3 (       | )       | 4       | 39      | 2        | 0                | 1       | 60  | 726         |
| 6:30 PM            | 0  | 31      | Li       | в О         |           | 1    | 19      | ) 3      | 3 0         |           | 1      | 42     | 2        | 2 (       | )       | 3       | 35      | 2        | 0                | 1       | 47  | 680         |
| 6:45 PM            | 1  | 28      | 3 9      | 9 0         |           | 0    | 21      | . :      | 3 0         |           | 0      | 37     | ,        | 1 (       | )       | 4       | 35      | 1        | 0                | 1       | 40  | 623         |
|                    |    |         |          |             |           |      |         |          |             |           |        |        |          |           |         |         |         |          |                  |         |     |             |

| HEAVY-VEHICLE VOL  | UMES    |          |         |         |          |         |         |            |           |        |           |          |       |          |
|--------------------|---------|----------|---------|---------|----------|---------|---------|------------|-----------|--------|-----------|----------|-------|----------|
| Time Perio NB Left | NB Thru | NB Right | SB Left | SB Thru | SB Right | EB Left | EB Thru | u EB Right | t WB Left | WB Thr | u WB Righ | it Total | Hourl | y Totals |
| 3:00 PM            | 0       | 2        | 1       | 0       | 0        | 0       | 0       | 2          | 0         | 1      | 8         | 1        | 15    |          |
| 3:15 PM            | 0       | 1        | 2       | 0       | 0        | 1       | 1       | 2          | 1         | 1      | 7         | 0        | 16    |          |
| 3:30 PM            | 1       | 0        | 2       | 0       | 1        | 0       | 0       | 3          | 2         | 4      | 5         | 0        | 18    |          |
| 3:45 PM            | 1       | 0        | 1       | 0       | 1        | 0       | 0       | 2          | 0         | 2      | 8         | 0        | 15    | 64       |
| 4:00 PM            | 2       | 3        | 6       | 0       | 3        | 2       | 0       | 5          | 0         | 5      | 15        | 0        | 41    | 90       |
| 4:15 PM            | 0       | 5        | 3       | 0       | 3        | 0       | 3       | 7          | 4         | 5      | 11        | 0        | 41    | 115      |
| 4:30 PM            | 1       | 1        | 0       | 0       | 0        | 0       | 0       | 3          | 1         | 2      | 8         | 0        | 16    | 113      |
| 4:45 PM            | 2       | 1        | 2       | 0       | 1        | 1       | 3       | 11         | 0         | 5      | 6         | 0        | 32    | 130      |
| 5:00 PM            | 1       | 8        | 5       | 0       | 4        | 0       | 1       | 12         | 1         | 6      | 8         | 0        | 46    | 135      |
| 5:15 PM            | 3       | 2        | 3       | 0       | 3        | 0       | 0       | 5          | 1         | 2      | 5         | 0        | 24    | 118      |
| 5:30 PM            | 0       | 2        | 2       | 0       | 5        | 1       | 0       | 4          | 2         | 1      | 5         | 0        | 22    | 124      |
| 5:45 PM            | 1       | 0        | 0       | 0       | 2        | 1       | 0       | 5          | 1         | 3      | 5         | 1        | 19    | 111      |
| 6:00 PM            | 0       | 0        | 1       | 0       | 2        | 1       | 0       | 4          | 0         | 1      | 4         | 0        | 13    | 78       |
| 6:15 PM            | 1       | 1        | 0       | 0       | 3        | 1       | 0       | 3          | 1         | 1      | 4         | 0        | 15    | 69       |
| 6:30 PM            | 0       | 2        | 1       | 0       | 2        | 0       | 1       | 1          | 2         | 0      | 2         | 0        | 11    | 58       |
| 6:45 PM            | 1       | 1        | 0       | 0       | 1        | 0       | 1       | 2          | 1         | 1      | 3         | 0        | 11    | 50       |

# **APPENDIX C**

Future Traffic Volumes Future Traffic Volumes TFMS Output

### **Traffic Volume Calculations** US-42 at SR-29 Safety Study



Source: Traffic Access Study for the Proposed US 42 Warehouse Development, CEC, 06/07/2023

US-42 SR-29 Growth Factors 2043 0.4 %/yr 1.08 0.3 %/yr 1.06 1.8 %/yr 1.38 1.5 %/yr 1.32

4. Heavy Truck-% Obtained from TFMS TD-% Output in lieu of the Traffic Access Study

OHIO DEPARTMENT OF TRANSPORTATION

## **TFMS - Segment Forecast Report**

| Username   | Email               | Script Import Date   | Script Version | Model Version |
|------------|---------------------|----------------------|----------------|---------------|
| Ghansel    | ghansel@cmtengr.com | 4/14/2020 5:30:19 PM | 2020.001       | 2023.1900     |
|            |                     | Forecast Summ        | ary            |               |
| Project ID |                     | Project Name         | Opening Year   | Design Year   |
|            | US-42 a             | t SR-29 Safety Study | 2023           | 2043          |

#### **Project Description**

\*Users of this data need to be aware that there are limitations to the forecasts generated by this product that make it suitable only for roadway design projects which are low risk.

## Segment Information

| Segment ID | LRS ID         | BMP    | EMP    | Length | Latitude          | Longitude        |
|------------|----------------|--------|--------|--------|-------------------|------------------|
| 1850450    | SMADSR00029**C | 8.570  | 9.589  | 1.019  | -83.3704992864957 | 39.9706541780601 |
| 1850452    | SMADSR00029**C | 9.589  | 10.418 | 0.829  | -83.3560490331477 | 39.9631788285228 |
| 1850749    | SMADUS00042**C | 13.155 | 13.998 | 0.843  | -83.3678506417906 | 39.9620060315064 |
| 1850755    | SMADUS00042**C | 13.998 | 14.831 | 0.833  | -83.3573006438278 | 39.9710356454198 |

## Forecast Information

| Segment ID | 2023 AADT | 2043 AADT | DHV-30 | K%   | D%   | T24% | TD% |
|------------|-----------|-----------|--------|------|------|------|-----|
| 1850450    | 5,100     | 5,700     | 700    | 11.9 | 61.4 | 19   | 14  |
| 1850452    | 5,100     | 5,600     | 650    | 11.9 | 61.4 | 20   | 15  |
| 1850749    | 6,500     | 9,300     | 1,100  | 12.0 | 50.9 | 21   | 18  |
| 1850755    | 6,900     | 9,500     | 1,000  | 11.0 | 51.6 | 23   | 20  |



### Definitions:

- AADT Annual Average Daily Traffic
   DHV30 Design Hour Volume for 30th highest hour of the year
   DHV30 K \* AADT

- o K % Design Hour Factor
  o D % Peak Direction Factor
  o T24 % Percent Daily Trucks
  o TD % Percent Design Hour Trucks

| Forecast Segment ID | Route          | BMP   | EMP   |
|---------------------|----------------|-------|-------|
| 1850450             | SMADSR00029**C | 8.570 | 9.589 |

|       |              |                  | Forecast |           |                  |                      |
|-------|--------------|------------------|----------|-----------|------------------|----------------------|
| Year  | K%           | T24 % (Existing) | PA AADT  | PA Method | PA Growth Rate % | PA Calculated Rate % |
| 2050  | 11.9         | 17               | 4,800    | Average   | 0.400            | 0.400                |
| AADT  | D%           | TD % (Existing)  | BC AADT  | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 6,000 | <b>6</b> 1.4 | 12               | 1,200    | Model     | 1.400            | 1.400                |

♦ K/D factors from TCDS were used.

|                        |                             |             | ĺ             | Regression    |         |         |               |               |  |
|------------------------|-----------------------------|-------------|---------------|---------------|---------|---------|---------------|---------------|--|
| Metho                  | d Number                    |             | PA AADT       |               | BC AADT |         | AADT          |               |  |
|                        | 2                           |             | 5,322         |               | 1,645   |         | 6,967         |               |  |
| 95% Confidence Min/Max |                             |             |               |               |         |         |               |               |  |
| PA Min                 | PA Min PA Max BC Min BC Max |             |               |               |         | Y       | ′ear          |               |  |
| 4131                   |                             | 6256        |               | 467 2133      |         |         | 2050          |               |  |
| Method Number          | PA Growth %                 | BC Growth % | PA Drop Count | BC Drop Count | PA AADT | BC AADT | PA Adjustment | PA Adjustment |  |
| 1                      | 0.86                        | 2.92        | 0             | 0             | 5,244   | 1,528   | 5,289         | 1,544         |  |
| 2                      | 0.89                        | 3.34        | 4             | 2             | 5,308   | 1,631   | 5,322         | 1,645         |  |
| 3                      | 1.00                        | 1.52        | 0             | 0             | 5,428   | 1,147   | 5,449         | 1,212         |  |
| 4                      | 0.99                        | 0.02        | 4             | 6             | 5,442   | 681     | 5,441         | 855           |  |
| 5                      | 1.04                        | 1.97        | 0             | 0             | 5,479   | 1,266   | 5,496         | 1,320         |  |
| 6                      | 0.93                        | 2.32        | 4             | 5             | 5,369   | 1,384   | 5,372         | 1,403         |  |

|    | Adjustment Info            |                           |                     |                         |                              |                     |                              |  |  |  |
|----|----------------------------|---------------------------|---------------------|-------------------------|------------------------------|---------------------|------------------------------|--|--|--|
| ID | Adjustment<br>Methods Name | Model vs<br>Count<br>AADT | Adjusted<br>AADT    | Model vs<br>Count<br>BC | Adjusted<br>BC               | PA Growth<br>Rate % | BC Growth<br>Rate %          |  |  |  |
| 1  | DIF                        | -4,238                    | 5,488 10            |                         | 1,181                        | 0.04                | 1.39                         |  |  |  |
| 2  | RAT                        | 0.55                      | 5,316 1.01          |                         | 1,185                        | -0.11               | 1.41                         |  |  |  |
| 3  | MRAT                       | 1.04                      | 5,322 1.39          |                         | 1,184                        | -0.10               | 1.40                         |  |  |  |
| 4  | RAF                        |                           | 5,405               |                         | 1,183                        | -0.03               | 1.40                         |  |  |  |
| Ac | Adjust Method<br>AADT      |                           | Adjust Method<br>BC |                         | Selected PA Growth<br>Rate % |                     | Selected BC Growth<br>Rate % |  |  |  |
|    | Average                    |                           | Average             |                         | 0.000                        |                     | 1.400                        |  |  |  |

## Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total MaxVolume |
|---------------|---------------|---------------|---------------|------------------|-----------------|
| 4131          | 4307          | 1181          | 1185          | 5312             | 5492            |

| Process Flag: | Adjusted model to counts with process per ODOT 255 spreadsheet |
|---------------|--|
| Comment:      |  |
|               | No Comment   |

| Historical Count |       |       |        |  |  |  |  |  |
|------------------|-------|-------|--------|--|--|--|--|--|
| Year             | All   | Cars  | Trucks |  |  |  |  |  |
| 2007             | 4,070 | 3,710 | 360    |  |  |  |  |  |
| 2011             | 4,450 | 3,780 | 670    |  |  |  |  |  |
| 2013             | 4,589 | 3,898 | 691    |  |  |  |  |  |
| 2016             | 4,542 | 3,884 | 657    |  |  |  |  |  |
| 2019             | 4,814 | 4,130 | 684    |  |  |  |  |  |
| * 2022           | 5,108 | 4,258 | 850    |  |  |  |  |  |

\* Pivot Point



| Segment ID | LRS ID         | BMP   | EMP   | Length | Yr 2023<br>AADT | Yr 2043<br>AADT | DHV30 | K %  | D %  | T24 % | TD % |
|------------|----------------|-------|-------|--------|-----------------|-----------------|-------|------|------|-------|------|
| 1850450    | SMADSR00029**C | 8.570 | 9.589 | 1.019  | 5,100           | 5,700           | 700   | 11.9 | 61.4 | 19    | 14   |

| Forecast Segment ID | Route          | BMP   | EMP    |
|---------------------|----------------|-------|--------|
| 1850452             | SMADSR00029**C | 9.589 | 10.418 |

|       |   |      |                  | Forecast |           |                  |                      |
|-------|---|------|------------------|----------|-----------|------------------|----------------------|
| Year  |   | K%   | T24 % (Existing) | PA AADT  | PA Method | PA Growth Rate % | PA Calculated Rate % |
| 2050  | • | 11.9 | 17               | 4,600    | Average   | 0.300            | 0.300                |
| AADT  |   | D%   | TD % (Existing)  | BC AADT  | BC Method | BC Growth Rate % | BC Calculated Rate % |
| 5,800 | • | 61.4 | 12               | 1,200    | Model     | 1.400            | 1.400                |

♦ K/D factors from TCDS were used.

|                     | Regression |         |      |  |  |  |  |  |
|---------------------|------------|---------|------|--|--|--|--|--|
| Method Number       | PA AADT    | BC AADT | AADT |  |  |  |  |  |
| 2 5,322 1,645 6,967 |            |         |      |  |  |  |  |  |

#### 95% Confidence Min/Max

| PA Min        |           | PA Max        |           | BC Min |               | BC Max |        | ٢       | Year          |               |
|---------------|-----------|---------------|-----------|--------|---------------|--------|--------|---------|---------------|---------------|
| 3780          |           | 6256          |           | 467    |               | 2133   |        | 2       | 2050          |               |
| Method Number | PA Growth | % BC Growth % | PA Drop C | ount   | BC Drop Count | F      | A AADT | BC AADT | PA Adjustment | PA Adjustment |
| 1             | 0.86      | 2.92          | 0         |        | 0             |        | 5,244  | 1,528   | 5,289         | 1,544         |
| 2             | 0.89      | 3.34          | 4         |        | 2             |        | 5,308  | 1,631   | 5,322         | 1,645         |
| 3             | 1.00      | 1.52          | 0         |        | 0             |        | 5,428  | 1,147   | 5,449         | 1,212         |
| 4             | 0.99      | 0.02          | 4         |        | 6             |        | 5,442  | 681     | 5,441         | 855           |
| 5             | 1.04      | 1.97          | 0         |        | 0             |        | 5,479  | 1,266   | 5,496         | 1,320         |
| 6             | 0.93      | 2.32          | 4         |        | 5             |        | 5,369  | 1,384   | 5,372         | 1,403         |

|    | Adjustment Info            |                           |                     |                         |                              |                     |                              |  |  |  |
|----|----------------------------|---------------------------|---------------------|-------------------------|------------------------------|---------------------|------------------------------|--|--|--|
| ID | Adjustment<br>Methods Name | Model vs<br>Count<br>AADT | Adjusted<br>AADT    | Model vs<br>Count<br>BC | Adjusted<br>BC               | PA Growth<br>Rate % | BC Growth<br>Rate %          |  |  |  |
| 1  | DIF                        | -3,347                    | 4,971 -21           |                         | 1,191                        | -0.40               | 1.43                         |  |  |  |
| 2  | RAT                        | 0.60                      | 5,025 0.98          |                         | 1,182                        | -0.35               | 1.39                         |  |  |  |
| 3  | MRAT                       | 0.98                      | 5,025               | 1.39                    | 1,185                        | -0.35               | 1.41                         |  |  |  |
| 4  | RAF                        |                           | 4,998               |                         | 1,188                        | -0.38               | 1.42                         |  |  |  |
| Ac | Adjust Method<br>AADT      |                           | Adjust Method<br>BC |                         | Selected PA Growth<br>Rate % |                     | Selected BC Growth<br>Rate % |  |  |  |
|    | Ratio                      |                           | Average             |                         | -0.400                       |                     | 1.400                        |  |  |  |

## Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total MaxVolume |
|---------------|---------------|---------------|---------------|------------------|-----------------|
| 3780          | 3843          | 1182          | 1191          | 4962             | 5034            |

| Process Flag: | Adjusted model to counts with process per ODOT 255 spreadsheet |  |  |  |  |  |  |
|---------------|--|--|--|--|--|--|--|
| Comment:      |  |  |  |  |  |  |  |
|               | No Comment   |  |  |  |  |  |  |

| Historical Count |       |       |        |  |  |  |  |  |
|------------------|-------|-------|--------|--|--|--|--|--|
| Year             | All   | Cars  | Trucks |  |  |  |  |  |
| 2007             | 4,070 | 3,710 | 360    |  |  |  |  |  |
| 2011             | 4,450 | 3,780 | 670    |  |  |  |  |  |
| 2013             | 4,589 | 3,898 | 691    |  |  |  |  |  |
| 2016             | 4,542 | 3,884 | 657    |  |  |  |  |  |
| 2019             | 4,814 | 4,130 | 684    |  |  |  |  |  |
| * 2022           | 5,108 | 4,258 | 850    |  |  |  |  |  |

\* Pivot Point



| Segr | ment ID | LRS ID         | BMP   | EMP    | Length | Yr 2023<br>AADT | Yr 2043<br>AADT | DHV30 | K %  | D %  | T24 % | TD % |
|------|---------|----------------|-------|--------|--------|-----------------|-----------------|-------|------|------|-------|------|
| 185  | 50452   | SMADSR00029**C | 9.589 | 10.418 | 0.829  | 5,100           | 5,600           | 650   | 11.9 | 61.4 | 20    | 15   |
| Forecast Segment ID | Route          | BMP    | EMP    |
|---------------------|----------------|--------|--------|
| 1850749             | SMADUS00042**C | 13.155 | 13.998 |

| Forecast |   |      |                  |         |           |                  |                      |  |
|----------|---|------|------------------|---------|-----------|------------------|----------------------|--|
| Year     |   | K%   | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |  |
| 2050     | • | 12.0 | 17               | 8,000   | Model     | 1.800            | 1.800                |  |
| AADT     |   | D%   | TD % (Existing)  | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |  |
| 10,300   | • | 50.9 | 14               | 2,300   | Average   | 5.800            | 4.000                |  |

Warning: The truck growth rate was exceeded the maximum and was capped at 5.800%

K/D factors from TCDS were used.

|                                    | Regression |  |  |  |  |  |  |  |
|------------------------------------|------------|--|--|--|--|--|--|--|
| Method Number PA AADT BC AADT AADT |            |  |  |  |  |  |  |  |
| 2 9,927 2,002 11,929               |            |  |  |  |  |  |  |  |

#### 95% Confidence Min/Max

| PA Min        |           | PA Max        |            | BC Min |               |          | BC Max  | ١        | ′ear          |               |     |
|---------------|-----------|---------------|------------|--------|---------------|----------|---------|----------|---------------|---------------|-----|
| 3320          |           | 12082         |            | 563    |               | 563 4799 |         | 563 4799 |               | 2             | 050 |
| Method Number | PA Growth | % BC Growth % | PA Drop Co | ount   | BC Drop Count | P        | PA AADT | BC AADT  | PA Adjustment | PA Adjustment |     |
| 1             | 2.05      | 2.44          | 0          |        | 0             |          | 8,748   | 1,762    | 8,348         | 1,820         |     |
| 2             | 3.12      | 3.04          | 6          |        | 2             |          | 10,307  | 1,949    | 9,927         | 2,002         |     |
| 3             | 1.93      | 1.74          | 0          |        | 0             |          | 8,541   | 1,521    | 8,167         | 1,609         |     |
| 4             | 3.74      | 3.96          | 6          |        | 2             |          | 11,330  | 2,264    | 10,861        | 2,283         |     |
| 5             | 1.03      | 3.96          | 0          |        | 0             |          | 7,062   | 2,264    | 6,826         | 2,283         |     |
| 6             | 0.70      | 4.07          | 5          |        | 5             |          | 6,385   | 2,310    | 6,347         | 2,315         |     |

|    | Adjustment Info            |                           |                              |                         |                              |                     |                              |  |  |
|----|----------------------------|---------------------------|------------------------------|-------------------------|------------------------------|---------------------|------------------------------|--|--|
| ID | Adjustment<br>Methods Name | Model vs<br>Count<br>AADT | Adjusted<br>AADT             | Model vs<br>Count<br>BC | Adjusted<br>BC               | PA Growth<br>Rate % | BC Growth<br>Rate %          |  |  |
| 1  | DIF                        | -301                      | 11,709                       | -2,042                  | 4,799                        | 1.08                | 12.27                        |  |  |
| 2  | RAT                        | 0.95                      | ).95 11,469 0.3 <sup>4</sup> |                         | 2,369                        | 2.56                | 4.25                         |  |  |
| 3  | MRAT                       | 1.80                      | 11,575                       | 2.19                    | 3,689                        | 1.74                | 8.61                         |  |  |
| 4  | RAF                        |                           | 11,642                       |                         | 4,244                        | 1.41                | 10.44                        |  |  |
| Ac | ljust Method<br>AADT       |                           | Adjust Method<br>BC          |                         | Selected PA Growth<br>Rate % |                     | Selected BC Growth<br>Rate % |  |  |
|    | Average                    |                           | Model Ratio                  |                         | 1.800                        |                     | 8.600                        |  |  |

## Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total MaxVolume |
|---------------|---------------|---------------|---------------|------------------|-----------------|
| 6910          | 9100          | 2369          | 4799          | 9279             | 13899           |

| Process Flag: | Adjusted model to counts with process per ODOT 255 spreadsheet |  |  |  |  |  |  |
|---------------|--|--|--|--|--|--|--|
| Comment:      |  |  |  |  |  |  |  |
|               | No Comment   |  |  |  |  |  |  |

| Historical Count |       |       |        |  |  |  |  |  |
|------------------|-------|-------|--------|--|--|--|--|--|
| Year             | All   | Cars  | Trucks |  |  |  |  |  |
| 2007             | 4,590 | 4,020 | 570    |  |  |  |  |  |
| 2011             | 5,207 | 4,290 | 917    |  |  |  |  |  |
| 2014             | 5,669 | 4,928 | 740    |  |  |  |  |  |
| 2016             | 6,058 | 5,266 | 791    |  |  |  |  |  |
| 2019             | 6,640 | 5,730 | 910    |  |  |  |  |  |
| * 2022           | 6,384 | 5,302 | 1,082  |  |  |  |  |  |

\* Pivot Point



| Segment ID | LRS ID         | BMP    | EMP    | Length | Yr 2023<br>AADT | Yr 2043<br>AADT | DHV30 | K %  | D %  | T24 % | TD % |
|------------|----------------|--------|--------|--------|-----------------|-----------------|-------|------|------|-------|------|
| 1850749    | SMADUS00042**C | 13.155 | 13.998 | 0.843  | 6,500           | 9,300           | 1100  | 12.0 | 50.9 | 21    | 18   |

| Forecast Segment ID | Route          | BMP    | EMP    |
|---------------------|----------------|--------|--------|
| 1850755             | SMADUS00042**C | 13.998 | 14.831 |

| Forecast |   |      |                  |         |           |                  |                      |  |
|----------|---|------|------------------|---------|-----------|------------------|----------------------|--|
| Year     |   | K%   | T24 % (Existing) | PA AADT | PA Method | PA Growth Rate % | PA Calculated Rate % |  |
| 2050     | • | 11.0 | 17               | 8,000   | Model     | 1.500            | 1.500                |  |
| AADT     |   | D%   | TD % (Existing)  | BC AADT | BC Method | BC Growth Rate % | BC Calculated Rate % |  |
| 10,500   | • | 51.6 | 15               | 2,500   | Average   | 4.300            | 4.000                |  |

Warning: The truck growth rate was exceeded the maximum and was capped at 4.300%

K/D factors from TCDS were used.

|                                    | Regression |  |  |  |  |  |  |  |
|------------------------------------|------------|--|--|--|--|--|--|--|
| Method Number PA AADT BC AADT AADT |            |  |  |  |  |  |  |  |
| 2 5,996 1,370 7,366                |            |  |  |  |  |  |  |  |

#### 95% Confidence Min/Max

| PA Min        |           | PA Max        | BC Min        |     |               |   | BC Max  | Y       | Year          |               |  |  |
|---------------|-----------|---------------|---------------|-----|---------------|---|---------|---------|---------------|---------------|--|--|
| 3565          |           | 11760         |               | 763 |               |   |         | 4911    | 2             | 2050          |  |  |
| Method Number | PA Growth | % BC Growth % | PA Drop Count |     | BC Drop Count | P | PA AADT | BC AADT | PA Adjustment | PA Adjustment |  |  |
| 1             | 0.99      | 1.48          | 0             |     | 0             |   | 6,702   | 1,554   | 7,111         | 1,665         |  |  |
| 2             | 0.27      | 0.59          | 6             |     | 6             |   | 5,108   | 1,121   | 5,996         | 1,370         |  |  |
| 3             | 1.51      | 2.32          | 0             |     | 0             |   | 7,635   | 1,869   | 7,927         | 1,941         |  |  |
| 4             | 0.48      | 3.47          | 6             |     | 2             |   | 5,461   | 2,287   | 6,318         | 2,320         |  |  |
| 5             | 2.37      | 3.47          | 0             |     | 0             |   | 9,115   | 2,287   | 9,268         | 2,320         |  |  |
| 6             | 2.61      | 3.67          | 5             |     | 5             |   | 9,644   | 2,384   | 9,642         | 2,388         |  |  |

|    | Adjustment Info            |                           |                     |                         |                              |                     |                              |  |  |  |  |  |  |
|----|----------------------------|---------------------------|---------------------|-------------------------|------------------------------|---------------------|------------------------------|--|--|--|--|--|--|
| ID | Adjustment<br>Methods Name | Model vs<br>Count<br>AADT | Adjusted<br>AADT    | Model vs<br>Count<br>BC | Adjusted<br>BC               | PA Growth<br>Rate % | BC Growth<br>Rate %          |  |  |  |  |  |  |
| 1  | DIF                        | -309                      | 09 11,844 -2,016    |                         | 4,911                        | 0.87                | 11.33                        |  |  |  |  |  |  |
| 2  | RAT                        | 0.96                      | 11,620 0.37         |                         | 2,554                        | 2.24                | 4.18                         |  |  |  |  |  |  |
| 3  | MRAT                       | 1.72                      | 11,714 2.1          |                         | 3,825                        | 1.49                | 8.03                         |  |  |  |  |  |  |
| 4  | RAF                        |                           | 11,779              |                         | 4,368                        | 1.18                | 9.68                         |  |  |  |  |  |  |
| Ad | just Method<br>AADT        |                           | Adjust Method<br>BC |                         | Selected PA Growth<br>Rate % |                     | Selected BC Growth<br>Rate % |  |  |  |  |  |  |
|    | Average                    |                           | Model Ratio         |                         | 1.500                        |                     | 8.000                        |  |  |  |  |  |  |

## Method 1 - 4 Volume

| PA Min Volume | PA Max Volume | BC Min Volume | BC Max Volume | Total Min Volume | Total MaxVolume |
|---------------|---------------|---------------|---------------|------------------|-----------------|
| 6933          | 9066          | 2554          | 4911          | 9487             | 13977           |

| Process Flag: | Adjusted model to counts with process per ODOT 255 spreadsheet |  |  |  |  |  |  |  |
|---------------|--|--|--|--|--|--|--|--|
| Comment:      |  |  |  |  |  |  |  |  |
|               | No Comment   |  |  |  |  |  |  |  |

| Historical Count |       |       |        |  |  |  |  |  |  |
|------------------|-------|-------|--------|--|--|--|--|--|--|
| Year             | All   | Cars  | Trucks |  |  |  |  |  |  |
| 2007             | 5,440 | 4,560 | 880    |  |  |  |  |  |  |
| 2011             | 5,491 | 4,612 | 879    |  |  |  |  |  |  |
| 2014             | 5,241 | 4,402 | 839    |  |  |  |  |  |  |
| 2016             | 5,601 | 4,704 | 897    |  |  |  |  |  |  |
| 2019             | 5,713 | 4,742 | 971    |  |  |  |  |  |  |
| * 2022           | 6,746 | 5,569 | 1,177  |  |  |  |  |  |  |

\* Pivot Point



| Segment ID | LRS ID         | BMP    | EMP    | Length | Yr 2023<br>AADT | Yr 2043<br>AADT | DHV30 | K %  | D %  | T24 % | TD % |
|------------|----------------|--------|--------|--------|-----------------|-----------------|-------|------|------|-------|------|
| 1850755    | SMADUS00042**C | 13.998 | 14.831 | 0.833  | 6,900           | 9,500           | 1000  | 11.0 | 51.6 | 23    | 20   |

## **APPENDIX D**

**Crash Diagram** 

#### **TYPE OF CRASHES**

- 17 REAR END
- 8 ANGLE
- 4 LEFT TURN
- 1 FIXED OBJECT
- 1 SIDESWIPE OPPOSITE
- 1 SIDESWIPE PASSING

<u>TOTAL: 32</u>

### **CRASH SEVERITY**

17 - PDO CRASHES 14 - INJURY CRASHES 1 - FATAL

5 CRASHES - WEST APPROACH 4 REAR END (4 FTC), 1 SIDESWIPE-PASSING (I STA) 1 INJURY, 1 WET, 2 DARK - ROADWAY NOT LIGHTED

4 CRASHES - WEST INTERSECTION 2 LEFT TURN (I FTY, I RRL), I FIXED OBJECT (I DOR), 1 ANGLE (I RRL) 3 INJURIES, 1 WET, 2 DARK - ROADWAY NOT LIGHTED

7 CRASHES - NORTH APPROACH 7 REAR END (7 FTC) 0 INJURIES, 3 WET, 1 DARK - ROADWAY NOT LIGHTE

<u>3 CRASHES - NORTH INTERSECTION</u> 2 ANGLE (2 RRL), 1 LEFT TURN (1 FTY) 1, FATAL, 1 INJURY, 2 DARK - ROADWAY NOT LIGHTED

E.

4 CRASHES - EAST INTERSECTION

2 CRASHES - SOUTH INTERSECTION 2 ANGLE (2 RRL) 1 INJURY, 1 WET

4 CRASHES - SOUTH APPROACH 3 REAR END (3 FTC), I SIDESWIPE-OPPOSITE (I LOC) 3 INJURIES, I WET, 2 DARK - ROADWAY NOT LIGHTED

1\*

|              |                  |               |          |               |    |                  | 1   |                       |        |                      |           |             |             |               |                |
|--------------|------------------|---------------|----------|---------------|----|------------------|-----|-----------------------|--------|----------------------|-----------|-------------|-------------|---------------|----------------|
| 0            |                  | TYPES OF (    | CRASHES  | 5             | :  | SYMBOLS          |     | CONTRIBUTI            | NG FAC | TORS                 |           | CD          | A C LI      |               |                |
|              | _ <b>_</b> ►_► [ | Rear End      | _(F)►    | Fixed Object  |    | Moving Vehicle   | FTY | Failure to Yield      | ILC    | Improper Lane Change |           | <b>U</b> RI | <b>4</b> 3П | DIAG          |                |
|              | ,                | Angle         | *        | Pedestrian    | ⊢► | Slow/Stopped     | RRL | Ran Red Light         | IP     | Improper Passing     | LOG POINT |             |             |               |                |
|              |                  | Side Swipe    | , ∧<br>↓ |               | *  | Vehicle at Fault | FTC | Following Too Closely | LOC    | Left of Center       | PERIOD    | 5 Years     | FROM _      | 2018          | то             |
| $\mathbf{M}$ |                  | Right Turning |          | Loft Turning  |    |                  | IC  | Improper Crossing     | DOR    | Drove off Road       |           | אר          | Jefferso    | n Township, M | Madison Count  |
|              | <b>†</b>         |               |          | - Leit ruming |    |                  | IT  | Improper Turn         | USS    | Unsafe Speed         |           |             |             | State Route   | 29 at US Route |
|              | -** -            | Backing Up    |          |               |    |                  | OIA | Other Improper Action | STA    | Swerving to Avoid    | ROUTE NAM | IE / NUMBER |             |               |                |

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



# **APPENDIX E**

## Crash Summary (CAM Tool Output)

**Crash Summary Sheet** 

| Fatalities       | 1  |
|------------------|----|
| Serious Injuries | 3  |
| Other Injuries   | 20 |

| Crash Severity               | Crashes | %       |
|------------------------------|---------|---------|
| (1) Fatal                    | 1       | 3.13%   |
| (2) Serious Injury Suspected | 2       | 6.25%   |
| (3) Minor Injury Suspected   | 10      | 31.25%  |
| (4) Injury Possible          | 2       | 6.25%   |
| (5) PDO/No Injury            | 17      | 53.13%  |
| Grand Total                  | 32      | 100.00% |

| Day of Week   | Crashes | %       |
|---------------|---------|---------|
| (1) Sunday    | 3       | 9.38%   |
| (2) Monday    | 7       | 21.88%  |
| (3) Tuesday   | 5       | 15.63%  |
| (4) Wednesday | 4       | 12.50%  |
| (5) Thursday  | 6       | 18.75%  |
| (6) Friday    | 6       | 18.75%  |
| (7) Saturday  | 1       | 3.13%   |
| Grand Total   | 32      | 100 00% |

| Hour of Day | Crashes | %       |
|-------------|---------|---------|
| 2           | 1       | 3.13%   |
| 4           | 1       | 3.13%   |
| 5           | 1       | 3.13%   |
| 6           | 3       | 9.38%   |
| 7           | 2       | 6.25%   |
| 8           | 1       | 3.13%   |
| 10          | 1       | 3.13%   |
| 12          | 1       | 3.13%   |
| 14          | 3       | 9.38%   |
| 15          | 1       | 3.13%   |
| 16          | 7       | 21.88%  |
| 17          | 5       | 15.63%  |
| 18          | 1       | 3.13%   |
| 19          | 1       | 3.13%   |
| 21          | 2       | 6.25%   |
| 22          | 1       | 3.13%   |
| Grand Total | 32      | 100.00% |

| Crashes Per Year             | 6.40  |
|------------------------------|-------|
| Fatal and All Injury Crashes | 15    |
| Percent Injury               | 46.9% |
| Equivalent PDO Index Value   | 7.16  |

| Year        | Crashes | %       |
|-------------|---------|---------|
| 2018        | 15      | 46.88%  |
| 2019        | 8       | 25.00%  |
| 2020        | 4       | 12.50%  |
| 2021        | 1       | 3.13%   |
| 2022        | 4       | 12.50%  |
| Grand Total | 32      | 100.00% |

| Crash Type           | Crashes | %       |
|----------------------|---------|---------|
| Rear End             | 17      | 53.13%  |
| Angle                | 8       | 25.00%  |
| Left Turn            | 4       | 12.50%  |
| Fixed Object         | 1       | 3.13%   |
| Sideswipe - Opposite | 1       | 3.13%   |
| Sideswipe - Passing  | 1       | 3.13%   |
| Grand Total          | 32      | 100.00% |

| Month       | Crashes | %       |
|-------------|---------|---------|
| 1           | 1       | 3.13%   |
| 2           | 1       | 3.13%   |
| 3           | 6       | 18.75%  |
| 4           | 3       | 9.38%   |
| 6           | 5       | 15.63%  |
| 7           | 5       | 15.63%  |
| 8           | 2       | 6.25%   |
| 9           | 2       | 6.25%   |
| 10          | 2       | 6.25%   |
| 11          | 2       | 6.25%   |
| 12          | 3       | 9.38%   |
| Grand Total | 32      | 100.00% |

#### **Crash Summary Sheet**

| Weather Condition | Crashes | %       |
|-------------------|---------|---------|
| Clear             | 17      | 53.13%  |
| Cloudy            | 10      | 31.25%  |
| Rain              | 5       | 15.63%  |
| Grand Total       | 32      | 100 00% |

| Road Condition | Crashes | %       |
|----------------|---------|---------|
| Dry            | 22      | 68.75%  |
| Wet            | 10      | 31.25%  |
| Grand Total    | 32      | 100.00% |

| Light Condition            | Crashes | %       |
|----------------------------|---------|---------|
| Daylight                   | 20      | 62.50%  |
| Dark - Roadway Not Lighted | 10      | 31.25%  |
| Dark - Lighted Roadway     | 1       | 3.13%   |
| Dawn/Dusk                  | 1       | 3.13%   |
| Grand Total                | 32      | 100.00% |

| ODOT Location         | Crashes | %       |
|-----------------------|---------|---------|
| Four-Way Intersection | 31      | 96.88%  |
| Not An Intersection   | 1       | 3.13%   |
| Grand Total           | 32      | 100.00% |

| Number of Units | Crashes | %       |
|-----------------|---------|---------|
| 2               | 25      | 78.13%  |
| 3               | 4       | 12.50%  |
| 1               | 1       | 3.13%   |
| 5               | 1       | 3.13%   |
| 4               | 1       | 3.13%   |
| Grand Total     | 32      | 100.00% |

| Work Zone Related | Crashes | %       |
|-------------------|---------|---------|
| No                | 32      | 100.00% |
| Grand Total       | 32      | 100.00% |

| Alcohol Related               | Crashes        | %              |
|-------------------------------|----------------|----------------|
| No                            | 31             | 96.88%         |
| Yes                           | 1              | 3.13%          |
| Grand Total                   | 32             | 100.00%        |
|                               |                |                |
| Drug Related (Inc. Marijuana) | Crashes        | %              |
| No                            | 31             | 96.88%         |
| Yes                           | 1              | 3.13%          |
| Grand Total                   | 32             | 100.00%        |
|                               |                |                |
| Marijuana Related             | Crashes        | %              |
| No                            | 32             | 100.00%        |
| Grand Total                   | 32             | 100.00%        |
|                               |                |                |
| Older Driver (651)            | Crachae        | 0/             |
| No                            | 01a51165<br>27 | /0<br>8/1 3.8% |
| Vec                           | 5              | 15 63%         |
| Grand Total                   | 32             | 100.00%        |
| Stand Potal                   | 52             | 100.0070       |
| Young Driver (15-25)          | Crashes        | %              |
| No                            | 23             | 71.88%         |
| Yes                           | 9              | 28.13%         |
| Grand Total                   | 32             | 100.00%        |

| Motorcycle Involved | Crashes | %       |
|---------------------|---------|---------|
| No                  | 32      | 100.00% |
| Grand Total         | 32      | 100.00% |

| Contour        | Crashes | %       |
|----------------|---------|---------|
| Straight Level | 32      | 100.00% |
| Grand Total    | 32      | 100.00% |

| Roadway Departure    | Crashes | %       |
|----------------------|---------|---------|
| No                   | 28      | 87.50%  |
| Yes                  | 4       | 12.50%  |
| Grand Total          | 32      | 100.00% |
|                      |         |         |
| Intersection Related | Crashes | %       |
| Yes                  | 31      | 96.88%  |
| No                   | 1       | 3.13%   |
| Grand Total          | 32      | 100.00% |
|                      |         |         |
| Speed Related        | Crashes | %       |
| No                   | 32      | 100.00% |
| Grand Total          | 32      | 100 00% |

#### MAD US 42 14.00 Crash Summary Sheet Unit 1 Summary

| Unit 1 Pre-Crash Action       | Crashes | %       |
|-------------------------------|---------|---------|
| Straight Ahead                | 26      | 81.25%  |
| Making Left Turn              | 4       | 12.50%  |
| Slowing or Stopped In Traffic | 1       | 3.13%   |
| Making Right Turn             | 1       | 3.13%   |
| Grand Total                   | 32      | 100.00% |

| Unit 1 Contributing Factor | Crashes | %       |
|----------------------------|---------|---------|
| Following Too Closely/ACDA | 18      | 56.25%  |
| Ran Red Light              | 7       | 21.88%  |
| Failure to Yield           | 5       | 15.63%  |
| Drove off Road             | 1       | 3.13%   |
| Left of Center             | 1       | 3.13%   |
| Grand Total                | 32      | 100.00% |

| Unit 1 Object Struck | Crashes | %       |
|----------------------|---------|---------|
| Nothing Struck       | 30      | 93.75%  |
| Other Fixed Object   | 1       | 3.13%   |
| Ditch                | 1       | 3.13%   |
| Grand Total          | 32      | 100.00% |

| Unit 1 Traffic Control | Crashes | %       |
|------------------------|---------|---------|
| Signal                 | 29      | 90.63%  |
| No Control             | 3       | 9.38%   |
| Grand Total            | 32      | 100.00% |

| Unit 1 Posted Speed | Crashes | %       |
|---------------------|---------|---------|
| 55                  | 32      | 100.00% |
| Grand Total         | 32      | 100.00% |

| Unit 1 Direction From | Crashes | %       |
|-----------------------|---------|---------|
| North                 | 9       | 28.13%  |
| West                  | 6       | 18.75%  |
| East                  | 6       | 18.75%  |
| South                 | 5       | 15.63%  |
| Northeast             | 2       | 6.25%   |
| Southeast             | 2       | 6.25%   |
| Southwest             | 1       | 3.13%   |
| Northwest             | 1       | 3.13%   |
| Grand Total           | 32      | 100.00% |

| Unit 1 Direction To | Crashes | %       |
|---------------------|---------|---------|
| South               | 11      | 34.38%  |
| North               | 6       | 18.75%  |
| East                | 5       | 15.63%  |
| West                | 4       | 12.50%  |
| Southwest           | 2       | 6.25%   |
| Northwest           | 2       | 6.25%   |
| Southeast           | 1       | 3.13%   |
| Northeast           | 1       | 3.13%   |
| Grand Total         | 32      | 100.00% |

#### MAD US 42 14.00 Crash Summary Sheet Unit 1 Summary

| Unit 1 Type             | Crashes | %       |
|-------------------------|---------|---------|
| Passenger Car           | 18      | 56.25%  |
| Pick up                 | 8       | 25.00%  |
| Semi-Tractor            | 2       | 6.25%   |
| Sport Utility Vehicle   | 2       | 6.25%   |
| Cargo Van               | 1       | 3.13%   |
| Passenger Van (minivan) | 1       | 3.13%   |
| Grand Total             | 32      | 100.00% |

| Unit 1 Special Function | Crashes | %       |
|-------------------------|---------|---------|
| None                    | 31      | 96.88%  |
| Other / Unknown         | 1       | 3.13%   |
| Grand Total             | 32      | 100.00% |

#### Unit 2 Summary

| Unit 2 Pre-Crash Action       | Crashes | %       |
|-------------------------------|---------|---------|
| Slowing or Stopped In Traffic | 16      | 50.00%  |
| Straight Ahead                | 13      | 40.63%  |
|                               | 1       | 3.13%   |
| Making Left Turn              | 1       | 3.13%   |
| Making Right Turn             | 1       | 3.13%   |
| Grand Total                   | 32      | 100.00% |

| Unit 2 Contributing Factor | Crashes | %       |
|----------------------------|---------|---------|
| None                       | 31      | 96.88%  |
|                            | 1       | 3.13%   |
| Grand Total                | 32      | 100.00% |

| Unit 2 Direction From | Crashes | %       |
|-----------------------|---------|---------|
|                       | 1       | 3.13%   |
| East                  | 3       | 9.38%   |
| North                 | 10      | 31.25%  |
| Northwest             | 2       | 6.25%   |
| South                 | 6       | 18.75%  |
| Southeast             | 4       | 12.50%  |
| Southwest             | 1       | 3.13%   |
| West                  | 5       | 15.63%  |
| Grand Total           | 32      | 100.00% |

| Unit 2 Type             | Crashes | %       |
|-------------------------|---------|---------|
| Sport Utility Vehicle   | 10      | 31.25%  |
| Passenger Car           | 10      | 31.25%  |
| Semi-Tractor            | 5       | 15.63%  |
| Pick up                 | 4       | 12.50%  |
| Passenger Van (minivan) | 1       | 3.13%   |
|                         | 1       | 3.13%   |
| Single Unit Truck       | 1       | 3.13%   |
| Grand Total             | 32      | 100.00% |

| Unit 2 Direction To | Crashes | %       |
|---------------------|---------|---------|
|                     | 1       | 3.13%   |
| East                | 6       | 18.75%  |
| North               | 5       | 15.63%  |
| Northeast           | 2       | 6.25%   |
| Northwest           | 4       | 12.50%  |
| South               | 10      | 31.25%  |
| Southeast           | 1       | 3.13%   |
| West                | 3       | 9.38%   |
| Grand Total         | 32      | 100.00% |

| Unit 2 Special Function | Crashes | %       |
|-------------------------|---------|---------|
| None                    | 29      | 90.63%  |
| Other / Unknown         | 1       | 3.13%   |
|                         | 1       | 3.13%   |
| Farm                    | 1       | 3.13%   |
| Grand Total             | 32      | 100.00% |











## Frequency of Crashes by Hour















## Frequency of Crashes by Contributing Factor 1









# **APPENDIX F**

**Capacity Analyses** 

Roundabout

Left-Turn Lanes Traffic Signal Alternative

#### **HCS Signalized Intersection Input Data**

| General Information                      |                           | NGH + Associates |                                   |         |        |          |               | Intersec   | tion Info | ormatic | on       |              | *              | <u>د لړ</u>     |  |      |  |
|--|---------------------------|------------------|-----------------------------------|---------|--------|----------|---------------|------------|-----------|---------|----------|--------------|----------------|-----------------|--|------|--|
| Agency                                   | SINGH + Associate         | s                |                                   |         |        |          |               | Duration   | , h       | 0.250   |          |              | <b>*</b> *     |                 |  |      |  |
| Analyst                                  | Grea Gedemer              |                  | Analvs                            | is Date | 12/19/ | 2023     | _             | Area Tvr   | e         | Other   |          | <br>         |                | ₹               |  |      |  |
| Jurisdiction                             | ODOT                      |                  | Time P                            | eriod   | AM Pe  | eak      |               | PHF        |           | 0.96    |          | _→<br>       | w∔E            |                 |  |      |  |
| Urban Street                             | MAD US 42 14.00           |                  | Analvs                            | is Year | 2022   | Base Lir | ne            | Analvsis   | Period    | 1> 7:0  | 00       |              |                | <br>*           |  |      |  |
| Intersection                             | US 42 at SR 29            |                  | File Na                           | me      | US 42  | -SR 29   | AM F          | Peak - 202 | 2 Basel   | ine.xus |          |              | ste            | <u> </u>        |  |      |  |
| Project Description                      | US 42 Safety Study        | ,                |                                   |         | 100.1  |          |               |            |           |         |          | 1            | ት<br>ት ት ቁ ም ት | • (*            |  |      |  |
| · · • j••• • • • • • • • • • •           |                           |                  |                                   |         |        |          |               |            |           |         |          |              |                |                 |  |      |  |
| <b>Demand Information</b>                |                           |                  |                                   | EB      |        |          | W             | 'B         |           | NB      |          |              | SB             |                 |  |      |  |
| Approach Movement                        |                           |                  | L                                 | Т       | R      | L        |               | R          | L         | Т       | R        | L            | Т              | R               |  |      |  |
| Demand ( v ), veh/h                      |                           |                  | 23                                | 225     | 18     | 47       | 18            | 39 8       | 37        | 83      | 27       | 3            | 142            | 24              |  |      |  |
|  |                           |                  | i).                               |         |        |          |               |            |           |         | <u> </u> |              |                |                 |  |      |  |
| Signal Information                       |                           |                  |                                   | 215     | _ ₹    | -        |               |            |           |         |          |              |                | _               |  |      |  |
| Cycle, s 44.1                            | Reference Phase           | 2                |                                   | - SA2   | × ۳    | ··]      |               |            |           |         | 1        | $\mathbf{Y}$ | 3              | $\mathbf{\Phi}$ |  |      |  |
| Offset, s 0                              | Reference Point           | End              | Green                             | 20.0    | 10.9   | 0.0      | 0.0           | 0.0        | 0.0       |         |          | <b></b>      |                | <u> </u>        |  |      |  |
| Uncoordinated Yes                        | Simult. Gap E/W           | On               | Yellow                            | 5.6     | 5.6    | 0.0      | 0.0           | 0.0        | 0.0       |         |          |              |                |                 |  |      |  |
| Force Mode Fixed                         | Simult. Gap N/S           | On               | Red                               | 1.0     | 1.0    | 0.0      | 0.0           | 0.0        | 0.0       |         | 5        | 6            | 7              | 8               |  |      |  |
|  |                           |                  |                                   |         |        |          |               |            |           |         |          |              |                |                 |  |      |  |
| Traffic Information                      |                           |                  | <u> </u>                          | EB      |        |          | WE            | 3          |           | NB      |          |              | SB             |                 |  |      |  |
| Approach Movement                        |                           |                  | L                                 | Т       | R      | L        | Т             | R          | L         | Т       | R        | L            | Т              | R               |  |      |  |
| Demand ( <i>v</i> ), veh/h               |                           |                  | 23                                | 225     | 18     | 47       | 189           | 8          | 37        | 83      | 27       | 3            | 142            | 24              |  |      |  |
| Initial Queue (Qb), veh/                 | 'n                        |                  | 0                                 | 0       | 0      | 0        | 0             | 0          | 0         | 0       | 0        | 0            | 0              | 0               |  |      |  |
| Base Saturation Flow F                   | Rate ( <i>s</i> ₀), veh/h |                  | 1900                              | 1900    | 1900   | 1900     | 190           | 0 1900     | 1900      | 1900    | 1900     | 1900         | 1900           | 1900            |  |      |  |
| Parking (Nm), man/h                      |                           |                  |                                   | None    |        |          | Non           | e          |           | None    |          |              | None           |                 |  |      |  |
| leavy Vehicles ( <i>PHV</i> ), %         |                           |                  |                                   | 14      |        |          | 15            |            |           | 18      |          |              | 20             |                 |  |      |  |
| Ped / Bike / RTOR, /h                    | ed / Bike / RTOR, /h      |                  |                                   | 0       | 0      | 0        | 0             | 0          | 0         | 0       | 0        | 0            | 0              | 0               |  |      |  |
| Buses ( <i>N</i> <sub>b</sub> ), buses/h | s/h                       |                  |                                   | 0       | 0      | 0        | 0             | 0          | 0         | 0       | 0        | 0            | 0              | 0               |  |      |  |
| Arrival Type ( <i>AT</i> )               |                           |                  | 3                                 | 3       | 3      | 3        | 3             | 3          | 3         | 3       | 3        | 3            | 3              | 3               |  |      |  |
| Upstream Filtering (I)                   |                           |                  | 1.00                              | 1.00    | 1.00   | 1.00     | 1.00          | 0 1.00     | 1.00      | 1.00    | 1.00     | 1.00         | 1.00           | 1.00            |  |      |  |
| Lane Width ( W ), ft                     |                           |                  |                                   | 12.0    |        |          | 12.0          | ן כ        |           | 12.0    |          |              | 12.0           |                 |  |      |  |
| Turn Bay Length, ft                      |                           |                  |                                   | 0       |        |          | 0             |            |           | 0       |          |              | 0              |                 |  |      |  |
| Grade ( <i>Pg</i> ), %                   |                           |                  |                                   | 0       |        |          | 0             |            |           | 0       |          |              | 0              |                 |  |      |  |
| Speed Limit, mi/h                        |                           |                  | 55                                | 55      | 55     | 55       | 55            | 55         | 55        | 55      | 55       | 55           | 55             | 55              |  |      |  |
| Bhase Information                        |                           |                  | EDI                               |         | DT     | \//DI    |               |            | NDI       |         |          | CDI          |                | CDT             |  |      |  |
| Maximum Groop (Grou                      | ) or Phase Split          |                  |                                   |         | 20.0   | VVDL     | -             | 30.0       | INDL      |         | 60.0     | 300          |                | 30.0            |  |      |  |
| Vellow Change Interval                   |                           |                  |                                   |         | 5.6    |          | $\rightarrow$ | 5.6        |           |         | 5.6      |              |                | 56              |  |      |  |
| Red Clearance Interval                   | $ (P_{\alpha}) _{\beta}$  |                  |                                   |         | 1.0    |          |               | 1.0        | -         | -       | 1.0      |              |                | 1.0             |  |      |  |
| Minimum Green ( Gmin)                    | ( <i>1</i> ( <i>j</i> , 3 |                  |                                   |         | 10     |          | +             | 10         |           |         | 20       |              |                | 20              |  |      |  |
| Start-Up Lost Time ( If)                 | s.                        |                  | 20                                |         | 2.0    | 20       |               | 2.0        | 20        |         | 2.0      | 20           |                | 2.0             |  |      |  |
| Extension of Effective (                 | , s<br>Green (e), s       |                  | 2.0                               |         | 2.0    | 2.0      | +             | 2.0        | 2.0       |         | 2.0      | 2.0          |                | 2.0             |  |      |  |
| Passage (PT) s                           |                           |                  | 2.0                               |         | 3.5    | 2.0      | -             | 3.5        | 2.0       |         | 3.5      | 2.0          |                | 3.5             |  |      |  |
| Recall Mode                              |                           |                  | <u> </u>                          |         | Off    |          | -             | Off        |           |         | Min      |              |                | Min             |  |      |  |
| Dual Entry                               | Mode                      |                  | <u> </u>                          |         | Ves    |          | -             | Ves        |           |         | Yes      |              |                | Yes             |  |      |  |
| Walk (Walk) s                            |                           |                  | <u> </u>                          |         | 0.0    |          | +             | 0.0        |           |         | 0.0      |              |                | 0.0             |  |      |  |
| Pedestrian Clearance 7                   | Time (PC) s               |                  |                                   |         | 0.0    |          | -             | 0.0        |           |         | 0.0      |              |                | 0.0             |  |      |  |
|  |                           |                  |                                   |         | 5.5    |          |               | 0.0        |           |         | 5.5      |              |                | 5.0             |  |      |  |
| Multimodal Informatio                    | on                        |                  |                                   | EB      |        |          | WE            | 3          |           | NB      |          |              | SB             |                 |  |      |  |
| 85th % Speed / Rest in                   | Walk / Corner Radi        | us               | 0.0                               | No      | 25.0   | 0.0      | No            | 25.0       | 0.0       | No      | 25.0     | 0.0          | No             | 25.0            |  |      |  |
| Walkway / Crosswalk V                    | Vidth / Length, ft        |                  | 9.0                               | 12.0    | 0.0    | 9.0      | 12.0          | 0.0        | 9.0       | 12.0    | 0.0      | 9.0          | 12.0           | 0.0             |  |      |  |
| Street Width / Island / 0                | Curb, ft                  |                  | 0.0                               | 0       | No     | 0.0      | 0             | No         | 0.0       | 0       | No       | 0.0          | 0              | No              |  |      |  |
| Width Outside / Bike La                  | ane / Shoulder, ft        |                  | 12.0                              | 5.0     | 2.0    | 12.0     | 5.0           | 2.0        | 12.0      | 5.0     | 2.0      | 12.0         | 5.0            | 2.0             |  |      |  |
| Pedestrian Signal / Occ                  | cupied Parking            |                  | estrian Signal / Occupied Parking |         | No     |          | 0.50          | No         |           | 0.50    | No       |              | 0.50           | No              |  | 0.50 |  |

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HCS™ Streets Version 2023

## **HCS Signalized Intersection Results Summary**

|                          |                                 |                              | Interportion Information |         |               |          |          |               |           |          |          |          |                     |            |              |
|--------------------------|---------------------------------|------------------------------|--------------------------|---------|---------------|----------|----------|---------------|-----------|----------|----------|----------|---------------------|------------|--------------|
| General Inform           | nation                          |                              |                          |         |               |          |          |               | Intersec  | tion Inf | ormatio  | on       |                     | ╡┵┿╪┶┊┊    | ⊾ L <u>a</u> |
| Agency                   |                                 | SINGH + Associate            | s                        |         |               |          |          | Î             | Duration  | , h      | 0.250    |          |                     | 4          |              |
| Analyst                  |                                 | Greg Gedemer                 |                          | Analys  | sis Dat       | te 12/19 | /2023    |               | Area Typ  | е        | Other    |          | 4                   |            | ۲.<br>۲.     |
| Jurisdiction             |                                 | ODOT                         |                          | Time F  | Period        | AM P     | eak      |               | PHF       |          | 0.96     |          | <b>♦</b> - <b>♦</b> | w‡e        | ↔ <u>+</u>   |
| Urban Street             |                                 | MAD US 42 14.00              |                          | Analys  | sis Yea       | ar 2022  | Base Lir | ne            | Analysis  | Period   | 1> 7:0   | 00       | 7                   |            | *            |
| Intersection             |                                 | US 42 at SR 29               |                          | File Na | ame           | US 42    | 2-SR 29  | AM P          | eak - 202 | 2 Base   | line.xus |          |                     | *\$*       | ×            |
| Project Descrip          | tion                            | US 42 Safety Study           | /                        | 4       |               |          |          |               |           |          |          |          |                     | 4 1 4 17 1 | • <b>(</b> * |
|                          |                                 |                              |                          |         |               |          | 16       |               |           | 14       |          |          |                     |            |              |
| Demand Inform            | nation                          |                              |                          |         | EB            |          |          | W             | B         |          | NB       |          |                     | SB         |              |
| Approach Move            | ement                           |                              |                          | L       | Т             | R        | L        | Т             | R         | L        | Т        | R        | L                   | Т          | R            |
| Demand ( <i>v</i> ), v   | eh/h                            |                              |                          | 23      | 225           | 5 18     | 47       | 18            | 98        | 37       | 83       | 27       | 3                   | 142        | 24           |
| 0:                       | <u></u>                         |                              |                          | 1       | 1 11:         |          |          |               |           |          |          |          |                     |            |              |
| Signal Informa           | tion                            |                              | -                        |         | 205           | .3 5     |          |               |           |          |          |          | RT 2                |            |              |
| Cycle, s                 | 44.1                            | Reference Phase              | 2                        |         | - M           | γR '     |          |               |           |          |          | 1        |                     | 3          | ╋ ₄          |
| Offset, s                | 0                               | Reference Point              | End                      | Green   | 20.0          | 10.9     | 0.0      | 0.0           | 0.0       | 0.0      |          |          |                     |            | <u> </u>     |
| Uncoordinated            | Yes                             | Simult. Gap E/W              | On                       | Yellow  | 5.6           | 5.6      | 0.0      | 0.0           | 0.0       | 0.0      |          |          |                     |            | Y            |
| Force Mode               | Fixed                           | Simult. Gap N/S              | On                       | Red     | 1.0           | 1.0      | 0.0      | 0.0           | 0.0       | 0.0      | _        | 5        | 6                   | 7          | 8            |
| <b></b>                  |                                 |                              |                          |         |               |          |          |               | MOT       |          |          | NET      | 0.01                |            | 0.D.T.       |
| Timer Results            |                                 |                              |                          | EBI     | -             | EBI      | WB       |               | WBI       | NB       |          | NBI      | SBI                 |            | SBI          |
| Assigned Phase           | 9                               |                              |                          |         | _             | 4        | <u> </u> | $\rightarrow$ | 8         |          |          | 2        | <u> </u>            | _          | 6            |
| Case Number              | -                               |                              |                          |         | +             | 8.0      | <u> </u> | +             | 8.0       |          | _        | 8.0      |                     |            | 8.0          |
| Phase Duration           | , S                             | \ -                          |                          |         | $\rightarrow$ | 17.5     | <u> </u> | +             | 17.5      |          | _        | 26.6     |                     |            | 26.6         |
| Change Period,           | ( Y+R (                         | c), S                        |                          |         |               | 6.6      |          | _             | 0.0       |          |          | 0.0      |                     |            | 0.0          |
| Max Allow Head           | away ( <i>I</i> i               | ИАН ), S                     |                          |         | +             | 4.4      |          | _             | 4.4       |          |          | 4.4      |                     |            | 4.4          |
| Queue Clearan            | the Clearance Time ( $g_s$ ), s |                              |                          |         |               | 8.7      | <u> </u> | _             | 8.3       |          |          | 4.6      |                     |            | 5.1          |
| Green Extensio           | een Extension Time ( g e ), s   |                              |                          |         | +             | 2.2      |          |               | 2.2       |          | -        | 1.4      |                     |            | 1.4          |
| Phase Call Pro           | obability                       |                              |                          |         | $\rightarrow$ | 1.00     | <u> </u> | _             | 1.00      | <u> </u> | _        | 1.00     |                     |            | 1.00         |
| Max Out Proba            | bility                          |                              |                          |         |               | 0.00     |          |               | 0.00      |          | 0.00     |          |                     |            | J.00         |
| Movement Gro             | oup Res                         | ults                         |                          | EB      |               | _        |          | WB            |           |          | NB       |          |                     | SB         |              |
| Approach Move            | ement                           |                              |                          | L       | Т             | R        | L        | Т             | R         | L        | Т        | R        | L                   | Т          | R            |
| Assigned Move            | ment                            |                              |                          | 7       | 4             | 14       | 3        | 8             | 18        | 5        | 2        | 12       | 1                   | 6          | 16           |
| Adjusted Flow F          | Rate( <i>v</i>                  | ), veh/h                     |                          |         | 277           |          |          | 254           |           |          | 153      |          |                     | 176        |              |
| Adjusted Satura          | ation Flo                       | w Rate ( <i>s</i> ), veh/h/l | n                        |         | 1633          | 3        |          | 1549          | )         |          | 1448     |          |                     | 1561       |              |
| Queue Service            | Time ( g                        | g s ), s                     |                          |         | 0.4           |          |          | 0.0           |           |          | 0.0      |          |                     | 0.0        |              |
| Cycle Queue C            | learance                        | e Time ( <i>g c</i> ), s     |                          |         | 6.7           |          |          | 6.3           |           |          | 2.6      |          |                     | 3.1        |              |
| Green Ratio ( g          | /C )                            |                              |                          |         | 0.25          |          |          | 0.25          |           |          | 0.45     |          |                     | 0.45       |              |
| Capacity ( <i>c</i> ), v | /eh/h                           |                              |                          |         | 492           |          |          | 480           |           |          | 759      |          |                     | 791        |              |
| Volume-to-Capa           | acity Ra                        | tio(X)                       |                          |         | 0.563         | 3        |          | 0.53          | D         |          | 0.202    |          |                     | 0.222      |              |
| Back of Queue            | (Q), ft                         | /In ( 95 th percentile       | )                        |         | 95            |          |          | 86            |           |          | 24.9     |          |                     | 29.5       |              |
| Back of Queue            | ( Q ), ve                       | eh/In ( 95 th percenti       | le)                      |         | 3.4           |          |          | 3.1           |           |          | 0.9      |          |                     | 1.0        |              |
| Queue Storage            | Ratio (                         | RQ) (95 th percent           | tile)                    |         | 0.00          |          |          | 0.00          |           |          | 0.00     |          |                     | 0.00       |              |
| Uniform Delay (          | ( d 1 ), s                      | /eh                          |                          |         | 15.0          |          |          | 14.8          |           |          | 7.3      |          |                     | 7.4        |              |
| Incremental De           | lay ( <i>d</i> 2                | ), s/veh                     |                          |         | 1.2           |          |          | 1.1           |           |          | 0.2      |          |                     | 0.2        |              |
| Initial Queue De         | elay(d                          | 3 ), s/veh                   |                          |         | 0.0           |          |          | 0.0           |           |          | 0.0      |          |                     | 0.0        |              |
| Control Delay (          | d ), s/ve                       | əh                           |                          |         | 16.2          |          |          | 15.9          |           |          | 7.4      |          |                     | 7.6        |              |
| Level of Service         | e (LOS)                         | 6)                           |                          |         | В             |          |          | В             |           |          | A        |          |                     | A          |              |
| Approach Delay           | /, s/veh                        | /LOS                         |                          | 16.2    | 2             | В        | 15.9     | )             | В         | 7.4      |          | А        | 7.6                 |            | А            |
| Intersection De          | lay, s/ve                       | h / LOS                      |                          |         |               | 1:       | 2.8      |               |           |          |          |          | В                   |            |              |
|                          |                                 |                              |                          |         |               |          |          |               |           |          |          |          |                     |            |              |
| Multimodal Re            | sults                           | // 00                        |                          | 4.0     | EB            | -        |          | WB            | -         |          | NB       | <b>D</b> |                     | SB         | _            |
| Pedestrian LOS           | Score                           | / LOS                        |                          | 1.67    |               | В        | 1.67     |               | В         | 1.6      |          | В        | 1.65                |            | В            |
| BICYCIE LOS SC           | ore / LC                        | 15                           | 0.94                     | •       | A             | 0.91     |          | A             | 0.74      | +        | A        | 0.78     | 5                   | A          |              |

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HCS™ Streets Version 2023

US 42-SR 29 AM Peak - 2022 Baseline.xus

## HCS Signalized Intersection Intermediate Values

| General Inform              | nation            |  |      |      |         |         |          |          |    | Inter  | sectio          | n Inf | ormat  | ion   |       |            | *        |
|-----------------------------|-------------------|--|------|------|---------|---------|----------|----------|----|--------|-----------------|-------|--------|-------|-------|------------|----------|
| Agency                      |                   | SINGH + Associates                           |      |      |         |         |          |          |    | Dura   | tion, h         |       | 0.25   | 50    |       | <b>*</b> * |          |
| Analyst                     |                   | Greg Gedemer                                 |      | Ar   | nalysis | Date    | 12/19/20 | )23      |    | Area   | Туре            |       | Oth    | er    |       |            | 4        |
| Jurisdiction                |                   | ODOT   |      | Tir  | me Pei  | riod /  | AM Pea   | k        |    | PHF    |                 |       | 0.96   | 6     | * -*  | W = E      |          |
| Urban Street                |                   | MAD US 42 14.00                              |      | Ar   | nalysis | Year 2  | 2022 Ba  | se Lir   | e  | Analy  | /sis Pe         | eriod | 1>7    | 7:00  | 4     |            | *        |
| Intersection                |                   | US 42 at SR 29                               |      | Fil  | le Nam  | ie l    | US 42-S  | R 29     | AM | Peak - | 2022            | Base  | ine.xu | IS    |       | \$         |          |
| Project Descrip             | tion              | US 42 Safety Study                           |      |      |         |         |          |          |    |        |                 |       |        |       |       | ነ          | 1 1      |
|                             |                   |  |      | _    |         |         |          |          |    |        |                 |       |        |       |       |            |          |
| Demand Inform               | nation            |  |      |      |         | EB      |          |          | V  | NB     | $ \rightarrow $ |       | N      | 3     |       | SB         | 1        |
| Approach Move               | ement             |  |      |      | L       | Т       | R        | L        |    | Т      | R               | L     | Т      | R     | L     | Т          | R        |
| Demand ( <i>v</i> ), v      | eh/h              |  |      | 2    | 23      | 225     | 18       | 47       | 1  | 189    | 8               | 37    | 83     | 3 27  | 3     | 142        | 24       |
| Signal Informa              | tion              |  |      |      |         |         | 6        |          |    |        |                 |       |        |       |       |            |          |
| Signal informa              |                   | Deference Dhase                              | 2    |      | 2       | XIV2    | .a 🗄     |          |    |        |                 |       |        |       | sta   |            | ~        |
| Cycle, s                    | 44.1              | Reference Phase                              | Z    |      |         | - SAZ - | ן * ≿    |          |    |        |                 |       |        | 1     | 2     | 3          |          |
| Unseed S                    | Vaa               | Simult Cap E/M                               |      | Gr   | reen 2  | 20.0    | 10.9     | 0.0      | 0  | .0 (   | 0.0             | 0.0   |        |       |       |            | <b>A</b> |
| Earoo Mada                  | Fixed             | Simult. Cap N/S                              | On   | Ye   | ellow 5 | 5.6     | 5.6      | 0.0      | 0  | .0 (   | 0.0             | 0.0   | -11    | Ē     | 1     | 7          | ¥ .      |
| Force Mode                  | Fixeu             | Simult. Gap N/S                              | OII  | R    | eu   I  | .0      | 1.0      | 0.0      | 0  | .0 10  | J.U             | 0.0   |        | 5     | 0     | 1          | 0        |
| Saturation Flo              | w / Dela          |  |      |      | т       | R       |          | Т        |    | R      |                 |       | т      | R     | 1     | т          | R        |
| Lane Width Adi              | ustment           | Eactor (fw)                                  | 1.00 | 20   | 1 000   | 1 000   | 1 000    | 1.00     | 0  | 1 000  | 1 00            | 0 1   | 000    | 1 000 | 1 000 | 1 000      | 1 000    |
| Heavy Vehicles              | and Gr            | ade Factor (fHVg)                            | 1.0  | 20   | 0.891   | 1 000   | 1.000    | 0.88     | 33 | 1 000  | 1.00            |       | 860    | 1 000 | 1.000 | 0.844      | 1,000    |
| Parking Activity            | Adjustn           | nent Eactor $(f_p)$                          | 1.0  | 20   | 1 000   | 1.000   | 1.000    | 1.00     | 00 | 1.000  | 1.00            |       | 000    | 1.000 | 1.000 | 1 000      | 1.000    |
| Bus Blockage A              | diustme           | ent Factor $(f_{bb})$                        | 1.0  | 20   | 1 000   | 1 000   | 1.000    | 1.00     | 0  | 1 000  | 1.00            | 0 1   | 000    | 1 000 | 1 000 | 1 000      | 1.000    |
| Area Type Adiu              | stment l          | Eactor $(f_2)$                               | 1.0  | 20   | 1.000   | 1.000   | 1.000    | 1.00     | 0  | 1.000  | 1.00            |       | 000    | 1.000 | 1.000 | 1.000      | 1.000    |
| Lane Utilization            | Adjustr           | nent Factor (fu)                             | 1.0  | 20   | 1 000   | 1.000   | 1.000    | 1.00     | 0  | 1 000  | 1.00            |       | 000    | 1.000 | 1.000 | 1.000      | 1.000    |
| Left-Turn Adjust            | tment F           | actor $(f_{l,T})$                            | 0.9  | 75   | 0.965   | 1.000   | 0.927    | 0.92     | 23 | 1.000  | 0.91            | 3 (   | 887    | 1.000 | 0.998 | 0.973      | 1.000    |
| Right-Turn Adju             | stment            | Factor (fer)                                 | 0.01 |      | 0.000   | 0.965   | 0.021    | 0.00     | 00 | 0.923  | 0.0             |       | 000    | 0.887 | 0.000 | 0.000      | 0.973    |
| Left-Turn Pedes             | strian Ad         | diustment Factor (fund                       | 1.00 | 20   | 0.000   | 0.000   | 1.000    | 0.00     |    | 0.020  | 1.00            | 0     |        | 0.001 | 1.000 | 0.000      | 0.010    |
| Right-Turn Ped-             | -Bike Ac          | liustment Factor (feed                       |      |      |         | 1 000   | 1.000    | -        |    | 1 000  | 1.00            |       |        | 1 000 | 1.000 |            | 1 000    |
| Work Zone Adiu              | ustment           | Factor (f <sub>wz</sub> )                    | 1.00 | 20   | 1.000   | 1.000   | 1.000    | 1.00     | 00 | 1.000  | 1.00            | 0 1   | .000   | 1.000 | 1.000 | 1.000      | 1.000    |
| DDI Factor (fool            | ()                |  | 1.00 | 00   | 1.000   | 1.000   | 1.000    | 1.00     | 00 | 1.000  | 1.00            | 0 1   | .000   | 1.000 | 1.000 | 1.000      | 1.000    |
| Left-Turn Prot.             | ,<br>CAV Ad       | . Factor (fCAV,prot)                         |      |      |         |         | <u> </u> |          |    |        |                 | -     |        |       |       |            |          |
| Left-Turn Perm.             | CAV A             | dj. Factor ( <i>f</i> CAV.perm)              | 1.0  | 0    |         |         | 1.00     | <u> </u> | -  |        | 1.0             | 0     |        |       | 1.00  |            |          |
| Movement Satu               | ration F          | low Rate (s), veh/h                          | 14   | 1    | 1381    | 110     | 298      | 120      | 0  | 51     | 364             | 1     | 818    | 266   | 28    | 1312       | 222      |
| Proportion of Ve            | ehicles A         | Arriving on Green (P)                        | 0.2  | 5    | 0.25    | 0.25    | 0.25     | 0.2      | 5  | 0.25   | 0.4             | 5     | 0.45   | 0.45  | 0.45  | 0.45       | 0.45     |
| Incremental De              | lay Fact          | or (k)                                       |      |      | 0.13    |         |          | 0.1      | 3  |        |                 |       | 0.13   |       |       | 0.13       |          |
|                             |                   |  |      |      |         |         |          |          |    |        |                 |       |        |       |       |            |          |
| Signal Timing               | / Mover           | nent Groups                                  | E    | EBL  | . E     | BT/R    | WE       | BL       | W  | /BT/R  | 1               | IBL   | 1      | IBT/R | SBL   | - 8        | SBT/R    |
| Lost Time (t <sub>L</sub> ) |                   |  |      |      |         | 6.6     |          |          |    | 6.6    |                 |       |        | 6.6   |       |            | 6.6      |
| Green Ratio (g/             | (C)               |  |      |      |         | 0.25    |          |          | C  | ).25   |                 |       |        | 0.45  |       |            | 0.45     |
| Permitted Satur             | ation Fl          | ow Rate ( <i>s</i> <sub></sub> ), veh/h/lr   |      |      |         | 1195    |          |          | 1  | 144    |                 |       |        | 1231  |       |            | 1298     |
| Shared Saturati             | ion Flow          | / Rate ( <i>s</i> sh), veh/h/ln              |      |      |         | 1610    |          |          | 1  | 488    |                 |       |        | 1437  |       |            | 1591     |
| Permitted Effect            | tive Gre          | en Time ( <i>g</i> <sub>p</sub> ), s         |      |      |         | 10.9    |          |          | 1  | 10.9   |                 |       |        | 20.0  |       |            | 20.0     |
| Permitted Servi             | ce Time           | e (g <sub>u</sub> ), s                       |      |      |         | 4.6     |          |          |    | 4.2    |                 |       | _      | 17.0  |       |            | 17.4     |
| Permitted Queu              | ie Servi          | ce Time ( <i>g<sub>ps</sub></i> ), s         |      |      |         | 0.4     |          | _        |    | 0.0    |                 |       | _      | 0.0   |       |            | 0.0      |
| Time to First Blo           | ockage            | ( <i>g</i> <sub>f</sub> ), s                 |      |      |         | 5.3     |          |          |    | 3.8    |                 |       |        | 5.6   |       |            | 15.9     |
| Queue Service               | Time Be           | efore Blockage ( <i>g</i> /s), s             | -    |      |         | 5.3     |          |          |    | 3.8    |                 |       |        | 1.9   |       |            | 2.4      |
| Protected Right             | Satura            | tion Flow ( <i>s</i> <sub>R</sub> ), veh/h/l | n    |      |         |         |          |          |    |        |                 |       |        |       |       |            |          |
| Protected Right             | Effectiv          | /e Green Time ( <i>g</i> <sub>R</sub> ), s   |      |      |         |         |          |          |    |        |                 |       |        |       |       |            |          |
| Multimodal                  |                   |  |      |      | EB      |         |          | W        | В  |        |                 |       | NB     |       |       | SB         |          |
| Pedestrian Fw /             | Fv                |  | 0.   | 972  | 2 (     | 0.000   | 0.9      | 72       | 0  | .000   | 0.              | 972   | (      | 0.000 | 0.97  | 2          | 0.000    |
| Pedestrian Fs /             | Fdelay            |  | 0.   | 000  | ) (     | 0.101   | 0.00     | 00       | 0  | .101   | 0.              | 000   | (      | 0.076 | 0.00  | 0          | 0.076    |
| Pedestrian Mcor             | ner / <b>M</b> cw | ,  | 0    | .00  |         |         | 0.0      | 0        |    |        | 0               | .00   |        |       | 0.00  |            |          |
| Bicycle cb / db             |                   |  | 49   | 3.6  | 0       | 12.50   | 493.     | 60       | 1  | 2.50   | 90              | 7.49  |        | 6.58  | 907.4 | .9         | 6.58     |
| Bicycle Fw / Fv             |                   |  | -3   | 3.64 |         | 0.46    | -3.6     | 64       | C  | 0.42   | -3              | 6.64  |        | 0.25  | -3.64 | 1          | 0.29     |

US 42-SR 29 AM Peak - 2022 Baseline.xus

#### HCS Signalized Intersection Results Graphical Summary

|                            | -                        |  |         |          |         |         | _      |           |         |              |    |     |              |            |
|----------------------------|--------------------------|--|---------|----------|---------|---------|--------|-----------|---------|--------------|----|-----|--------------|------------|
| General Information        |                          |  |         |          |         |         | In     | itersecti | on Info | ormatio      | on |     | 444,         | يد لير     |
| Agency                     | SINGH + Associate        | s  |         |          |         |         | D      | uration,  | h       | 0.250        |    |     | * <b>*</b> * |            |
| Analyst                    | Greg Gedemer             |  | Analys  | is Date  | 12/19/2 | 2023    | A      | rea Type  | ;       | Other        |    | 4   |              | ۲.<br>۲.   |
| Jurisdiction               | ODOT                     |  | Time F  | Period   | AM Pe   | ak      | P      | HF        |         | 0.96         |    | *-* | w 🗍 E<br>8   | ÷          |
| Urban Street               | MAD US 42 14.00          |  | Analys  | sis Year | 2022 B  | ase Lir | ne A   | nalysis F | Period  | 1> 7:(       | 00 |     |              |            |
| Intersection               | US 42 at SR 29           |  | File Na | ame      | US 42-  | SR 29   | AM Pea | ak - 2022 | Baseli  | ine.xus      |    |     | **           |            |
| Project Description        | US 42 Safety Study       | ,  |         |          | 8       |         |        |           |         |              |    |     | ***          | × (*       |
|                            |                          |  |         |          |         | 1       |        |           |         |              |    | 1   |              |            |
| Demand Information         |                          |  |         | EB       |         |         | WB     | 1 -       |         | NB           |    |     | SB           |            |
| Approach Movement          |                          |  | L       | Т        | R       | L       | Т      | R         | L       | Т            | R  | L   | T            | R          |
| Demand ( <i>v</i> ), veh/h |                          |  | 23      | 225      | 18      | 47      | 189    | 8         | 37      | 83           | 27 | 3   | 142          | 24         |
| Signal Information         |                          |  |         |          | 5       |         |        |           |         |              | 1  |     |              |            |
| Cycle s 44.1               | Reference Phase          | 2  | 1       | 1245<br> |         | 1       |        |           |         |              |    | 572 |              | <b>_</b>   |
| Offset s                   | Reference Point          | End  |         | <u></u>  | F3 -    |         |        |           |         |              | 1  | 2   | 3            | <b>Y</b> 4 |
|                            | Simult Gap E/W           | On   | Green   | 20.0     | 10.9    | 0.0     | 0.0    | 0.0       | 0.0     | _            |    |     |              | <b>—</b>   |
| Force Mode Fixed           | Simult, Gap N/S          | On   | Red     | 5.6      | 5.6     | 0.0     | 0.0    | 0.0       | 0.0     | -            | 5  | 6   | 7            | ¥ 8        |
|                            |                          | OII  | Reu     | 1.0      | 1.0     | 0.0     | 0.0    | 0.0       | 0.0     |              |    |     |              | 0          |
| Movement Group Res         | sults                    |  |         | EB       |         |         | WB     |           |         | NB           |    |     | SB           |            |
| Approach Movement          |                          |  | L       | T        | R       | L       | T      | R         | L       | Т            | R  | L   | T            | R          |
| Back of Queue (Q), f       | ft/In (195 th percentile | )  |         | 95       |         |         | 86     |           |         | 24.9         |    |     | 29.5         |            |
| Back of Queue (Q), v       | eh/ln (95 th percenti    | /<br>le)   |         | 3.4      | _       |         | 3.1    |           |         | 0.9          |    |     | 1.0          |            |
| Queue Storage Ratio (      | (95 th percent           | ile)   |         | 0.00     |         |         | 0.00   |           |         | 0.00         |    |     | 0.00         |            |
| Control Delay ( d ) s/v    | eh                       |  |         | 16.2     |         |         | 15.9   |           |         | 74           |    |     | 7.6          |            |
| Level of Service (LOS)     | )                        | _  |         | B        | _       |         | B      |           |         | A            |    |     | A            |            |
| Approach Delay, s/veh      | ///05                    |  | 16.2    |          | В       | 15.9    |        | В         | 74      |              | Α  | 7.6 |              | Α          |
| Intersection Delay, s/ver  | eh / LOS                 |  | 10.2    | -        | 12.     | 8       |        | -         |         |              |    | B   |              |            |
| <b>3</b> 7                 |                          |  |         |          |         |         |        |           |         |              |    |     |              |            |
|                            | 3.4                      |  |         | 16.2     | 7.6     | 15.9    |        |           |         | <b>—</b> 3.1 | _  |     |              |            |
|                            |                          | LOS A<br>LOS B<br>LOS C<br>LOS D<br>LOS E<br>LOS F |         |          | 0.9     |         |        | Queue —   | - D     | elay         | -  |     |              |            |

US 42-SR 29 AM Peak - 2022 Baseline.xus



## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 AM Peak - 2022 Baseline.xus Generated: 2/15/2024 10:54:26 AM

#### **HCS Signalized Intersection Input Data**

| General Information                          |                                | NGH + Associates |          |         |                 |          |               | Intersec   | tion Info | ormatio | on   | 2            | ****               | 4 L <u>.</u>    |  |  |
|--|--------------------------------|------------------|----------|---------|-----------------|----------|---------------|------------|-----------|---------|------|--------------|--------------------|-----------------|--|--|
| Agency                                       | SINGH + Associate              | s                |          |         |                 |          |               | Duration   | , h       | 0.250   | -    |              | *                  |                 |  |  |
| Analvst                                      | Grea Gedemer                   |                  | Analvs   | is Date | 12/19/          | 2023     | _             | Area Tvr   | )e        | Other   |      | <br>         |                    | ₹               |  |  |
| Jurisdiction                                 | ODOT                           |                  | Time P   | eriod   | PM Pe           | eak      |               | PHF        |           | 0.96    |      | →<br>+<br>+  | w∔E                |                 |  |  |
| Urban Street                                 | MAD US 42 14.00                |                  | Analvs   | is Year | 2022            | Base Lir | ne            | Analysis   | Period    | 1> 7:0  | 00   |              |                    | +<br>¥          |  |  |
| Intersection                                 | US 42 at SR 29                 |                  | File Na  | me      | US 42           | -SR 29   | PM F          | Peak - 202 | 2 Basel   | ine.xus |      |              | ste                | <u>_</u>        |  |  |
| Project Description                          | US 42 Safety Study             | ,                |          |         | 100             |          |               |            |           |         |      | 1            | ۲<br>• • • • • • • | * (*            |  |  |
| · · · <b>·</b> · · · · · · · · · · · · · · · |                                |                  |          |         |                 |          |               |            |           |         |      | 1            |                    |                 |  |  |
| <b>Demand Information</b>                    |                                |                  |          | EB      |                 |          | W             | /B         |           | NB      |      |              | SB                 |                 |  |  |
| Approach Movement                            |                                |                  | L        | Т       | R               | L        | 1             | Г R        | L         | Т       | R    | L            | Т                  | R               |  |  |
| Demand ( v ), veh/h                          |                                |                  | 33       | 222     | 19              | 34       | 24            | 49 10      | 44        | 237     | 65   | 6            | 87                 | 16              |  |  |
|  |                                |                  | ili.     |         |                 |          |               |            |           |         |      |              |                    |                 |  |  |
| Signal Information                           |                                |                  |          | 215     | _ ₹             | =        |               |            |           |         |      |              |                    | _               |  |  |
| Cycle, s 45.3                                | Reference Phase                | 2                |          | - SA2   | 'R <sup>i</sup> |          |               |            |           |         | 1    | $\mathbf{Y}$ | 3                  | $\mathbf{\Phi}$ |  |  |
| Offset, s 0                                  | Reference Point                | End              | Green    | 20.0    | 12.1            | 0.0      | 0.0           | 0.0        | 0.0       | _       |      | <b></b> -    |                    | <u> </u>        |  |  |
| Uncoordinated Yes                            | Simult. Gap E/W                | On               | Yellow   | 5.6     | 5.6             | 0.0      | 0.0           | 0.0        | 0.0       |         |      |              |                    |                 |  |  |
| Force Mode Fixed                             | Simult. Gap N/S                | On               | Red      | 1.0     | 1.0             | 0.0      | 0.0           | 0.0        | 0.0       |         | 5    | 6            | 7                  | 8               |  |  |
|  |                                |                  |          |         |                 |          |               |            |           |         |      |              |                    |                 |  |  |
| Traffic Information                          |                                |                  | <u> </u> | EB      |                 |          | WE            | 3          |           | NB      |      |              | SB                 |                 |  |  |
| Approach Movement                            |                                |                  | L        | Т       | R               | L        | Т             | R          | L         | Т       | R    | L            | Т                  | R               |  |  |
| Demand ( <i>v</i> ), veh/h                   |                                |                  | 33       | 222     | 19              | 34       | 249           | 9 10       | 44        | 237     | 65   | 6            | 87                 | 16              |  |  |
| Initial Queue (Qb), veh/                     | /h                             |                  | 0        | 0       | 0               | 0        | 0             | 0          | 0         | 0       | 0    | 0            | 0                  | 0               |  |  |
| Base Saturation Flow F                       | Rate ( <i>s</i> ₀), veh/h      |                  | 1900     | 1900    | 1900            | 1900     | 190           | 0 1900     | 1900      | 1900    | 1900 | 1900         | 1900               | 1900            |  |  |
| Parking (Nm), man/h                          |                                |                  |          | None    |                 |          | Non           | e          |           | None    |      |              | None               |                 |  |  |
| leavy Vehicles ( <i>P</i> <sub>HV</sub> ), % |                                |                  |          | 14      |                 |          | 15            |            |           | 18      |      |              | 20                 |                 |  |  |
| Ped / Bike / RTOR, /h                        | ed / Bike / RTOR, /h           |                  |          | 0       | 0               | 0        | 0             | 0          | 0         | 0       | 0    | 0            | 0                  | 0               |  |  |
| Buses ( <i>N</i> <sub>b</sub> ), buses/h     | ses/h                          |                  |          | 0       | 0               | 0        | 0             | 0          | 0         | 0       | 0    | 0            | 0                  | 0               |  |  |
| Arrival Type (AT)                            |                                |                  | 3        | 3       | 3               | 3        | 3             | 3          | 3         | 3       | 3    | 3            | 3                  | 3               |  |  |
| Upstream Filtering (I)                       |                                |                  | 1.00     | 1.00    | 1.00            | 1.00     | 1.00          | 0 1.00     | 1.00      | 1.00    | 1.00 | 1.00         | 1.00               | 1.00            |  |  |
| Lane Width ( <i>W</i> ), ft                  |                                |                  |          | 12.0    |                 |          | 12.0          | 0          |           | 12.0    |      |              | 12.0               |                 |  |  |
| Turn Bay Length, ft                          |                                |                  |          | 0       |                 |          | 0             |            |           | 0       |      |              | 0                  |                 |  |  |
| Grade ( <i>Pg</i> ), %                       |                                |                  |          | 0       |                 |          | 0             |            |           | 0       |      |              | 0                  |                 |  |  |
| Speed Limit, mi/h                            |                                |                  | 55       | 55      | 55              | 55       | 55            | 55         | 55        | 55      | 55   | 55           | 55                 | 55              |  |  |
| Phase Information                            |                                |                  | EBI      |         | ERT             | W/RI     |               | W/BT       | NBI       |         | NRT  | SBI          |                    | SBT             |  |  |
| Maximum Green (Gree                          | ) or Phase Split s             |                  |          |         | 30.0            | VVDL     | -             | 30.0       |           |         | 60.0 |              |                    | SD 0            |  |  |
| Yellow Change Interva                        |                                |                  | <u> </u> |         | 56              |          | +             | 5.6        |           |         | 5.6  |              | <u> </u>           | 5.6             |  |  |
| Red Clearance Interva                        | $ (R_c) $ s                    | _                |          |         | 1.0             |          | -             | 1.0        | <u> </u>  |         | 1.0  |              |                    | 1.0             |  |  |
| Minimum Green ( Gmin                         |                                |                  |          |         | 10              |          | $\rightarrow$ | 10         | <u> </u>  |         | 20   |              |                    | 20              |  |  |
| Start-Up   ost Time ( /t)                    | ,, <del>S</del>                |                  | 2.0      |         | 2.0             | 2.0      | -             | 2.0        | 2.0       |         | 2.0  | 2.0          |                    | 2.0             |  |  |
| Extension of Effective                       | , c<br>Green (e), s            |                  | 2.0      |         | 2.0             | 2.0      | +             | 2.0        | 2.0       | +       | 2.0  | 2.0          |                    | 2.0             |  |  |
| Passage (PT), s                              |                                |                  | 2.0      |         | 3.5             | 2.0      | -             | 3.5        | 2.0       |         | 3.5  | 2.0          |                    | 3.5             |  |  |
| Recall Mode                                  |                                |                  |          |         | Off             |          | -             | Off        |           | -       | Min  |              |                    | Min             |  |  |
| Dual Entry                                   |                                |                  |          |         | Yes             |          | -             | Yes        |           |         | Yes  |              |                    | Yes             |  |  |
| Walk (Walk), s                               |                                |                  |          |         | 0.0             |          | -             | 0.0        |           |         | 0.0  |              |                    | 0.0             |  |  |
| Pedestrian Clearance                         | Time (PC), s                   |                  |          |         | 0.0             |          |               | 0.0        |           |         | 0.0  |              |                    | 0.0             |  |  |
|  |                                |                  |          |         |                 |          |               | 5.0        |           |         |      |              |                    |                 |  |  |
| Multimodal Information                       | on                             |                  |          | EB      |                 |          | WE            | 3          |           | NB      |      |              | SB                 |                 |  |  |
| 85th % Speed / Rest in                       | walk / Corner Radi             | us               | 0.0      | No      | 25.0            | 0.0      | No            | 25.0       | 0.0       | No      | 25.0 | 0.0          | No                 | 25.0            |  |  |
| Walkway / Crosswalk V                        | Vidth / Length, ft             |                  | 9.0      | 12.0    | 0.0             | 9.0      | 12.0          | 0.0        | 9.0       | 12.0    | 0.0  | 9.0          | 12.0               | 0.0             |  |  |
| Street Width / Island /                      | Curb, ft                       |                  | 0.0      | 0       | No              | 0.0      | 0             | No         | 0.0       | 0       | No   | 0.0          | 0                  | No              |  |  |
| Width Outside / Bike La                      | ane / Shoulder, ft             |                  | 12.0     | 5.0     | 2.0             | 12.0     | 5.0           | 2.0        | 12.0      | 5.0     | 2.0  | 12.0         | 5.0                | 2.0             |  |  |
| Pedestrian Signal / Oc                       | rian Signal / Occupied Parking |                  |          |         | 0.50            | No       |               | 0.50       | No        |         | 0.50 | No           |                    | 0.50            |  |  |

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HCS<sup>™</sup> Streets Version 2023

## **HCS Signalized Intersection Results Summary**

|                                   |                  |                               | Intersection Information |          |         |          |          |               |           |          |         |             |                     |                     |                    |  |
|-----------------------------------|------------------|-------------------------------|--------------------------|----------|---------|----------|----------|---------------|-----------|----------|---------|-------------|---------------------|---------------------|--------------------|--|
| General Inform                    | nation           |                               |                          |          |         |          |          |               | Intersect | tion Inf | ormatic | on          | <u></u>             | ***                 | <del>بر</del><br>۲ |  |
| Agency                            |                  | SINGH + Associate             | s                        |          |         |          |          |               | Duration, | h        | 0.250   |             |                     | <b>*</b> *          |                    |  |
| Analyst                           |                  | Greg Gedemer                  |                          | Analys   | sis Da  | te 12/19 | /2023    |               | Area Typ  | е        | Other   |             | 4                   |                     | 4                  |  |
| Jurisdiction                      |                  | ODOT                          |                          | Time F   | Period  | PM P     | eak      |               | PHF       |          | 0.96    |             | <b>*</b> - <b>*</b> | w  E                |                    |  |
| Urban Street                      |                  | MAD US 42 14.00               |                          | Analys   | sis Yea | ar 2022  | Base Li  | ne            | Analysis  | Period   | 1> 7:0  | 00          | 4                   |                     |                    |  |
| Intersection                      |                  | US 42 at SR 29                |                          | File Na  | ame     | US 42    | 2-SR 29  | PM P          | eak - 202 | 2 Base   | ine.xus |             |                     | <b>*</b> ‡ <b>#</b> |                    |  |
| Project Descrip                   | tion             | US 42 Safety Study            | /                        | 4        |         | R        |          |               |           |          |         |             |                     | * 1 4 11            | × (*               |  |
|                                   |                  |                               |                          | 1        |         |          |          |               |           |          |         |             | <u> </u>            |                     |                    |  |
| Demand Inform                     | nation           |                               |                          |          | EB      | }        |          | W             | 3         |          | NB      |             |                     | SB                  |                    |  |
| Approach Move                     | ement            |                               |                          | L        | Т       | R        | L        | Т             | R         | L        | Т       | R           | L                   | Т                   | R                  |  |
| Demand ( <i>v</i> ), v            | eh/h             |                               |                          | 33       | 222     | 2 19     | 34       | 24            | 9 10      | 44       | 237     | 65          | 6                   | 87                  | 16                 |  |
|                                   | 4!               |                               |                          | 1        | 1 11:   |          |          | -             | _         | -        |         |             |                     |                     |                    |  |
| Signal Informa                    | tion             |                               | -                        |          | 205     |          |          |               |           |          |         |             | sta                 |                     |                    |  |
| Cycle, s                          | 45.3             | Reference Phase               | 2                        |          | - N     | γŔ '     |          |               |           |          |         | 1           | 2                   | 3                   | ★ ₄                |  |
| Offset, s                         | 0                | Reference Point               | End                      | Green    | 20.0    | 12.1     | 0.0      | 0.0           | 0.0       | 0.0      |         |             |                     |                     | 5                  |  |
| Uncoordinated                     | Yes              | Simult. Gap E/W               | On                       | Yellow   | 5.6     | 5.6      | 0.0      | 0.0           | 0.0       | 0.0      | _       |             |                     |                     |                    |  |
| Force Mode                        | Fixed            | Simult. Gap N/S               | On                       | Red      | 1.0     | 1.0      | 0.0      | 0.0           | 0.0       | 0.0      |         | 5           | 6                   | 7                   | 8                  |  |
| Timer Desults                     |                  |                               | _                        |          | 1       | EDT      |          |               | MDT       | ND       | _       |             |                     | _                   | ODT                |  |
| Accident Accident                 |                  |                               |                          | EBL      | -       |          | VVB      |               | 0         | INBI     | 2       |             | SBL                 | -                   | 5B1                |  |
| Assigned Phase                    | e                |                               |                          | <u> </u> |         | 4        | <u> </u> |               | 0         |          | 2       |             | <u> </u>            |                     | 0                  |  |
| Case Number                       |                  |                               |                          |          | -       | 0.0      |          |               | 0.0       |          |         | 0.U<br>26.6 | <u> </u>            |                     | 0.0                |  |
| Change Duration                   | ( V+D            |                               |                          |          |         | 6.6      | <u> </u> |               | 10.7      |          | 20.0    |             | <u> </u>            |                     | 20.0               |  |
|                                   | $\frac{1}{1}$    | (), S                         |                          |          |         | 0.0      |          |               | 0.0       |          |         | 0.0         |                     |                     | 0.0                |  |
|                                   | co Timo          | $(a_{\lambda})$ s             |                          |          |         | 4.4      |          |               | 4.4       |          |         | 4.4         |                     |                     | 4.4                |  |
| Green Extension Time ( $g_s$ ), s |                  |                               |                          |          |         | 9.0      |          |               | 9.6       |          |         | 9.J<br>2.2  |                     |                     | 4.0                |  |
| Green Extension Time ( g e ), s   |                  |                               |                          |          | -       | 2.5      |          | $\rightarrow$ | 2.5       |          |         | 2.2         |                     |                     | 2.2                |  |
| Phase Call Probability            |                  |                               |                          |          |         | 0.01     |          |               | 0.01      |          | 0.00    |             |                     |                     | 0.00               |  |
|                                   | onity            |                               |                          |          |         | 0.01     |          |               | 0.01      |          | 0.00    |             |                     |                     | 0.00               |  |
| Movement Gro                      | oup Res          | ults                          |                          | EB       |         |          |          | WB            |           |          | NB      |             |                     | SB                  |                    |  |
| Approach Move                     | ement            |                               |                          | L        | Т       | R        | L        | Т             | R         | L        | Т       | R           | L                   | Т                   | R                  |  |
| Assigned Move                     | ment             |                               |                          | 7        | 4       | 14       | 3        | 8             | 18        | 5        | 2       | 12          | 1                   | 6                   | 16                 |  |
| Adjusted Flow F                   | Rate( <i>v</i>   | ), veh/h                      |                          |          | 285     |          |          | 305           |           |          | 360     |             |                     | 114                 |                    |  |
| Adjusted Satura                   | ation Flo        | ow Rate ( <i>s</i> ), veh/h/l | n                        |          | 1604    | 1        |          | 1602          | 2         |          | 1533    |             |                     | 1547                |                    |  |
| Queue Service                     | Time ( g         | gs), s                        |                          |          | 0.0     |          |          | 0.7           |           |          | 0.0     |             |                     | 0.0                 |                    |  |
| Cycle Queue C                     | learance         | e Time ( <i>g c</i> ), s      |                          |          | 7.0     |          |          | 7.6           |           |          | 7.5     |             |                     | 2.0                 |                    |  |
| Green Ratio ( g                   | /C)              |                               |                          |          | 0.27    | ·        |          | 0.27          |           |          | 0.44    |             |                     | 0.44                |                    |  |
| Capacity ( <i>c</i> ), v          | /eh/h            |                               |                          |          | 518     |          |          | 517           |           |          | 766     |             |                     | 766                 |                    |  |
| Volume-to-Capa                    | acity Ra         | tio(X)                        |                          |          | 0.55    | 1        |          | 0.590         | )         |          | 0.470   |             |                     | 0.148               |                    |  |
| Back of Queue                     | (Q), ft          | /In ( 95 th percentile        | )                        |          | 97.6    | ;        |          | 107.7         | 7         |          | 78.6    |             |                     | 20.4                |                    |  |
| Back of Queue                     | ( Q ), ve        | eh/In ( 95 th percenti        | le)                      |          | 3.5     |          |          | 3.8           |           |          | 2.7     |             |                     | 0.7                 |                    |  |
| Queue Storage                     | Ratio (          | RQ) (95 th percent            | tile)                    |          | 0.00    | )        |          | 0.00          |           |          | 0.00    |             |                     | 0.00                |                    |  |
| Uniform Delay (                   | ( d 1 ), si      | /veh                          |                          | 14.7     | ·       |          | 14.9     |               |           | 9.2      |         |             | 7.6                 |                     |                    |  |
| Incremental De                    | lay ( <i>d</i> 2 | ), s/veh                      |                          | 1.1      |         |          | 1.3      |               |           | 0.5      |         |             | 0.1                 |                     |                    |  |
| Initial Queue De                  | elay(d           | з ), s/veh                    |                          | 0.0      |         |          | 0.0      |               |           | 0.0      |         |             | 0.0                 |                     |                    |  |
| Control Delay (                   | d ), s/ve        | eh                            |                          | 15.8     | ;       |          | 16.2     |               |           | 9.7      |         |             | 7.7                 |                     |                    |  |
| Level of Service                  | rvice (LOS)      |                               |                          |          | В       |          |          | В             |           |          | A       |             |                     | A                   |                    |  |
| Approach Delay, s/veh / LOS       |                  |                               | 15.8                     | 3        | В       | 16.2     | 2        | В             | 9.7       |          | А       | 7.7         |                     | А                   |                    |  |
| Intersection De                   | lay, s/ve        | h / LOS                       |                          |          |         | 1        | 3.0      |               |           |          |         |             | В                   |                     |                    |  |
|                                   |                  |                               |                          |          |         |          |          |               |           |          |         |             |                     |                     |                    |  |
| Multimodal Re                     | sults            | // 00                         |                          |          | EB      | _        |          | WB            | _         |          | NB      | _           |                     | SB                  | _                  |  |
| Pedestrian LOS                    | Score            | / LOS                         |                          | 1.67     |         | В        | 1.67     |               | В         | 1.65     | >       | В           | 1.65                | ,                   | В                  |  |
| Bicycle LOS Sc                    | EOS Score / LOS  |                               |                          | 0.96     | )       | A        | 0.99     | 9             | A         | 1.08     | 5       | A           | 0.67                |                     | A                  |  |

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HCS™ Streets Version 2023

## HCS Signalized Intersection Intermediate Values

| General Information          |   |      |        |          |        |         |          |     | Inters | section  | Info          | rmati | ion        |       |            | ta la    |
|------------------------------|---|------|--------|----------|--------|---------|----------|-----|--------|----------|---------------|-------|------------|-------|------------|----------|
| Agency SI                    | NGH + Associates  |      |        |          |        |         |          |     | Durat  | ion, h   |               | 0.25  | 0          |       | <b>*</b> * |          |
| Analyst Gro                  | reg Gedemer   |      | Anal   | ysis     | Date 1 | 2/19/20 | 23       |     | Area   | Туре     |               | Othe  | er         |       |            | 4<br>5   |
| Jurisdiction OE              | ТОСТ  |      | Time   | Per      | iod F  | PM Peal | <b>‹</b> |     | PHF    |          |               | 0.96  |            | *-*   | W = E      |          |
| Urban Street MA              | AD US 42 14.00  |      | Anal   | ysis `   | Year 2 | 2022 Ba | se Lin   | е   | Analy  | vsis Per | iod           | 1> 7  | :00        | *     |            | *        |
| Intersection US              | S 42 at SR 29   |      | File I | Nam      | e l    | JS 42-S | R 29 F   | PMI | Peak - | 2022 B   | aselir        | ne.xu | s          |       | **         |          |
| Project Description US       | S 42 Safety Study                                       |      |        |          |        |         |          |     |        |          |               |       |            |       | ነ          | 1 1      |
|                              |   |      |        |          |        |         |          |     |        | r        |               |       |            |       |            |          |
| Demand Information           |   |      |        |          | EB     |         |          | V   | VB     |          |               | NB    | 3          |       | SB         |          |
| Approach Movement            |   |      | L      |          | Т      | R       | L        |     | Т      | R        | L             | Т     | R          | L     | Т          | R        |
| Demand ( v ), veh/h          |   |      | 33     |          | 222    | 19      | 34       | 2   | .49    | 10       | 44            | 237   | 7 65       | 6     | 87         | 16       |
| Cignel Information           |   |      |        |          |        | E       |          |     |        |          |               |       |            | _     | 1          |          |
| Signal Information           | -f  | 0    |        | 2        | ΨS  .  | 2 H     |          |     |        |          |               |       |            | sta   |            | ~        |
| Cycle, s 45.3 Re             | eference Phase  | Z    |        |          | 517 E  | ן * ≿   |          |     |        |          |               |       | 1          | 2     | 3          |          |
| Ulisel, s U Re               |   | Ena  | Gree   | n 2      | 0.0    | 12.1    | 0.0      | 0.  | .0 (   | ).0      | 0.0           |       |            |       |            | <u> </u> |
| Uncoordinated Yes Si         | imult. Gap E/W  | On   | Yello  | w 5      | .6     | 5.6     | 0.0      | 0.  | .0 (   | 0.0      | 0.0           | -     | <b>_</b> _ | ₽     | ~          | ×.       |
| Force Mode Fixed Si          | inuit. Gap N/S  | On   | Reu    |          | .0     | 1.0     | 0.0      | 0.  | .0  (  | ).0      | 0.0           |       | 5          | 6     | 1          | 8        |
| Saturation Flow / Delay      |   | 1.1  |        | т        | R      | 1.1     | т        | -   | R      | 1        | -             | г     | R          |       | т          | R        |
| Lane Width Adjustment Fa     | $actor(f_w)$  | 1.00 | 0 1    | 1        | 1 000  | 1 000   | 1 00     | 0   | 1 000  |          | 1 (           | 00    | 1 000      | 1 000 | 1 000      | 1 000    |
| Heavy Vehicles and Grade     | a Eactor $(f_{\mu\nu\alpha})$                           | 1.00 |        | 801      | 1.000  | 1.000   | 0.88     | 3   | 1.000  | 1.000    |               | 260   | 1.000      | 1.000 | 0.844      | 1.000    |
| Parking Activity Adjustmen   | $f_{\text{rector}}(f_{\text{rector}})$                  | 1.00 | 0 0.   | 000      | 1.000  | 1.000   | 1 00     | 0   | 1.000  | 1.000    |               |       | 1.000      | 1.000 | 1 000      | 1.000    |
| Bus Blockage Adjustment      | Eactor $(f_{\mu})$                                      | 1.00 | 0 1    | 000      | 1.000  | 1.000   | 1.00     |     | 1.000  | 1.000    | 1.0           |       | 1.000      | 1.000 | 1.000      | 1.000    |
| Area Type Adjustment Eac     | $\frac{1}{2} \operatorname{actor} \left( f_{a} \right)$ | 1.00 | 0 1.   | 000      | 1.000  | 1.000   | 1.00     |     | 1.000  | 1.000    |               |       | 1.000      | 1.000 | 1.000      | 1.000    |
| Lane Utilization Adjustment  | nt Factor (ful)   | 1.00 | 0 1    | 000      | 1.000  | 1.000   | 1.00     |     | 1.000  | 1.000    | $\frac{1}{1}$ |       | 1.000      | 1.000 | 1.000      | 1.000    |
| Left-Turn Adjustment Facto   | $ror (f_{t,\tau})$                                      | 0.05 | 7 0    | 000      | 1.000  | 0.960   | 0.05     | 5   | 1.000  | 0.070    |               | 300   | 1.000      | 0.000 | 0.964      | 1.000    |
| Right-Turn Adjustment Facto  | ctor (fat)  | 0.90 | 0.     | 000      | 0 0/8  | 0.900   | 0.93     | 0   | 0.055  | 0.970    |               | 000   | 0.030      | 0.990 | 0.904      | 0.964    |
| Left-Turn Pedestrian Adjus   | stment Eactor (funk)                                    | 1.00 | 0.     | 000      | 0.940  | 1 000   | 0.00     |     | 0.900  | 1 000    | 0.0           | 00    | 0.959      | 1 000 | 0.000      | 0.904    |
| Pight Turn Pod Riko Adjus    | stment Factor ( <i>ILpb</i> )                           | 1.00 |        | _        | 1 000  | 1.000   |          | +   | 1 000  | 1.000    | '             |       | 1 000      | 1.000 |            | 1 000    |
| Work Zone Adjustment Fac     | f(t, r, r)  | 1.00 | 0 1    | 000      | 1.000  | 1 000   | 1 00     | 0   | 1.000  | 1 000    | 1 (           | 000   | 1.000      | 1 000 | 1 000      | 1.000    |
| DDI Factor ( $f_{DDI}$ )     |   | 1.00 | 0 1    | 000      | 1.000  | 1.000   | 1.00     |     | 1.000  | 1.000    | 1.0           |       | 1.000      | 1.000 | 1.000      | 1.000    |
| Left-Turn Prot CAV Adi E     | actor (fcavorat)  | 1.00 | .0 1.  | 000      | 1.000  | 1.000   | 1.00     |     | 1.000  | 1.000    | , 1.0         | ,00   | 1.000      | 1.000 | 1.000      | 1.000    |
| Left-Turn Perm CAV Adi       | Eactor (fcAVperm)                                       | 1.0  | 0      |          |        | 1.00    |          | +   |        | 1 00     | -             |       |            | 1 00  |            |          |
| Movement Saturation Flow     | w Rate (s) veh/h  | 1.0  | 3 1:   | 300      | 111    | 186     | 136      | 1   | 55     | 195      | 10            | 50    | 288        | 85    | 1234       | 227      |
| Proportion of Vehicles Arriv | iving on Green $(P)$                                    | 0.2  | 7 0    | 27       | 0.27   | 0.27    | 0.27     | 7   | 0.27   | 0.44     | 0             | 44    | 0.44       | 0.44  | 0.44       | 0.44     |
| Incremental Delay Factor (   | (k)   |      | 0      | 13       | 0.2.   |         | 0.13     | 3   |        | ••••     | 0.            | 13    |            |       | 0.13       |          |
| nioronioniai Bolay Pacior    | (**)  |      |        | 10       |        |         | 0.10     |     |        |          | 0.            | 10    |            |       | 0.10       |          |
| Signal Timing / Movemer      | nt Groups   | E    | BL     | E        | BT/R   | WE      | SL       | W   | 'BT/R  | NE       | 3L            | N     | BT/R       | SBL   | \$         | SBT/R    |
| Lost Time (t <sub>L</sub> )  |   |      |        |          | 6.6    |         |          | 6   | 6.6    |          |               |       | 6.6        |       |            | 6.6      |
| Green Ratio (g/C)            |   |      |        | (        | 0.27   |         |          | 0   | ).27   |          |               | (     | ).44       |       |            | 0.44     |
| Permitted Saturation Flow    | Rate ( <i>s</i> <sub>p</sub> ), veh/h/ln                |      |        | 1        | 1127   |         |          | 1   | 147    |          |               | 1     | 307        |       |            | 1082     |
| Shared Saturation Flow Ra    | ate (ssh), veh/h/ln                                     |      |        | 1        | 1563   |         |          | 1   | 559    |          |               | 1     | 544        |       |            | 1540     |
| Permitted Effective Green    | Time ( <i>g</i> <sub><i>p</i></sub> ), s                |      |        | <u> </u> | 12.1   |         |          | 1   | 2.1    |          |               | 2     | 20.0       |       |            | 20.0     |
| Permitted Service Time (g    | lu), s  |      |        |          | 4.5    |         |          | Ę   | 5.2    |          |               | 1     | 18.0       |       |            | 12.5     |
| Permitted Queue Service      | Time ( <i>g</i> <sub>ps</sub> ), s                      |      |        |          | 0.0    |         |          | (   | 0.7    |          |               |       | 0.0        |       |            | 0.0      |
| Time to First Blockage (gr)  | ), S  |      |        |          | 5.3    |         |          | Ę   | 5.2    |          |               |       | 8.9        |       |            | 14.8     |
| Queue Service Time Befor     | re Blockage ( <i>g</i> ₅), s                            |      |        |          | 5.3    |         |          | 5   | 5.2    |          |               |       | 5.3        |       |            | 1.6      |
| Protected Right Saturation   | n Flow ( <i>s</i> <sub>R</sub> ), veh/h/li              | ۱    |        |          |        |         |          |     |        |          |               |       |            |       |            |          |
| Protected Right Effective C  | Green Time ( <i>g</i> <sub>R</sub> ), s                 |      |        |          |        |         |          |     |        |          |               |       |            |       |            |          |
| Multimodal                   |   |      |        | ΞB       |        |         | W        | 3   |        |          | Ν             | l₿    |            |       | SB         |          |
| Pedestrian Fw / Fv           |   | 0.   | 972    | 0        | 0.000  | 0.97    | 2        | 0.  | .000   | 0.9      | 72            | 0     | .000       | 0.97  | 2          | 0.000    |
| Pedestrian Fs / Fdelay       |   | 0.   | 000    | 0        | .100   | 0.00    | 0        | 0.  | .100   | 0.0      | 00            | 0     | .078       | 0.00  | 0          | 0.078    |
| Pedestrian Mcorner / Mcw     |   | 0    | .00    |          |        | 0.0     | 0        |     |        | 0.0      | 00            |       |            | 0.00  | )          |          |
| Bicycle cb / db              |   | 53   | 5.07   | 1        | 2.16   | 535.    | 07       | 12  | 2.16   | 882      | .51           | 1     | 7.08       | 882.5 | 51         | 7.08     |
| Bicycle Fw / Fv              |   | -3   | .64    | (        | 0.47   | -3.6    | 4        | 0   | ).50   | -3.      | 64            | (     | ).59       | -3.64 | 1          | 0.19     |

US 42-SR 29 PM Peak - 2022 Baseline.xus

## HCS Signalized Intersection Results Graphical Summary

|                            | HCS Sign               | alize  | d Inte  | rsecti   | ion Re                   | esults  | s Grap | ohical    | l Sum    | mary        |    |                 |                |          |
|----------------------------|------------------------|--|---------|----------|--------------------------|---------|--------|-----------|----------|-------------|----|-----------------|----------------|----------|
| General Information        |                        |  |         |          |                          |         | In     | tersect   | ion Info | ormatio     | n  |                 | ╵┥╎┿╷          | be la    |
| Agency                     | INGH + Associates      | 3  |         |          |                          |         | D      | uration,  | h        | 0.250       |    |                 | *              |          |
| Analyst G                  | reg Gedemer            |  | Analys  | is Date  | 12/19/2                  | 2023    | A      | rea Type  | e        | Other       |    | <br>            |                | ۲.<br>۲. |
| Jurisdiction O             | DOT                    |  | Time F  | Period   | PM Pe                    | ak      | PI     | HF        |          | 0.96        |    | <b>→</b><br>-{- | w≜E            |          |
| Urban Street M             | IAD US 42 14.00        |  | Analys  | sis Year | 2022 B                   | ase Lir | ie Ai  | nalysis l | Period   | 1> 7:0      | 0  | *               |                | 4<br>17  |
| Intersection U             | S 42 at SR 29          |  | File Na | ame      | US 42-                   | SR 29   | PM Pea | ak - 202  | 2 Basel  | ine.xus     | -  |                 | भौन            |          |
| Project Description U      | S 42 Safety Study      |  |         |          |                          |         |        |           |          |             |    | 1               | 1<br>1 1 1 4 M | <b>۴</b> |
|                            | , ,                    |  |         |          |                          |         |        |           |          |             |    |                 |                |          |
| Demand Information         |                        |  |         | EB       |                          |         | WB     |           |          | NB          |    |                 | SB             |          |
| Approach Movement          |                        |  | L       | Т        | R                        | L       | Т      | R         | L        | Т           | R  | L               | Т              | R        |
| Demand ( v ), veh/h        |                        |  | 33      | 222      | 19                       | 34      | 249    | 10        | 44       | 237         | 65 | 6               | 87             | 16       |
|                            |                        |  | ll.     | 1 11-    |                          |         |        |           |          |             |    |                 |                |          |
| Signal Information         |                        |  | -       | 205      | ≳_ ⊱                     |         |        |           |          |             |    | -+-             |                | -        |
| Cycle, s 45.3 R            | Reference Phase        | 2  |         | 512      | Ř                        |         |        |           |          |             | 1  |                 | 3              | - ← ₄    |
| Offset, s 0 R              | Reference Point        | End  | Green   | 20.0     | 12.1                     | 0.0     | 0.0    | 0.0       | 0.0      | _           |    |                 |                | <u> </u> |
| Uncoordinated Yes S        | Simult. Gap E/W        | On   | Yellow  | 5.6      | 5.6                      | 0.0     | 0.0    | 0.0       | 0.0      |             |    |                 |                |          |
| Force Mode Fixed S         | Simult. Gap N/S        | On   | Red     | 1.0      | 1.0                      | 0.0     | 0.0    | 0.0       | 0.0      |             | 5  | 6               | 7              | 8        |
|                            |                        |  |         |          |                          |         |        |           |          |             |    |                 |                |          |
| Movement Group Resul       | lts                    |  |         | EB       |                          |         | WB     |           |          | NB          |    |                 | SB             |          |
| Approach Movement          |                        |  | L       | Т        | R                        | L       | Т      | R         | L        | Т           | R  | L               | Т              | R        |
| Back of Queue (Q), ft/In   | n (95 th percentile)   | )  |         | 97.6     |                          |         | 107.7  |           |          | 78.6        |    |                 | 20.4           |          |
| Back of Queue (Q), veh     | /In ( 95 th percentile | e)   |         | 3.5      |                          |         | 3.8    |           |          | 2.7         |    |                 | 0.7            |          |
| Queue Storage Ratio ( R    | Q) (95 th percenti     | le)  |         | 0.00     |                          |         | 0.00   |           |          | 0.00        |    |                 | 0.00           |          |
| Control Delay ( d ), s/veh |                        |  |         | 15.8     |                          |         | 16.2   |           |          | 9.7         |    |                 | 7.7            |          |
| Level of Service (LOS)     |                        |  |         | В        |                          |         | В      |           |          | А           |    |                 | A              |          |
| Approach Delay, s/veh / L  | _OS                    |  | 15.8    | 3        | В                        | 16.2    |        | В         | 9.7      |             | А  | 7.7             |                | А        |
| Intersection Delay, s/veh  | / LOS                  |  |         |          | 13.                      | 0       |        |           |          |             |    | В               |                |          |
|                            |                        | OS A<br>OS B<br>OS C<br>OS D<br>OS E<br>OS F |         | 15.8     | 0.7<br>7.7<br>9.7<br>9.7 | 16.2    |        | Queue     | - D      | 3.8<br>elay | -  |                 |                |          |
US 42-SR 29 PM Peak - 2022 Baseline.xus



## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 PM Peak - 2022 Baseline.xus Generated: 2/15/2024 10:53:30 AM

#### **HCS Signalized Intersection Input Data**

|                                  |   |                     |      |         |         |        |          |        | P 01 - 0     |           |          |      |          |                    |              |
|----------------------------------|---|---------------------|------|---------|---------|--------|----------|--------|--------------|-----------|----------|------|----------|--------------------|--------------|
| General Inform                   | nation  |                     |      |         |         |        |          |        | Intersec     | tion Info | ormatio  | on   | 2        | ****               | 4 L <u>.</u> |
| Agencv                           |   | SINGH + Associate   | s    |         |         |        |          |        | Duration     | h         | 0.250    | -    |          | *                  |              |
| Analyst                          |   | Grea Gedemer        | -    | Analvs  | is Date | 12/19/ | 2023     | _      | Area Tvp     | e         | Other    |      | <br>     |                    | ~            |
| Jurisdiction                     |   | ODOT                |      | Time P  | eriod   | AM Pe  | eak      |        | PHF          |           | 0.96     |      | ⇒<br>∻-∻ | w∔E                | ↔<br>∻-      |
| Urban Street                     |   | MAD US 42 14.00     |      | Analvs  | is Year | 2043   | No-Build | ł      | Analvsis     | Period    | 1> 7:0   | 00   | -4<br>-4 |                    | ++<br>*r     |
| Intersection                     |   | US 42 at SR 29      |      | File Na | me      | US 42  | -SR 29   | AM F   | Peak - 204   | 3 No-Bi   | uild.xus |      |          | ste                | <u>_</u>     |
| Project Descrip                  | tion  | US 42 Safety Study  | ,    |         |         | 100    |          |        |              |           |          |      | 1        | ۲<br>• • • • • • • | * (*         |
| · · · <b>)</b> · · · · · · · · · |   | <b>-</b>            |      |         |         |        |          |        |              |           |          |      |          |                    |              |
| Demand Inform                    | nation  |                     |      |         | EB      |        |          | W      | 'B           |           | NB       |      |          | SB                 |              |
| Approach Move                    | ement   |                     |      | L       | Т       | R      | L        | ٦      | R            | L         | Т        | R    | L        | Т                  | R            |
| Demand ( v ), v                  | eh/h  |                     |      | 30      | 300     | 30     | 60       | 24     | 10 20        | 70        | 150      | 50   | 10       | 240                | 40           |
|                                  |   |                     |      | 11      |         |        |          |        |              | -         |          | _    |          | _                  |              |
| Signal Informa                   | ition   |                     |      | -       | 205     | 1 2 8  |          |        |              |           |          |      | -        |                    |              |
| Cycle, s                         | 48.1  | Reference Phase     | 2    |         | L 517   | 'R "   |          |        |              |           |          | 1    |          | 3                  | € ₄          |
| Offset, s                        | 0   | Reference Point     | End  | Green   | 20.0    | 14.9   | 0.0      | 0.0    | 0.0          | 0.0       |          |      |          |                    | <u> </u>     |
| Uncoordinated                    | Yes   | Simult. Gap E/W     | On   | Yellow  | 5.6     | 5.6    | 0.0      | 0.0    | 0.0          | 0.0       |          |      |          |                    |              |
| Force Mode                       | Fixed   | Simult. Gap N/S     | On   | Red     | 1.0     | 1.0    | 0.0      | 0.0    | 0.0          | 0.0       |          | 5    | 6        | 7                  | 8            |
| Traffic Informer                 | 4!  |                     | _    | 1       |         | _      |          | 10/5   | 2            |           |          | _    |          | 00                 | _            |
|                                  | tion  |                     |      |         | EB      | Р      |          |        | 3            |           |          | Р    |          | SB                 | P            |
| Approach Move                    | emeni   |                     |      |         | 1       | R 20   |          | 1      |              |           | 150      | R    |          | 1                  | R 40         |
| Demand (V), ve                   |   | 'h                  |      | 30      | 300     | 30     | 0        | 240    | ) 20         | 70        | 150      | 50   | 10       | 240                | 40           |
|                                  | (b), ven/   |                     | 0    | 1000    | 1000    | 1000   | 100      | 0      | 0            | 1000      | 0        | 0    | 0        | 0                  |              |
| Base Saturation                  | 1 FIOW F  | kale (So), ven/n    | 1900 | None    | 1900    | 1900   | Non      | 0 1900 | 1900         | Nene      | 1900     | 1900 | 1900     | 1900               |              |
| Parking (IVm), IT                | ), man/h<br>cles ( <i>P</i> <sub>H</sub> v), %    |                     |      |         | 14      |        |          | 1000   | e            |           | 10       |      |          |                    |              |
| Ded / Pike / PT                  | icles ( <i>P</i> <sub>HV</sub> ), %<br>/ RTOR, /h |                     |      |         | 0       | 0      | 0        | 15     | 0            | 0         | 10       | 0    | 0        | 20                 | 0            |
| Peu / Bike / KT                  | ke / RTOR, /h<br>Vø), buses/h                     |                     |      |         | 0       | 0      | 0        | 0      | 0            | 0         | 0        | 0    | 0        | 0                  | 0            |
| Arrival Type (A)                 | $P_{\rm S}(N_b)$ , buses/h<br>al Type ( $AT$ )    |                     |      |         | 2       | 2      | 2        | 2      | 0            | 0         | 2        | 0    | 0        | 0                  | 0            |
| Anivar Type (An                  | Type (AT)   |                     |      |         | 1 00    | 3      | 1 00     | 1.00   | 3            | 1 00      | 1 00     | 1 00 | 1.00     | 3                  | 3            |
| Upstream Filter                  | () ft   |                     |      | 1.00    | 12.0    | 1.00   | 1.00     | 12 (   | יי<br>ר<br>ר | 1.00      | 12.0     | 1.00 | 1.00     | 12.0               | 1.00         |
| Turn Bay Lengt                   | ), n<br>h ft                                      |                     |      |         | 0       |        |          | 0      | 5            |           | 0        |      |          | 0                  |              |
| Grade (Pg) %                     | 11, IL  |                     |      |         | 0       |        |          | 0      |              |           | 0        |      |          | 0                  |              |
| Speed Limit mi                   | i/h   |                     |      | 55      | 55      | 55     | 55       | 55     | 55           | 55        | 55       | 55   | 55       | 55                 | 55           |
|                                  | /11   |                     |      | - 55    | 55      | 55     | 55       | 55     | 00           | 55        | 55       | 55   | 55       | 55                 | 55           |
| Phase Informa                    | tion  |                     |      | EBL     |         | EBT    | WBI      | -      | WBT          | NBL       | -        | NBT  | SBL      |                    | SBT          |
| Maximum Gree                     | n ( <i>G</i> max)                                 | ) or Phase Split, s |      |         |         | 30.0   |          |        | 30.0         |           |          | 60.0 |          |                    | 60.0         |
| Yellow Change                    | Interval  | (Y), s              |      |         |         | 5.6    |          |        | 5.6          |           |          | 5.6  |          |                    | 5.6          |
| Red Clearance                    | Interval  | ( <i>Rc</i> ), s    |      |         |         | 1.0    |          |        | 1.0          |           |          | 1.0  |          |                    | 1.0          |
| Minimum Greer                    | ר ( <i>Gmin</i> )                                 | , S                 |      |         |         | 10     |          |        | 10           |           |          | 20   |          |                    | 20           |
| Start-Up Lost T                  | ime ( <i>lt</i> ),                                | , S                 |      | 2.0     |         | 2.0    | 2.0      |        | 2.0          | 2.0       |          | 2.0  | 2.0      |                    | 2.0          |
| Extension of Ef                  | fective (   | Green (e), s        |      | 2.0     |         | 2.0    | 2.0      |        | 2.0          | 2.0       |          | 2.0  | 2.0      |                    | 2.0          |
| Passage (PT), s                  | S   |                     |      |         |         | 3.5    |          |        | 3.5          |           |          | 3.5  |          |                    | 3.5          |
| Recall Mode                      | II Mode   |                     |      |         |         | Off    |          |        | Off          |           |          | Min  |          |                    | Min          |
| Dual Entry                       | ual Entry   |                     |      |         |         | Yes    |          |        | Yes          |           |          | Yes  |          |                    | Yes          |
| Walk ( <i>Walk</i> ), s          | k ( <i>Walk</i> ), s                              |                     |      |         |         | 0.0    |          |        | 0.0          |           |          | 0.0  |          |                    | 0.0          |
| Pedestrian Clea                  | strian Clearance Time ( <i>PC</i> ), s            |                     |      |         |         | 0.0    |          |        | 0.0          |           |          | 0.0  |          |                    | 0.0          |
| Multimerclal                     | o # 5 4 1   | mation              |      |         |         |        |          |        | ,            |           |          |      |          | <b>C</b> D         |              |
|                                  | modal Information                                 |                     |      | 0.0     | EB      | 25.0   | 0.0      | VVE    |              | 0.0       | NB       | 25.0 | 0.0      | SB                 | 25.0         |
| ooun % Speed /                   | h % Speed / Rest in Walk / Corner Radius          |                     |      | 0.0     | 12.0    | 25.0   | 0.0      | 10.    | 25.0         | 0.0       | 100      | 25.0 | 0.0      | 12.0               | 25.0         |
| Stroot Width / L                 | alkway / Crosswalk Width / Length, ft             |                     |      | 9.0     | 0       | 0.0    | 9.0      | 12.0   | 0.0          | 9.0       | 12.0     | 0.0  | 9.0      | 12.0               | 0.0          |
|                                  | Bike La   | Jurb, IL            |      | 0.0     | 0       |        | 0.0      | 50     |              | 0.0       | U<br>E O |      | 0.0      |                    |              |
| Podostrian Sim                   |   | ane / Shoulder, It  |      | IZ.U    | 5.0     | 2.0    | IZ.U     | 5.0    | 2.0          | IZ.U      | 5.0      | 2.0  | IZ.U     | 5.0                | 2.0          |
| recestrian Sigr                  |   | Supleu Parking      |      | INO     |         | J.5U   | INO      |        | 0.50         | INO       |          | 0.50 | INO      |                    | 0.50         |

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HCS™ Streets Version 2023

# HCS Signalized Intersection Results Summary

| General Inform              | nation  |                              |       |         |               |         |          |               | Intersect | tion Inf | ormatio  | on   | <u></u>   | ╡┵┿╪┶┊┊   | ⊾ L <u>a</u>         |
|-----------------------------|---|------------------------------|-------|---------|---------------|---------|----------|---------------|-----------|----------|----------|------|---|-----------|----------------------|
| Agency                      |   | SINGH + Associate            | s     |         |               |         |          |               | Duration, | h        | 0.250    |      |   | 4         |                      |
| Analyst                     |   | Greg Gedemer                 |       | Analys  | sis Dat       | e 12/19 | /2023    |               | Area Typ  | е        | Other    |      | 4   |           | ۲.<br>۲.             |
| Jurisdiction                |   | ODOT                         |       | Time F  | Period        | AM P    | eak      |               | PHF       |          | 0.96     |      |   | w A E     |                      |
| Urban Street                |   | MAD US 42 14.00              |       | Analys  | sis Yea       | ar 2043 | No-Build | t             | Analysis  | Period   | 1> 7:(   | 00   | *   |           | +<br>*               |
| Intersection                |   | US 42 at SR 29               |       | File Na | ame           | US 42   | 2-SR 29  | AM P          | eak - 204 | 3 No-B   | uild.xus |      |   | <b>*</b>  | ¥                    |
| Project Descrip             | tion  | US 42 Safety Study           | ,     | 1       |               |         |          |               |           |          |          |      | The second se | 4 1 4 M 1 | • (*                 |
|                             |   |                              |       |         |               |         |          |               |           |          |          |      |   |           |                      |
| Demand Inform               | nation  |                              |       |         | EB            |         |          | W             | 3         |          | NB       |      |   | SB        |                      |
| Approach Move               | ement   |                              |       | L       | T             | R       | L        | Т             | R         | L        | T        | R    | L   | Т         | R                    |
| Demand ( v ), v             | eh/h  |                              |       | 30      | 300           | ) 30    | 60       | 24            | 0 20      | 70       | 150      | 50   | 10  | 240       | 40                   |
|                             |   |                              |       | II      |               |         |          | _             |           | _        |          |      |   |           |                      |
| Signal Informa              | tion  |                              | -     |         | 205           | .3 5    | <u> </u> |               |           |          |          |      | -   |           |                      |
| Cycle, s                    | 48.1  | Reference Phase              | 2     |         | - S1          | γŘ'     |          |               |           |          |          | 1    |   | 3         | € ₄                  |
| Offset, s                   | 0   | Reference Point              | End   | Green   | 20.0          | 14.9    | 0.0      | 0.0           | 0.0       | 0.0      |          |      |   |           | <u>-</u><br><u>⊼</u> |
| Uncoordinated               | Yes   | Simult. Gap E/W              | On    | Yellow  | 5.6           | 5.6     | 0.0      | 0.0           | 0.0       | 0.0      |          |      |   |           |                      |
| Force Mode                  | Fixed   | Simult. Gap N/S              | On    | Red     | 1.0           | 1.0     | 0.0      | 0.0           | 0.0       | 0.0      |          | 5    | 6   | 7         | 8                    |
|                             |   |                              | _     |         | _             |         |          |               |           |          |          |      |   |           |                      |
| Timer Results               |   |                              |       | EBL     | -             | EBT     | WB       |               | WBT       | NB       | -        | NBT  | SBL   | -         | SBT                  |
| Assigned Phase              | 9   |                              |       |         | $\rightarrow$ | 4       |          | -+            | 8         |          | _        | 2    |   |           | 6                    |
| Case Number                 |   |                              |       |         |               | 8.0     |          |               | 8.0       |          |          | 8.0  |   |           | 8.0                  |
| Phase Duration              | , S   |                              |       |         | $\rightarrow$ | 21.5    |          | $\rightarrow$ | 21.5      | <u> </u> |          | 26.6 |   |           | 26.6                 |
| Change Period,              | (Y+R)   | c ), S                       |       |         | _             | 6.6     |          |               | 6.6       |          |          | 6.6  |   |           | 6.6                  |
| Max Allow Head              | hange Period, ( Y+R c ), s<br>ax Allow Headway ( <i>MAH</i> ), s<br>ueue Clearance Time ( <i>q</i> s ), s |                              |       |         |               | 4.5     |          | $\rightarrow$ | 4.5       |          | _        | 4.5  |   |           | 4.5                  |
| Queue Clearan               | ax Allow Headway ( $MAH$ ), s<br>ueue Clearance Time ( $g s$ ), s   |                              |       |         |               | 11.8    |          |               | 11.0      |          |          | 8.2  |   |           | 8.7                  |
| Green Extensio              | ueue Clearance Time ( g s ), s<br>reen Extension Time ( g e ), s  |                              |       |         |               | 3.1     |          |               | 3.1       |          |          | 2.8  |   |           | 2.8                  |
| Phase Call Prol             | bability  |                              |       |         | $\rightarrow$ | 1.00    |          |               | 1.00      | <u> </u> |          | 1.00 |   |           | 1.00                 |
| Max Out Proba               | bility  |                              |       |         |               | 0.04    |          |               | 0.03      |          |          | 0.00 |   |           | 0.00                 |
| Movement Gro                | oup Res   | ults                         |       |         | EB            |         |          | WB            |           |          | NB       |      |   | SB        |                      |
| Approach Move               | ement   |                              |       | L       | Т             | R       | L        | Т             | R         | L        | Т        | R    | L   | Т         | R                    |
| Assigned Move               | ment  |                              |       | 7       | 4             | 14      | 3        | 8             | 18        | 5        | 2        | 12   | 1   | 6         | 16                   |
| Adjusted Flow F             | Rate ( v  | ), veh/h                     |       |         | 375           |         |          | 333           |           |          | 281      |      |   | 302       |                      |
| Adjusted Satura             | ation Flo   | w Rate ( <i>s</i> ), veh/h/l | n     |         | 1624          |         |          | 1519          | )         |          | 1407     |      |   | 1555      |                      |
| Queue Service               | Time ( g  | g s ), S                     |       |         | 0.8           |         |          | 0.0           |           |          | 0.0      |      |   | 0.0       |                      |
| Cycle Queue C               | learance  | e Time ( g c ), s            |       |         | 9.8           |         |          | 9.0           |           |          | 6.2      |      |   | 6.7       |                      |
| Green Ratio ( g             | /C )  |                              |       |         | 0.31          |         |          | 0.31          |           |          | 0.42     |      |   | 0.42      |                      |
| Capacity ( c ), v           | /eh/h   |                              |       |         | 583           |         |          | 559           |           |          | 680      |      |   | 725       |                      |
| Volume-to-Capa              | acity Ra  | itio(X)                      |       |         | 0.643         | 3       |          | 0.597         | 7         |          | 0.414    |      |   | 0.417     |                      |
| Back of Queue               | (Q), ft   | /In ( 95 th percentile       | )     |         | 137.8         | 3       |          | 119.3         | 3         |          | 71.1     |      |   | 78.4      |                      |
| Back of Queue               | ( Q ), ve   | eh/In ( 95 th percenti       | le)   |         | 5.0           |         |          | 4.3           |           |          | 2.5      |      |   | 2.7       |                      |
| Queue Storage               | Ratio (   | RQ) (95 th percent           | tile) |         | 0.00          |         |          | 0.00          |           |          | 0.00     |      |   | 0.00      |                      |
| Uniform Delay (             |   |                              | 14.8  |         |               | 14.4    |          |               | 10.0      |          |          | 10.2 |   |           |                      |
| Incremental De              |   |                              | 1.4   |         |               | 1.2     |          |               | 0.5       |          |          | 0.5  |   |           |                      |
| Initial Queue De            |   |                              | 0.0   | 1       |               | 0.0     |          |               | 0.0       |          |          | 0.0  |   |           |                      |
| Control Delay (             |   |                              | 16.2  | 1       |               | 15.7    |          |               | 10.5      |          |          | 10.6 |   |           |                      |
| Level of Service            |   |                              | В     |         |               | В       |          |               | В         |          |          | В    |   |           |                      |
| Approach Delay, s/veh / LOS |   |                              |       | 16.2    | 2             | В       | 15.7     | 7             | В         | 10.5     | 5        | В    | 10.6  | 3         | В                    |
| Intersection De             |   |                              |       | 1:      | 3.5           |         |          |               |           |          | В        |      |   |           |                      |
|                             |   |                              |       |         |               |         |          |               |           |          |          |      |   |           |                      |
| Multimodal Results          |   |                              |       |         | EB            |         |          | WB            |           |          | NB       |      |   | SB        |                      |
| Pedestrian LOS              | Aultimodal Results Pedestrian LOS Score / LOS   |                              |       |         | /             | В       | 1.67     | 7             | В         | 1.66     | 3        | В    | 1.66  | 3         | В                    |
| Bicycle LOS Sc              | ore / LC  | DS                           |       | 1.11    |               | А       | 1.04     | 1             | A         | 0.95     | 5        | А    | 0.99  | )         | A                    |

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HCS™ Streets Version 2023

# HCS Signalized Intersection Intermediate Values

| General Inform              | nation   |   |      |        |            |        |           |          |    | Inters | sectio  | n Info | rmat   | ion   |            | ┙┥┵┿╸↓  | ta la          |
|-----------------------------|--|---|------|--------|------------|--------|-----------|----------|----|--------|---------|--------|--------|-------|------------|---------|----------------|
| Agency                      |  | SINGH + Associates                          |      |        |            |        |           |          |    | Durat  | ion, h  |        | 0.25   | 0     |            | 4       |                |
| Analyst                     |  | Greg Gedemer                                |      | Ar     | nalysis    | Date   | 12/19/20  | )23      |    | Area   | Туре    |        | Othe   | er    |            |         | ت<br>بلا<br>ال |
| Jurisdiction                |  | ODOT  |      | Tir    | me Per     | riod / | AM Peal   | k        |    | PHF    |         |        | 0.96   |       | * -*       | W = E   |                |
| Urban Street                |  | MAD US 42 14.00                             |      | Ar     | nalysis    | Year 2 | 2043 No   | -Build   |    | Analy  | vsis Pe | riod   | 1> 7   | :00   | 4          |         | *              |
| Intersection                |  | US 42 at SR 29                              |      | Fil    | le Nam     | ie l   | JS 42-S   | R 29     | AM | Peak - | 2043 N  | lo-Bu  | ild.xu | s     |            | **      |                |
| Project Descrip             | tion   | US 42 Safety Study                          |      |        |            |        |           |          |    |        |         |        |        |       |            | ነ ላ ስቀጥ | * *            |
|                             |  |   |      |        |            |        |           |          |    |        |         |        |        |       |            |         |                |
| Demand Inform               | nation   |   |      |        |            | EB     |           |          | V  | NB     |         |        | NE     | 3     | _          | SB      | li             |
| Approach Move               | ement  |   |      |        | L          | Т      | R         | L        |    | Т      | R       | L      | Т      | R     |            | Т       | R              |
| Demand ( <i>v</i> ), v      | eh/h   |   |      |        | 30         | 300    | 30        | 60       | 2  | 240    | 20      | 70     | 15     | 0 50  | 10         | 240     | 40             |
| Signal Informa              | tion   |   |      |        |            |        | E.        |          |    |        |         |        |        |       |            |         |                |
|                             | 1011<br>19 1   | Poforonco Phasa                             | 2    | ¢      | 6          | 2422   | .a 🔚      |          |    |        |         |        |        |       | 512        |         | ~              |
| Offect s                    | 40.1   | Reference Priase                            | Z    |        |            | - SAZ  | $\exists$ |          |    |        |         |        |        | 1     | 2          | 3       |                |
| Uncoordinated               | Voc  |   | On   | Gr     | reen 2     | 20.0   | 14.9      | 0.0      | 0. | .0 0   | 0.0     | 0.0    | _      |       |            |         | -              |
| Force Mode                  | Fixed  | Simult Gap N/S                              | On   | Re     | ellow 5    | 0.6    | 5.6       | 0.0      | 0. | .0 (   | 0.0     | 0.0    | -11    | 5     | <b>↓</b> ■ | 7       | × 8            |
| T OFCE MODE                 | TIXCU  |   | OII  | 1.0    |            | .0     | 1.0       | 0.0      | 0. | .0 10  |         | 0.0    |        | Ŭ     |            |         | Ű              |
| Saturation Flo              | w / Dela   | av  |      |        | т          | R      |           | Т        |    | R      | 1       |        | т      | R     | 1          | Т       | R              |
| Lane Width Adi              | ustment  | Factor $(f_w)$                              | 1.00 | 20     | 1.000      | 1.000  | 1.000     | 1.00     | 00 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Heavy Vehicles              | and Gr   | ade Factor (fHVg)                           | 1.00 | 00     | 0.891      | 1.000  | 1.000     | 0.88     | 33 | 1.000  | 1.00    | ) 0    | 860    | 1.000 | 1.000      | 0.844   | 1.000          |
| Parking Activity            | Adjustn  | nent Factor $(f_p)$                         | 1.00 | 00     | 1.000      | 1.000  | 1.000     | 1.00     | )0 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Bus Blockage A              | Ing Activity Adjustment Factor (f <sub>p</sub> )<br>Blockage Adjustment Factor (f <sub>bb</sub> )                |   |      |        |            | 1.000  | 1.000     | 1.00     | )0 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Area Type Adiu              | Blockage Adjustment Factor ( $f_{bb}$ )<br>a Type Adjustment Factor ( $f_a$ )                                    |   |      |        |            | 1.000  | 1.000     | 1.00     | 00 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Lane Utilization            | a Type Adjustment Factor (fa)<br>= Utilization Adjustment Factor (fLU)   |   |      |        |            | 1.000  | 1.000     | 1.00     | 00 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Left-Turn Adjust            | e Utilization Adjustment Factor ( <i>f</i> <sub>L</sub> υ)<br>-Turn Adjustment Factor ( <i>f</i> <sub>L</sub> τ) |   |      |        |            |        | 0.912     | 0.90     | )6 |        | 0.88    | 5 0.   | 861    |       | 0.994      | 0.970   |                |
| Right-Turn Adiu             | Turn Adjustment Factor (f⊥τ)<br>t-Turn Adjustment Factor (fʀτ)   |   |      |        | 0.000      | 0.959  | 0.0.12    | 0.00     | )0 | 0.906  | 0.00    | 0.     | 000    | 0.861 |            | 0.000   | 0.970          |
| Left-Turn Pedes             | t-Turn Adjustment Factor (ƒ <sub>R7</sub> )<br>Turn Pedestrian Adjustment Factor (ƒ <sub>Lpl</sub>               |   |      |        |            |        | 1.000     |          |    |        | 1.00    | )      |        |       | 1.000      |         |                |
| Right-Turn Ped-             | -Bike Ac   | liustment Factor (f <sub>Rpb</sub> )        |      |        |            | 1.000  |           | <u> </u> | -  | 1.000  |         | -      |        | 1.000 |            |         | 1.000          |
| Work Zone Adju              | ustment  | Factor (fwz)                                | 1.00 | 00     | 1.000      | 1.000  | 1.000     | 1.00     | 00 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| DDI Factor (foor            | <sup>,</sup> )   | . /   | 1.00 | 00     | 1.000      | 1.000  | 1.000     | 1.00     | 00 | 1.000  | 1.00    | ) 1.   | 000    | 1.000 | 1.000      | 1.000   | 1.000          |
| Left-Turn Prot.             | ,<br>CAV Ad  | . Factor (fCAV,prot)                        | -    | $\neg$ |            |        |           |          |    |        |         | +      |        |       |            |         |                |
| Left-Turn Perm.             | CAV A  | dj. Factor ( <i>f</i> CAV,perm)             | 1.0  | 0      |            |        | 1.00      | <u> </u> | -  |        | 1.00    | +      |        |       | 1.00       |         |                |
| Movement Satu               | ration F   | low Rate (s), veh/h                         | 13   | 5      | 1353       | 135    | 285       | 114      | .0 | 95     | 365     | 7      | 82     | 261   | 54         | 1287    | 214            |
| Proportion of Ve            | ehicles /  | Arriving on Green (P)                       | 0.3  | 1      | 0.31       | 0.31   | 0.31      | 0.3      | 1  | 0.31   | 0.42    | 0      | .42    | 0.42  | 0.42       | 0.42    | 0.42           |
| Incremental De              | lay Fact   | or ( <i>k</i> )                             |      |        | 0.13       |        | 1         | 0.1      | 3  |        |         | 0      | .13    |       |            | 0.13    |                |
|                             |  |   |      |        |            |        |           |          |    |        |         |        |        |       |            |         |                |
| Signal Timing               | / Mover  | nent Groups                                 | E    | EBL    | . <u> </u> | BT/R   | WE        | BL       | W  | /BT/R  | N       | BL     | N      | IBT/R | SBL        |         | SBT/R          |
| Lost Time (t <sub>L</sub> ) |  |   |      |        |            | 6.6    |           |          |    | 6.6    |         |        |        | 6.6   |            |         | 6.6            |
| Green Ratio (g/             | (C)  |   | _    |        |            | 0.31   |           |          | 0  | ).31   |         |        |        | 0.42  |            |         | 0.42           |
| Permitted Satur             | ation Fl   | ow Rate ( <i>s</i> <sub>p</sub> ), veh/h/lr | ⊢    |        |            | 1126   |           |          | 1  | 053    |         |        |        | 1105  |            |         | 1192           |
| Shared Saturati             | ion Flow   | / Rate ( <i>ssh</i> ), veh/h/ln             | -    |        |            | 1601   |           |          | 1  | 458    |         |        | -      | 376   |            |         | 1571           |
| Permitted Effect            | ted Effective Green Time $(g_p)$ , s   |   |      |        |            | 14.9   |           |          | 1  | 14.9   |         |        |        | 20.0  |            |         | 20.0           |
| Permitted Servi             | rmitted Service Time $(g_{\mu})$ , s   |   |      |        |            | 5.9    |           |          |    | 5.1    |         |        |        | 13.3  |            |         | 13.8           |
| Permitted Queu              | ermitted Queue Service Time ( $g_{ps}$ ), s  |   |      |        |            | 0.8    | <u> </u>  |          | (  | 0.0    |         |        |        | 0.0   |            |         | 0.0            |
| Time to First Blo           | Time to First Blockage ( <i>gt</i> ), s  |   |      |        |            | 7.0    |           |          | 4  | 4.9    |         |        |        | 5.4   |            |         | 13.6           |
| Queue Service               | Queue Service Time Before Blockage ( $g_{fs}$ ), s   |   |      |        |            | 7.0    |           |          | 4  | 4.9    |         |        |        | 4.4   |            |         | 5.3            |
| Protected Right             | Protected Right Saturation Flow ( $s_R$ ), veh/h/ln  |   |      |        |            |        |           |          |    |        |         |        |        |       |            |         |                |
| Protected Right             | rotected Right Effective Green Time ( $g_R$ ), s   |   |      |        |            |        |           |          |    |        |         | _      |        |       |            |         |                |
| Multimodal                  | lultimodal   |   |      |        | EB         |        |           | W        | В  |        |         |        | NB     |       |            | SB      |                |
| Pedestrian Fw /             | Pedestrian $F_w / F_v$   |   |      |        | 2 (        | 0.000  | 0.97      | 72       | 0. | .000   | 0.9     | 72     | C      | .000  | 0.97       | 2 (     | 0.000          |
| Pedestrian Fs /             | Pedestrian Fs / F <sub>delay</sub>   |   |      |        | ) (        | 0.098  | 0.00      | 00       | 0. | .098   | 0.0     | 00     | C      | .084  | 0.00       | 0 (     | 0.084          |
| Pedestrian Mcor             | Pedestrian Mcorner / Mcw   |   |      |        |            |        | 0.0       | 0        |    |        | 0.      | 00     |        |       | 0.00       |         |                |
| Bicycle cb / db             | strian Mcomer / Mcw<br>sle cb / db   |   |      |        | 5 ^        | 11.47  | 618.      | 35       | 1  | 1.47   | 832     | .34    |        | 8.19  | 832.3      | 34      | 8.19           |
| Bicycle Fw / Fv             |  |   | -3   | 3.64   |            | 0.62   | -3.6      | 64       | 0  | ).55   | -3.     | 64     |        | 0.46  | -3.64      | 1       | 0.50           |

US 42-SR 29 AM Peak - 2043 No-Build.xus

## HCS Signalized Intersection Results Graphical Summary

| General Information         Intersection Information, h         0.250           Analyst         Greg Gedemer         Analysts Date         [21/19/202         Area Type         Other           Jurisdiction         ODOT         Time Period         AM Peak         Prif         0.66           Jurisdiction         ODOT         Time Period         AM Peak         Prif         0.66           Jurisdiction         US4 214.00         Analysis Vear         2043 No-Build Aut Peak         127.00           Intersection         US4 22 Stelp Study         US4 22 Stelp Study         US4 22 Stelp Study         US4 23 No-Build xus           Demand Information         EB         WB         NB         S         S           Approach Movement         L         T         R         L         T         R         L         T           Cycle, s         48.1         Reference Phase         20         14.9         0.0         0.0         0.0         0.0           Greeg Gedemert         Cycle, s         6         16.0         0.0         0.0         0.0         0.0         0.0           Greeg Gedemert         Velow         5.6         5.6         0.0         0.0         0.0         0.0         0.0  |                        | HCS Sigr                                | nalize         | d Inte  | rsect    | ion R   | esults   | s Grap | ohica    | l Sum    | mary     | /  |                      |           |               |
|--|------------------------|---|----------------|---------|----------|---------|----------|--------|----------|----------|----------|----|----------------------|-----------|---------------|
| Agency       SiNGH + Associates       Duration, h       0.250         Analyst       Greg Gedemer       Analysis Date       12/19/2023       Area Type       Other         Jurisdiction       ODOT       Time Period       AM Peak       PHF       0.96         Urban Street       MAD US 42 14.00       Analysis Year 2043 No-Build       Analysis Period       1> 7.00         Intersection       US 42 at SR 29       File Name       US 42-SR 29 AM Peak - 2043 No-Build Xus       Project Description       US 42 at SR 29       File Name       US 42-SR 29 AM Peak - 2043 No-Build Xus       T       R       L       T       R       R<  | General Informatio     | <u></u> n                               |                |         |          |         |          | In     | tersect  | ion Info | ormatio  | on |                      | ╵┥╎╬      | þa l <u>a</u> |
| Analysit         Oring Gedemer         Analysis Date         12/19/2023         Area Type         Other           Jurisdiction         ODOT         Time Period         AMP Peak         PHF         0.086         Privat           Urban Street         MAD US 42:14.00         Analysis Parced         1>7.00         Intersection         US 42:28 T82.9         File Name         US 42:58 29         AMP Peak         243 No-Build Analysis Parced         1>7.00           Project Description         US 42:28 Tely Study         Demand Information         E         WB         NB         SB           Approach Movement         L         T         R         L         T         R         L         T           Cytle, s         0         Reference Phase         2         Offset, S         0         Reference Phase         2         Offset, S         0         Reference Phase         2         Offset, S         0         0.0  | Agency                 | SINGH + Associate                       | s              |         |          |         |          | D      | uration, | h        | 0.250    | )  |                      | *         |               |
| Juriadicion         ODOT         Time Period         AM Peak         PHE         0.98           Urhan Street         MAD US 42 14.00         Analysis Year         20/3 No-Build         Analysis Period         1> 7.00           Intersection         US 42 at SR 29         File Name         US 42:SR 29 AM Peak - 2043 No-Build.xus         Image: Control of the c  | Analyst                | Greg Gedemer                            |                | Analys  | sis Date | 12/19/2 | 2023     | Ar     | rea Typ  | e        | Other    |    | <br>                 |           | بر<br>چ       |
| Urban Street       MAD US 42 14.00       Analysis Year       2043 No-Build       Analysis Period       1> 7:00         Intersection       US 42 at SR 29       File Name       US 42-SR 29 AM Peak - 2043 No-Build.xus       Image: Comparison of the NB of the SB of the NB | Jurisdiction           | ODOT                                    |                | Time F  | Period   | AM Pe   | ak       | PI     | HF       |          | 0.96     |    | <b>→</b><br><b>+</b> | w≜E       |               |
| Intersection         US 42 at SR 29         File Name         US 42-SR 29 AM Peak - 2043 No-Build.xus           Demand Information         EB         WB         NB         SB           Approach Movement         L         T         R         R         <   | Urban Street           | MAD US 42 14.00                         |                | Analys  | sis Year | 2043 N  | lo-Build | d Ar   | nalysis  | Period   | 1> 7:(   | 00 | -4<br>-4             |           |               |
| Project Description         US 42 Safety Study         EB         WB         NB         SB           Approach Movement         L         T         R   | Intersection           | US 42 at SR 29                          |                | File Na | ame      | US 42   | -SR 29   | AM Pea | k - 204  | 3 No-Bi  | uild.xus |    | - <u> </u>           | भौन       |               |
| Demand Information         EB         WB         NB         SB           Approach Movement         L         T         R         L         T   | Project Description    | US 42 Safety Study                      | /              |         |          |         |          |        |          | -        |          |    |                      | 1 4 1 4 M | ۲ (*          |
| Domain Information         EB         WB         NB         SB           Approach Movement         L         T         R         L         T   |                        | , ,                                     |                |         |          |         |          |        |          |          |          |    |                      |           |               |
| Approach Movement       L       T       R  | Demand Information     | on                                      |                |         | EB       |         |          | WB     |          |          | NB       |    |                      | SB        |               |
| Demand (v), veh/h         30         300         30         60         240         20         70         150         50         10         240           Signal Information<br>Cycle, s         48.1         Reference Point<br>Simult. Gap EW         Control         Contr   | Approach Movemen       | t                                       |                | L       | Т        | R       | L        | Т      | R        | L        | Т        | R  | L                    | Т         | R             |
| Signal Information         Cycle, s         48.1         Reference Phase         2           Offset, s         0         Reference Point         End         Green         20.0         14.9         0.0         0.0         0.0         0.0           Uncoordinated         Yes         Simult.Gap N/S         On         Ree         1.0         0.0   | Demand ( v ), veh/h    |   |                | 30      | 300      | 30      | 60       | 240    | 20       | 70       | 150      | 50 | 10                   | 240       | 40            |
| Signal Information         Cycle, s         48.1         Reference Phase         2           Offset, s         0         Reference Point         End         Green         20.0         14.9         0.0         0.0         0.0           Force Mode         Fixed         Simult. Gap E/W         On         Red         1.0         1.0         0.0         0.0         0.0         0.0           Force Mode         Fixed         Simult. Gap E/W         On         Red         1.0         1.0         0.0         0.0         0.0         0.0           Force Mode         Fixed         Simult. Gap E/W         On         Red         1.0         1.0         0.0   |                        |   |                | -11     |          |         | 1        |        |          | _        |          |    |                      |           |               |
| Cycle, s         48.1         Reference Phase         2           Offset, s         0         Reference Point         End           Green 20.0         14.9         0.0         0.0         0.0           Force Mode         Fixed         Simult. Gap EW         NB         SB           Movement Group Results         EB         WB         NB         SB           Approach Movement         L         T         R         L         T   | Signal Information     |   | ï              |         | 215      | a €     |          |        |          |          |          |    | -+-                  |           | -             |
| Offset, s       0       Reference Point       End<br>Originated       Green       20.0       14.9       0.0  | Cycle, s 48.           | 1 Reference Phase                       | 2              |         | 512      | Ŕ       |          |        |          |          |          | 1  | $\mathbf{Y}_{2}$     | 3         | -€ ₄          |
| Uncoordinated         Yes         Simult. Gap E/W         On         Yellow         5.6         5.6         0.0<   | Offset, s 0            | Reference Point                         | End            | Green   | 20.0     | 14.9    | 0.0      | 0.0    | 0.0      | 0.0      |          |    |                      |           | - <u>-</u> -  |
| Force Mode         Fixed         Simult. Gap N/S         On         Red         1.0         1.0         0.00         0.00  | Uncoordinated Yes      | s Simult. Gap E/W                       | On             | Yellow  | 5.6      | 5.6     | 0.0      | 0.0    | 0.0      | 0.0      |          |    |                      |           |               |
| Movement Group Results         EB         WB         NB         SB           Approach Movement         L         T         R         L         T   | Force Mode Fixe        | ed Simult. Gap N/S                      | On             | Red     | 1.0      | 1.0     | 0.0      | 0.0    | 0.0      | 0.0      |          | 5  | 6                    | 7         | 8             |
| Movement Group Results         EB         WB         NB         SB           Approach Movement         L         T         R         L         T   |                        |   |                |         |          |         |          |        |          |          |          |    |                      |           |               |
| L       T       R       L       D  | Movement Group F       | Results                                 |                |         | EB       |         |          | WB     |          |          | NB       |    |                      | SB        | -             |
| Back of Queue (Q), ft(in (95 th percentile)       137.8       119.3       71.1       78.4         Back of Queue (Q), veh/in (95 th percentile)       5.0       4.3       2.5       2.7         Queue Storage Ratio (RQ) (95 th percentile)       0.00       0.00       0.00       0.00         Control Delay (d), siveh       16.2       15.7       10.5       10.6         Level of Service (LOS)       B       B       B       B       B         Approach Delay, siveh / LOS       16.2       B       15.7       B       10.6       E         Intersection Delay, siveh / LOS       16.2       B       15.7       B       10.6       E         1       10.6       13.5       B       0.0       0.00       0.00       E         10.6       13.5       0.5       10.6       E       10.6       E         10.6       10.6       10.6       10.6       E       10.6       E         10.6       10.6       10.6       10.6       10.6       E       10.6       E         10.6       10.6       10.6       10.6       10.6       E       10.6       E         10.6       10.6       10.6       10.6       10.6   | Approach Movemen       | t                                       |                | L       | Т        | R       | L        | Т      | R        | L        | Т        | R  | L                    | Т         | R             |
| Back of Queue (Q), veh/ln (95 th percentile)       5.0       4.3       2.5       2.7         Queue Storage Ratio (RQ) (95 th percentile)       0.00       0.00       0.00       0.00         Control Delay (d), siveh       16.2       15.7       10.5       10.6         Level of Service (LOS)       B       B       B       B       B         Approach Delay, siveh / LOS       16.2       B       15.7       B       10.5       B       0.6       E         Intersection Delay, siveh / LOS       16.2       B       15.7       B       10.5       B       10.6       E         1       10.5       10.2       13.5       B       0.6       E         1       10.5       10.5       10.6       E       10.6       E         1       10.5       10.5       10.5       10.6       E         1       10.5       10.5       10.5       10.6       E         1       10.5       10.5       10.5       4.3       10.5         5       10.4       10.5       10.5       4.3       10.5   | Back of Queue (Q)      | ,ft <mark>/ln (</mark> 95 th percentile | e)             |         | 137.8    |         |          | 119.3  |          |          | 71.1     |    |                      | 78.4      |               |
| Queue Storage Ratio ( RQ ) ( 95 th percentile)       0.00       0.00       0.00       0.00         Control Delay ( d ), siveh       16.2       15.7       10.5       10.6         Level of Service (LOS)       B       B       B       B       B         Approach Delay, siveh / LOS       16.2       B       15.7       B       10.5       B       10.6         Intersection Delay, siveh / LOS       16.2       B       15.7       B       10.5       B       10.6       E         Intersection Delay, siveh / LOS       13.5       3.5       B       3.5       B       3.5       B       3.5         5       16.2       15.7       4.3       4.3       4.3       10.5       4.3   | Back of Queue (Q)      | , veh/ln ( 95 th percenti               | ile)           |         | 5.0      |         |          | 4.3    |          |          | 2.5      |    |                      | 2.7       |               |
| Control Delay (d), s/veh       16.2       15.7       10.5       10.6         Level of Service (LOS)       B       B       B       B       B       B         Approach Delay, s/veh / LOS       16.2       B       15.7       B       10.6       B         Intersection Delay, s/veh / LOS       16.2       B       15.7       B       10.6       E         Intersection Delay, s/veh / LOS       13.5       B       0.6       E         Intersection Delay, s/veh / LOS       13.5       B       0.6       E         Intersection Delay, s/veh / LOS       13.5       B       0.6       E         Intersection Delay, s/veh / LOS       16.2       15.7       A       A         Intersection Delay, s/veh / LOS       16.2       15.7       A       A         Intersection Delay, s/veh / LOS       16.2       15.7       A       A         Intersection Delay, s/veh / LOS       16.2       15.7       A       A         Intersection Delay, s/veh / LOS       16.2       15.7       A       A         Intersection Delay, s/veh / LOS   | Queue Storage Rati     | o(RQ)( 95 th percent                    | tile)          |         | 0.00     |         |          | 0.00   |          |          | 0.00     |    |                      | 0.00      |               |
| Level of Service (LOS)       B       Intersection Delay, s/veh / LOS       13.5       B       10.6       Intersection Delay, s/veh / LOS       13.5       Intersection Delay, s/veh / LOS       10.6       10.  | Control Delay ( d ), s | s/veh                                   |                |         | 16.2     |         |          | 15.7   |          |          | 10.5     |    |                      | 10.6      |               |
| Approach Delay, s/veh / LOS       16.2       B       15.7       B       10.5       B       10.6       E         Intersection Delay, s/veh / LOS       13.5       8 <td>Level of Service (LC</td> <td>S)</td> <td></td> <td></td> <td>В</td> <td></td> <td></td> <td>В</td> <td></td> <td></td> <td>В</td> <td></td> <td></td> <td>В</td> <td></td>   | Level of Service (LC   | S)                                      |                |         | В        |         |          | В      |          |          | В        |    |                      | В         |               |
| Intersection Delay, s/veh / LOS 13.5 B   | Approach Delay, s/v    | eh / LOS                                |                | 16.2    | 2        | В       | 15.7     | 7      | В        | 10.5     |          | В  | 10.6                 | 3         | В             |
|  | Intersection Delay, s  | /veh / LOS                              |                |         |          | 13      | .5       |        |          |          |          |    | В                    |           |               |
| LOS B     Queue       LOS C     2.5  |                        | 5                                       | LOS A<br>LOS B |         | 16.2     | 2.7     | 15.7     |        | Queue    |          | • 4.3    | _  |                      |           |               |

US 42-SR 29 AM Peak - 2043 No-Build.xus



## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 AM Peak - 2043 No-Build.xus Generated: 2/15/2024 10:55:07 AM

#### **HCS Signalized Intersection Input Data**

| Intersection Information         Duration, h         0.220         Duration, h         0.220           Agency         SINGH + Associates         Duration, h         0.250         Duration, h   |                         |  |                     |     | Jigina   |         |           |          |      | .p          |          |          |      |                  |               |              |
|--|-------------------------|--|---------------------|-----|----------|---------|-----------|----------|------|-------------|----------|----------|------|------------------|---------------|--------------|
| Agency         SINCH + Associates         Duration. h         0.250           Analyst         Gree Gedemer         Analysis Date 129023         Area Type         Other  | General Inform          | nation   |                     |     |          |         |           |          |      | Intersec    | tion Inf | ormatio  | on   | Į.               | **            | ید لید       |
| Analysis         Greg Gedemer         Analysis Dato         12/19/2023         Area Type         Other           Junsdiction         DDOT         Time Period         PM         0.50         PH         0.50           Utana Street         MAD US 42 14:00         Analysis Vera (204 No-Evaild         Analysis Vera (204 No-Evaild         Analysis Vera (204 No-Evaild         No         So           Project Description         US 42 at SR 28         File Name         US 42-SR 29 PM Perk - 2043 No-Evaild         No         Demand (10 nomation           Demand (V), wehh         50         200         30         50         320         20         80         410         120         10         150         80           Approach Movement         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         Demand (10, UN)         100         100         100         100         100         100         100         100         100         100         100         100   | Agency                  |  | SINGH + Associate   | s   |          |         |           |          |      | Duration    | . h      | 0.250    |      |                  | 4             |              |
| Durisdiction         ODOT         Time Period         PM Peak         PHF         O.96           Urban Street         MAD US 42 10.00         Analysis Year         2043 Mo-Build         Analysis Year         2043 Mo-Build         > 7.00           Intersaction         US 42 at SR 20         File Name         US 42 SR 29 PM Peak- 2043 No-Build xus         Image and the second se  | Analyst                 |  | Grea Gedemer        | -   | Analys   | is Date | 12/19/    | 2023     | _    | Area Tvr    | )e       | Other    |      | <br>             |               | ۲.<br>۲.     |
| Urban Street       MAD US 42 14 0.0       Analysis Year       2043 No-Build       Analysis Period       1> 7.00       Improvement       Improvement       US 42 at SR 20       File Name       US 42 SR 20 PM Peak - 2043 No-Build Xou-Build Xou-Bui   | Jurisdiction            |  |                     |     | Time F   | Period  | PM Pe     | eak      |      | PHE         |          | 0.96     |      | →<br>+<br>+      | w ‡ e         | ÷            |
| Intersection       US 42 at SR 29       File Name       US 42-SR 29 PM Pask - 2043 No-Build xus       Image of the section of the sec   | Urban Street            |  | MAD US 42 14.00     |     | Analys   | is Year | 2043      | No-Build | 4    | Analysis    | Period   | 1> 7:(   | 00   | <b>→</b>         |               | +<br>∵       |
| Project Description         US 42 Safety Study         EB         VB         NB         SB           Appraach Movement         L         T         R   | Intersection            |  | US 42 at SR 29      |     | File Na  | ame     | US 42     | -SR 29   | PM F | Peak - 204  | 3 No-Bi  | uild xus |      |                  | ್ರ            |              |
| Demand Information         EB         VB         NB         SB           Demand Information         L         T         R         L         T  | Project Descrip         | tion   | US 42 Safety Study  | ,   |          |         | 100       |          |      |             |          |          |      | 1                | ት<br>1 ቀ ነጥ 1 | * (*         |
| Demand Information         EB         WB         NT         R         L         T  | · · •j••• - ••••p       |  |                     |     |          |         |           |          |      |             |          |          |      |                  |               |              |
| Approach Movement.       L       T       R       L       T       R       L       T       R       L       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D       T       R       D <thd< th="">       D       <thd< th=""></thd<></thd<>   | Demand Inform           | nation   |                     |     |          | EB      |           |          | W    | ′B          |          | NB       |      |                  | SB            |              |
| Demand (v), veh/h         50         290         30         50         320         20         80         410         120         10         150         30           Signal Information<br>Cycle, s         65.2         Reference Point         End<br>(modified)         10   | Approach Move           | ement  |                     |     | L        | Т       | R         | L        |      | r R         | L        | Т        | R    | L                | Т             | R            |
| Signal Information         Cycle, s         66.2         Reference Phase         2           Oriset, s         0         Reference Phase         2           Oriset, s         0         Reference Point         End           Vuccordinated Ves         Simult. Gap LNV         On         Red         1.0         0.0         0.0         0.0         0.0           Force Mode         Fixed         Simult. Gap LNV         On         Red         1.0         1.0         0.0  | Demand ( v ), v         | eh/h   |                     |     | 50       | 290     | 30        | 50       | 32   | 20 20       | 80       | 410      | 120  | 10               | 150           | 30           |
| Signal Information         Cycle, s         65.2         Reference Phase         2           Offset, s         0         Reference Phase         2         Green A12         20.7         0.0 <t< td=""><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>  |                         |  |                     |     | 1        |         |           |          | 1    |             |          |          |      |                  |               |              |
| Cycle, s         65.2         Reference Phase 2         C <thc< <="" td=""><td>Signal Informa</td><td>ition</td><td></td><td></td><td></td><td>205</td><td>  ₂ €</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-+-</td><td></td><td></td></thc<>   | Signal Informa          | ition  |                     |     |          | 205     | ₂ €       |          |      |             |          |          |      | -+-              |               |              |
| Offset         O         Reference Point         End         Orean         1.3         20.7         0.0  | Cycle, s                | 65.2   | Reference Phase     | 2   |          | L - 547 | 'R "      |          |      |             |          |          | 1    | $\mathbf{Y}_{2}$ | 3             | $\mathbf{+}$ |
| Uncoordinated<br>Force Mode         Yeal<br>(%)         Simult. Gap LW/S<br>(%)         On<br>Red         1.0         1.0         0.   | Offset, s               | 0  | Reference Point     | End | Green    | 31.3    | 20.7      | 0.0      | 0.0  | 0.0         | 0.0      |          |      |                  |               | 5            |
| Force Mode         Fixed         Simult. Gap N/S         On         Red         1.0         0.0  | Uncoordinated           | Yes  | Simult. Gap E/W     | On  | Yellow   | 5.6     | 5.6       | 0.0      | 0.0  | 0.0         | 0.0      |          |      |                  |               |              |
| Traffic Information         L         T         R  | Force Mode              | Fixed  | Simult. Gap N/S     | On  | Red      | 1.0     | 1.0       | 0.0      | 0.0  | 0.0         | 0.0      |          | 5    | 6                | 7             | 8            |
| Traffic information         LB         T         R         L         T         R   |                         |  |                     | _   | 1        |         | _         |          |      | _           |          |          | _    |                  |               |              |
| Approach Movement       L       I       R       L       I       I       R       L       I       R       L       I       R       L       I       R       L       I       R       L       I       R       L       I       R       L       R  | Traffic Informa         | ition  |                     |     | <u> </u> | EB      | -         |          | WE   | 3           |          | NB       |      |                  | SB            |              |
| Demand (V), veh/n         50         290         30         50         290         30         50         200         80         410         120         10         150         30           Base Saturation Flow Rate (so), veh/h         1900         100         100         100         100         100         100         100         100         100         100 <td>Approach Move</td> <td>ement</td> <td></td> <td></td> <td>L</td> <td>1</td> <td>R</td> <td>L</td> <td>   </td> <td>R</td> <td>L</td> <td>1</td> <td>R</td> <td>L</td> <td>1</td> <td>R</td>   | Approach Move           | ement  |                     |     | L        | 1       | R         | L        |      | R           | L        | 1        | R    | L                | 1             | R            |
| Initial Queue (Qb), ven/n         ID         ID        ID         ID <thi< td=""><td>Demand (v), ve</td><td>h/h</td><td><u>n</u></td><td></td><td>50</td><td>290</td><td>30</td><td>50</td><td>320</td><td>) 20</td><td>80</td><td>410</td><td>120</td><td>10</td><td>150</td><td>30</td></thi<>  | Demand (v), ve          | h/h  | <u>n</u>            |     | 50       | 290     | 30        | 50       | 320  | ) 20        | 80       | 410      | 120  | 10               | 150           | 30           |
| Base soluration How Nate (sb), ven/n         1900   |                         | 2⊳), ven/  |                     |     | 0        | 0       | 0         | 0        | 0    | 0           | 0        | 0        | 0    | 0                | 0             | 0            |
| Parking (vm), man/n         None         None<  | Base Saturation         | aturation Flow Rate ( <i>s</i> <sub>0</sub> ), ven/n<br>g ( <i>N</i> <sub>m</sub> ), man/h<br>Vehicles ( <i>P</i> <sub>HV</sub> ), % |                     |     |          | 1900    | 1900      | 1900     | 190  | 0 1900      | 1900     | 1900     | 1900 | 1900             | 1900          | 1900         |
| Heary Verticies ( <i>PriV</i> , 70     ID     ID<   | Parking (Nm), m         | ing ( <i>N<sub>m</sub></i> ), man/h<br>vy Vehicles ( <i>P<sub>HV</sub></i> ), %  |                     |     |          | None    |           |          | Non  | e           |          | None     |      |                  | None          |              |
| Peak Prior, /n       O <tho< th=""></tho<>   | Heavy venicies          | vy Vehicles ( <i>P</i> <sub>HV</sub> ), %<br>/ Bike / RTOR, /h   |                     |     |          | 14      | 0         | 0        | 15   | 0           | 0        | 18       | 0    | 0                | 20            | 0            |
| Bases (Nb), busesmin       0       1.00   | Ped / Bike / RT         | I / Bike / RTOR, /h<br>es ( <i>N</i> <sub>b</sub> ), buses/h   |                     |     |          | 0       | 0         | 0        | 0    | 0           | 0        | 0        | 0    | 0                | 0             | 0            |
| Alfrida Type (AT)       3 <th3< th="">       3       3</th3<>  | Buses (IVb), bus        | ses ( <i>N<sub>b</sub></i> ), buses/h  |                     |     |          | 0       | 0         | 0        | 0    | 0           | 0        | 0        | 0    | 0                | 0             | 0            |
| Obstant Pittering (r)         1.00         1.0  | Anivar Type (An         | ival Type (AT)   |                     |     |          | 3       | 3<br>1 00 | 3        | 3    | 3<br>1 1 00 | 3        | 3        | 3    | 3                | 3             | 3            |
| Lane wider (W, nt       12.0       1   | Upstream Filter         | $\frac{1110}{110}$   |                     |     | 1.00     | 12.0    | 1.00      | 1.00     | 1.0  | J 1.00      | 1.00     | 12.0     | 1.00 | 1.00             | 12.0          | 1.00         |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$   | Turn Bay Longt          | ), n<br>b. ft  |                     |     |          | 0       |           |          | 12.0 | 5           |          | 0        |      |                  | 12.0          |              |
| Strate (V 9), N        | Grade (Pg) %            | 11, 11   |                     |     |          | 0       |           |          | 0    | -           |          | 0        |      |                  | 0             |              |
| Phase Information         EBL         EBT         WBL         WBT         NBL         NBT         SBL         SBT           Maximum Green (Gmax) or Phase Split, s         30.0         30.0         30.0         60.0 </td <td>Sneed Limit mi</td> <td>i/h</td> <td></td> <td></td> <td>55</td>   | Sneed Limit mi          | i/h  |                     |     | 55       | 55      | 55        | 55       | 55   | 55          | 55       | 55       | 55   | 55               | 55            | 55           |
| Phase InformationEBLEBTWBLWBTNBLNBTSBLSBTMaximum Green ( $G_{max}$ ) or Phase Split, s30.030.060.060.05660.056Yellow Change Interval ( $Y$ ), s5.65.65.65.65.65.65.65.65.65.6Red Clearance Interval ( $R_c$ ), s1.01.01.01.01.02.0  |                         | /11  |                     |     | 55       | 55      | 55        | 55       | 55   | 55          | 55       | 55       | 55   | 55               | 55            | 55           |
| Maximum Green ( $G_{max}$ ) or Phase Split, s       30.0       Image: Split Small       30.0       Image: Split Small       60.0       Image: Split Small       60.0       Image: Split Small       60.0       Image: Split Small       60.0       Image: Split Small       5.6       Image: Split Small <td>Phase Informa</td> <td>tion</td> <td></td> <td></td> <td>EBL</td> <td></td> <td>EBT</td> <td>WBL</td> <td>-  </td> <td>WBT</td> <td>NBL</td> <td>-</td> <td>NBT</td> <td>SBL</td> <td></td> <td>SBT</td>  | Phase Informa           | tion   |                     |     | EBL      |         | EBT       | WBL      | -    | WBT         | NBL      | -        | NBT  | SBL              |               | SBT          |
| Yellow Change Interval (Y), s $\overline{5.6}$  | Maximum Gree            | n (Gmax  | ) or Phase Split, s |     |          |         | 30.0      |          |      | 30.0        |          |          | 60.0 |                  |               | 60.0         |
| Red Clearance Interval ( $R_c$ ), s         I.0         II0  | Yellow Change           | Interval   | l (Y), s            |     |          |         | 5.6       |          |      | 5.6         |          |          | 5.6  |                  |               | 5.6          |
| $ \begin{array}{ c c c c c c } \begin{tabular}{ c c c c c } \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$  | Red Clearance           | Interval   | l ( <i>R</i> c), s  |     |          |         | 1.0       |          |      | 1.0         |          |          | 1.0  |                  |               | 1.0          |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | Minimum Greer           | ר ( <i>Gmin</i> )  | , S                 |     |          |         | 10        |          |      | 10          |          |          | 20   |                  |               | 20           |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | Start-Up Lost T         | ime ( <i>lt</i> )  | , S                 |     | 2.0      |         | 2.0       | 2.0      |      | 2.0         | 2.0      |          | 2.0  | 2.0              |               | 2.0          |
| $ \begin{array}{c c c c c c c } Passage (P7), s &   &   &   &   &   &   &   &   &   &$   | Extension of Eff        | fective (  | Green (e), s        |     | 2.0      |         | 2.0       | 2.0      |      | 2.0         | 2.0      |          | 2.0  | 2.0              |               | 2.0          |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$  | Passage (PT), s         | nsion of Effective Green (e), s<br>sage ( <i>PT</i> ), s   |                     |     |          |         | 3.5       |          |      | 3.5         |          |          | 3.5  |                  |               | 3.5          |
| Dual EntryImage: Image: I | Recall Mode             | ecall Mode   |                     |     |          |         | Off       |          |      | Off         |          |          | Min  |                  |               | Min          |
|  | Dual Entry              |  |                     |     |          |         | Yes       |          |      | Yes         |          |          | Yes  |                  |               | Yes          |
| Pedestrian Clearance Time (PC), s $0.0$ <th< td=""><td>Walk (<i>Walk</i>), s</td><td colspan="3">Valk (<i>Walk</i>), s</td><td></td><td></td><td>0.0</td><td></td><td></td><td>0.0</td><td></td><td></td><td>0.0</td><td></td><td></td><td>0.0</td></th<>  | Walk ( <i>Walk</i> ), s | Valk ( <i>Walk</i> ), s  |                     |     |          |         | 0.0       |          |      | 0.0         |          |          | 0.0  |                  |               | 0.0          |
| Multimodal Information $B = B = B = B = B = B = B = B = B = B =$   | Pedestrian Clea         | edestrian Clearance Time ( <i>PC</i> ), s  |                     |     |          |         | 0.0       |          |      | 0.0         |          |          | 0.0  |                  |               | 0.0          |
| Rest in Walk / Corner Radius       0.0       No       25.0       0.0   | Multimodal Inf          | timodal Information  |                     |     |          | FB      |           |          | \//F | 3           |          | NB       |      |                  | SB            |              |
| Walkway / Crosswalk Width / Length, ft       9.0       12.0       0.0       0.0   | 85th % Speed /          | lultimodal Information<br>5th % Speed / Rest in Walk / Corner Radius   |                     |     | 0.0      | No      | 25.0      | 0.0      | No   | 25.0        | 0.0      | No       | 25.0 | 0.0              | No            | 25.0         |
| Street Width / Island / Curb, ft         0.0         0         No         0.0         0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0         0.0         0   | Walkway / Cros          | 5th % Speed / Rest in Walk / Corner Radius<br>Valkway / Crosswalk Width / Length, ft   |                     |     | 9.0      | 12.0    | 0.0       | 9.0      | 12.0 | 0.0         | 9.0      | 12.0     | 0.0  | 9.0              | 12.0          | 0.0          |
| Width Outside / Bike Lane / Shoulder, ft         12.0         5.0         2.0         12.0         5.0         2.   | Street Width / Is       | Valkway / Crosswalk Width / Length, ft<br>Street Width / Island / Curb, ft   |                     |     | 0.0      | 0       | No        | 0.0      | 0    | No          | 0.0      | 0        | No   | 0.0              | 0             | No           |
| Pedestrian Signal / Occupied ParkingNo0.50No0.50No0.50   | Width Outside /         | Bike La  | ane / Shoulder. ft  |     | 12.0     | 5.0     | 2.0       | 12.0     | 5.0  | 2.0         | 12.0     | 5.0      | 2.0  | 12.0             | 5.0           | 2.0          |
|  | Pedestrian Sigr         | nal / Oco  | cupied Parking      |     | No       |         | 0.50      | No       |      | 0.50        | No       |          | 0.50 | No               |               | 0.50         |

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HCS™ Streets Version 2023

# HCS Signalized Intersection Results Summary

| General Inform                  | nation   |                               |       |         |              |            |            |               |               | Inte   | ersecti  | ion Infe | ormatio  | on       | <u>,</u>         | ***          | ≜ L <u>k</u>            |
|---------------------------------|--|-------------------------------|-------|---------|--------------|------------|------------|---------------|---------------|--------|----------|----------|----------|----------|------------------|--------------|-------------------------|
| Agency                          |  | SINGH + Associate             | s     |         |              |            |            |               | Î             | Dur    | ration,  | h        | 0.250    |          | 1                | -            |                         |
| Analyst                         |  | Greg Gedemer                  |       | Analys  | sis Da       | ite 12     | 2/19/2     | 2023          |               | Are    | ea Type  | ;        | Other    |          | 4                |              | 4                       |
| Jurisdiction                    |  | ODOT                          |       | Time F  | Period       | I PI       | M Pe       | ak            |               | PH     | F        |          | 0.96     |          | **               | W A E        | ↔ <u>+</u>              |
| Urban Street                    |  | MAD US 42 14.00               |       | Analys  | sis Yea      | ar 20      | 043 N      | lo-Build      | i i           | Ana    | alysis F | Period   | 1> 7:    | 00       | 14               |              | +<br>*                  |
| Intersection                    |  | US 42 at SR 29                |       | File Na | ame          | U          | S 42-      | SR 29         | PM F          | Peak   | - 2043   | 3 No-Bi  | uild.xus |          |                  | ж <b>л</b> г | ¥                       |
| Project Descrip                 | tion   | US 42 Safety Study            | /     | JI      |              |            |            |               |               |        |          |          |          |          | 1                | 4 1 4 YT 1   | ▼ <b> </b> <sup>₹</sup> |
|                                 |  |                               |       | _       |              |            |            |               |               |        |          |          |          |          |                  |              |                         |
| Demand Inform                   | nation   |                               |       |         | EE           | 3          |            |               | W             | 'B     |          |          | NB       |          |                  | SB           |                         |
| Approach Move                   | ement  |                               |       | L       | Т            |            | R          | L             | T             |        | R        | L        | Т        | R        | L                | Т            | R                       |
| Demand ( v ), v                 | eh/h   |                               |       | 50      | 290          | 0          | 30         | 50            | 32            | 20     | 20       | 80       | 410      | 120      | 10               | 150          | 30                      |
|                                 |  |                               |       | 1       |              |            |            |               |               |        | 1        |          |          |          |                  |              |                         |
| Signal Informa                  | tion   |                               | 1     |         | 245          | <u>،</u> ا | $_{a} \in$ |               |               |        |          |          |          |          | -+-              |              | _                       |
| Cycle, s                        | 65.2   | Reference Phase               | 2     |         | - 5 <u>7</u> | ηZË        | S e        | 1             |               |        |          |          |          | 1        | $\mathbf{Y}_{2}$ | 3            | 4                       |
| Offset, s                       | 0  | Reference Point               | End   | Green   | 31.3         | 3 2        | 20.7       | 0.0           | 0.0           | )      | 0.0      | 0.0      | _        |          |                  |              |                         |
| Uncoordinated                   | Yes  | Simult. Gap E/W               | On    | Yellow  | 5.6          | 5          | i.6        | 0.0           | 0.0           | )      | 0.0      | 0.0      |          |          |                  |              |                         |
| Force Mode                      | Fixed  | Simult. Gap N/S               | On    | Red     | 1.0          | 1          | .0         | 0.0           | 0.0           | )      | 0.0      | 0.0      |          | 5        | 6                | 7            | 8                       |
|                                 |  |                               |       |         | _            |            |            |               | _             |        | _        |          |          |          | 1                |              |                         |
| Timer Results                   | mer Results<br>ssigned Phase   |                               |       |         |              |            | Т          | WBI           |               | W      | BT       | NBL      | -        | NBT      | SBL              | -            | SBT                     |
| Assigned Phase                  | e  |                               |       |         | 4            |            |            | $\rightarrow$ | 8             | 8      |          |          | 2        |          |                  | 6            |                         |
| Case Number                     | ase Number<br>nase Duration, s   |                               |       |         |              |            | )          |               | $\rightarrow$ | 8.     | .0       |          |          | 8.0      |                  |              | 8.0                     |
| Phase Duration                  | hase Duration, s<br>hange Period, ( $Y+R_c$ ), s   |                               |       |         |              | 27.3       | 3          |               | $\rightarrow$ | 27     | 7.3      |          |          | 37.9     |                  |              | 37.9                    |
| Change Period                   | nase Duration, s<br>nange Period, ( Y+ <i>R c</i> ), s<br>ax Allow Headway ( <i>MAH</i> ), s       |                               |       |         |              | 6.6        | 5          |               | $\rightarrow$ | 6.     | .6       |          |          | 6.6      |                  |              | 6.6                     |
| Max Allow Head                  | nange Period, ( Y+R c ), s<br>ax Allow Headway ( <i>MAH</i> ), s<br>Jeue Clearance Time ( g s ), s |                               |       |         |              | 4.5        | 5          |               | $\rightarrow$ | 4.     | .5       |          |          | 4.5      |                  |              | 4.5                     |
| Queue Clearan                   | ax Allow Headway ( $MAH$ ), s<br>ueue Clearance Time ( $g s$ ), s                                  |                               |       |         |              | 16.6       | 6          |               | _             | 17     | 7.6      |          |          | 26.8     |                  |              | 6.9                     |
| Green Extensio                  | ueue Clearance Time ( $g s$ ), s<br>reen Extension Time ( $g e$ ), s                               |                               |       |         |              | 3.1        |            |               | $\rightarrow$ | 3.     | .0       |          |          | 4.4      |                  | _            | 4.5                     |
| Phase Call Pro                  | bability   |                               |       |         |              | 1.00       | 0          |               | $\rightarrow$ | 1.(    | 00       |          |          | 1.00     |                  |              | 1.00                    |
| Max Out Proba                   | bility   |                               |       |         |              | 0.15       | 5          |               |               | 0.1    | 18       |          |          | 0.00     |                  |              | 0.00                    |
| Movement Gro                    | ax Out Probability ovement Group Results   |                               |       |         |              | ;          |            |               | WE            | 3      |          | _        | NB       |          |                  | SB           |                         |
| Approach Move                   | ement  |                               |       | L       | Т            | F          | R          | L             | Т             |        | R        | L        | Т        | R        | L                | Т            | R                       |
| Assigned Move                   | ment   |                               |       | 7       | 4            | 1          | 14         | 3             | 8             |        | 18       | 5        | 2        | 12       | 1                | 6            | 16                      |
| Adjusted Flow I                 | Rate( <i>v</i>   | ), veh/h                      |       |         | 385          | 5          |            |               | 406           | 3      |          |          | 635      |          |                  | 198          |                         |
| Adjusted Satura                 | ation Flo  | ow Rate ( <i>s</i> ), veh/h/l | n     |         | 1542         | 2          |            |               | 155           | 7      |          |          | 1500     |          |                  | 1534         |                         |
| Queue Service                   | Time ( g   | g s ), S                      |       |         | 0.0          |            |            |               | 0.9           |        |          |          | 16.5     |          |                  | 0.0          |                         |
| Cycle Queue C                   | learance   | e Time ( <i>g c</i> ), s      |       |         | 14.6         | 3          |            |               | 15.6          | 3      |          |          | 24.8     |          |                  | 4.9          |                         |
| Green Ratio ( g                 | /C)  |                               |       |         | 0.32         | 2          |            |               | 0.32          | 2      |          |          | 0.48     |          |                  | 0.48         |                         |
| Capacity ( c ), v               | /eh/h  |                               |       |         | 552          | 2          |            |               | 557           | 7      |          |          | 783      |          |                  | 795          |                         |
| Volume-to-Capa                  | acity Ra   | tio(X)                        |       |         | 0.69         | 8          |            |               | 0.73          | 0      |          |          | 0.811    |          |                  | 0.249        |                         |
| Back of Queue                   | (Q), ft  | /In ( 95 th percentile        | e)    |         | 223.         | 5          |            |               | 241.          | 1      |          |          | 300.6    |          |                  | 66.3         |                         |
| Back of Queue                   | ( Q ), ve  | eh/In ( 95 th percenti        | ile)  |         | 8.0          |            |            |               | 8.6           |        |          |          | 10.5     |          |                  | 2.3          |                         |
| Queue Storage                   | Ratio (  | RQ) (95 th percent            | tile) |         | 0.00         | )          |            |               | 0.00          | ו      |          |          | 0.00     |          |                  | 0.00         |                         |
| Uniform Delay                   |  |                               | 20.0  | )       |              |            | 20.4       | 1             |               |        | 15.1     |          |          | 10.1     |                  |              |                         |
| Incremental De                  |  |                               | 2.0   |         |              |            | 2.6        |               |               |        | 2.5      |          |          | 0.2      |                  |              |                         |
| Initial Queue De                |  |                               | 0.0   |         |              |            | 0.0        |               |               |        | 0.0      |          |          | 0.0      |                  |              |                         |
| Control Delay (                 |  |                               | 22.0  | )       |              |            | 22.9       | 9             |               |        | 17.6     |          |          | 10.3     |                  |              |                         |
| Level of Service (LOS)          |  |                               |       |         | С            |            |            |               | С             |        |          |          | В        |          |                  | В            |                         |
| Approach Delay, s/veh / LOS     |  |                               |       | 22.0    | )            | С          |            | 22.9          |               | C      | С        | 17.6     | i        | В        | 10.3             |              | В                       |
| Intersection Delay, s/veh / LOS |  |                               |       |         |              |            | 19         | .1            |               |        |          |          |          |          | В                |              |                         |
|                                 |  |                               |       |         |              |            |            |               |               |        |          |          |          |          |                  | 0.5          |                         |
| Multimodal Results              |  |                               |       | 1.00    | EB           | -          |            | 4.00          | WE            | ა<br>- |          | 4.00     | NB       | <b>D</b> | 4.00             | SB           | _                       |
| Pedestrian LOS                  | Iultimodal Results<br>edestrian LOS Score / LOS  |                               |       |         |              | B          |            | 1.68          |               | E      | 5        | 1.66     | ,        | В        | 1.66             |              | В                       |
| BICYCIE LOS SC                  | ore / LC   | 15                            |       | 1.12    | -            | A          |            | 1.16          |               | P      | 4        | 1.54     |          | В        | 0.81             |              | A                       |

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HCS™ Streets Version 2023

US 42-SR 29 PM Peak - 2043 No-Build.xus

# HCS Signalized Intersection Intermediate Values

| General Information                     |   |      |        |              |              |         |          |      | Inters   | section | Info  | rmati | ion   |              | ┙┥┵╺┾   | ₽ P            |
|---|---|------|--------|--------------|--------------|---------|----------|------|----------|---------|-------|-------|-------|--------------|---------|----------------|
| Agency                                  | SINGH + Associates  |      |        |              |              |         |          |      | Durat    | ion, h  |       | 0.25  | 0     |              | 4       |                |
| Analyst                                 | Greg Gedemer  |      | Analy  | sis Da       | ate 1        | 2/19/20 | 23       |      | Area     | Туре    |       | Othe  | er    |              |         | ت<br>بلا<br>ال |
| Jurisdiction                            | ODOT  |      | Time   | Perio        | d P          | M Peal  | <b>‹</b> |      | PHF      |         |       | 0.96  |       | **           | W = E   |                |
| Urban Street                            | MAD US 42 14.00   |      | Analy  | sis Ye       | ear 2        | 043 No  | -Build   |      | Analy    | sis Per | iod   | 1> 7  | :00   |              |         | *              |
| Intersection                            | US 42 at SR 29  |      | File N | ame          | L            | JS 42-S | R 29 F   | PMI  | Peak - : | 2043 N  | o-Bui | ld.xu | s     |              | **      |                |
| Project Description                     | US 42 Safety Study  |      |        |              |              |         |          |      |          |         |       |       |       |              | ነ ላ ሰቀጥ | 1 1            |
|   |   |      |        |              |              | ľ       |          |      |          | r       |       |       |       |              |         |                |
| Demand Information                      |   |      |        | EI           | В            |         |          | V    | VB       |         |       | NE    | 3     |              | SB      |                |
| Approach Movement                       |   |      | L      | Т            | Г            | R       | L        |      | Т        | R       | L     | Т     | R     | L            | Т       | R              |
| Demand ( <i>v</i> ), veh/h              |   |      | 50     | 29           | 90           | 30      | 50       | 3    | 20 2     | 20      | 80    | 41(   | ) 120 | ) 10         | 150     | 30             |
| Circul Information                      |   |      |        |              |              | E.      |          |      |          | _       |       |       |       |              |         |                |
|   | Defense Dhees   | _    |        | 1243         | <u>ن</u> ا د | 2 🗄     |          |      |          |         |       |       |       | sta          |         | ~              |
| Cycle, s 65.2                           | Reference Phase   | Z    |        | 5            | ĭn?F         | ₹"      |          |      |          |         |       |       | 1     | 2            | 3       |                |
| Ulisel, s U                             | Reference Point   |      | Greer  | ı 31.        | 3 2          | 20.7    | 0.0      | 0.   | .0 C     | ).0     | 0.0   |       |       |              |         | <u> </u>       |
| Uncoordinated Yes                       | Simult. Gap E/W   | On   | Yellow | / 5.6        |              | 5.6     | 0.0      | 0.   | .0 0     | 0.0     | 0.0   | -     |       | $\mathbf{T}$ | -       | ×.             |
|   |   | On   | Reu    | 1.0          |              | 1.0     | 0.0      | 0.   | .0 [0    | 0.0     | 0.0   |       | 5     | 6            | 7       | 8              |
| Saturation Flow / Delay                 | V   | 1    | Т      | ·            | R            |         | т        | -    | R        | 1       | -     | г     | R     |              | т       | R              |
| Lane Width Adjustment                   | y<br>Factor (f.,)   | 1.00 | 0 1 0  | 00 1         |              | 1 000   | 1 00     | 0    | 1 000    |         | 10    |       | 1 000 | 1 000        | 1 000   | 1 000          |
| Heavy Vehicles and Gra                  | $\frac{1}{2} de Eactor (f_{HVa})$   | 1.00 |        | 00 1<br>01 1 |              | 1.000   | 0.88     | 3    | 1.000    | 1.000   |       | 260   | 1.000 | 1.000        | 0.844   | 1.000          |
| Parking Activity Adjustm                | ent Eactor $(f_{\rm r})$  | 1.00 | 0 1 0  |              |              | 1.000   | 1 00     |      | 1.000    | 1.000   |       |       | 1.000 | 1.000        | 1 000   | 1.000          |
| Bus Blockage Adjustme                   | tivity Adjustment Factor ( $f_p$ )<br>age Adjustment Factor ( $f_{bb}$ )  |      |        |              |              | 1.000   | 1.00     |      | 1.000    | 1.000   | 1.0   |       | 1.000 | 1.000        | 1.000   | 1.000          |
| Aroa Tupo Adjustment E                  | kage Adjustment Factor (f <sub>bb</sub> )<br>e Adjustment Factor (f <sub>a</sub> )  |      |        |              | 000          | 1.000   | 1.00     |      | 1.000    | 1.000   |       |       | 1.000 | 1.000        | 1.000   | 1.000          |
| Area Type Aujustment P                  | e Adjustment Factor ( $f_a$ )<br>zation Adjustment Factor ( $f_{LU}$ )  |      |        |              |              | 1.000   | 1.00     |      | 1.000    | 1.000   |       |       | 1.000 | 1.000        | 1.000   | 1.000          |
| Laft Turn Adjustment Fa                 | Jtilization Adjustment Factor ( $f_{LU}$ )<br>urn Adjustment Factor ( $f_{LT}$ )  |      |        |              | 1.000        | 0.033   | 0.02     |      | 1.000    | 0.040   |       | 100   | 1.000 | 0.080        | 0.056   | 1.000          |
| Right-Turn Adjustment F                 | n Adjustment Factor (fL7)<br>Irn Adjustment Factor (fR7)  |      |        |              | 011          | 0.955   | 0.92     | 0    | 0 028    | 0.948   |       |       | 0.018 | 0.900        | 0.930   | 0.956          |
| Left-Turn Pedestrian Ad                 | Adjustment Factor ( $f_{RT}$ )<br>Pedestrian Adjustment Factor ( $f_{Lpb}$ )  |      |        |              |              | 1 000   | 0.00     |      | 0.920    | 1 000   | 0.0   | 00    | 0.910 | 1 000        | 0.000   | 0.950          |
| Pight Turn Pod Riko Adi                 | Turn Adjustment Factor ( <i>TRT</i> )<br>urn Pedestrian Adjustment Factor ( <i>fLpb</i><br>Turn Ped-Bike Adjustment Factor ( <i>f</i> Pot |      |        |              | 000          | 1.000   |          | +    | 1 000    | 1.000   | '     |       | 1 000 | 1.000        |         | 1 000          |
| Work Zone Adjustment                    | Eactor (fug)  | 1.00 | 0 1 0  | 00 1         |              | 1 000   | 1 00     | 0    | 1.000    | 1 000   | 10    | 000   | 1.000 | 1 000        | 1 000   | 1.000          |
| DDI Factor (fpp)                        |   | 1.00 | 0 1.0  |              |              | 1.000   | 1.00     |      | 1.000    | 1.000   | 1.0   |       | 1.000 | 1.000        | 1.000   | 1.000          |
| Left-Turn Prot CAV Adi                  | Factor (fcavor)   | 1.00 | 0 1.0  |              |              | 1.000   | 1.00     |      | 1.000    | 1.000   | , 1.0 | ,00   | 1.000 | 1.000        | 1.000   | 1.000          |
| Left-Turn Perm CAV Ad                   | li Eactor (fcavperm)  | 1.00 | )      | -            |              | 1 00    |          | +    |          | 1 00    | -     |       |       | 1 00         |         |                |
| Movement Saturation Fl                  | low Rate (s) veh/h  | 208  | 12     | าด           | 125          | 200     | 127      | 7    | 80       | 1.00    | 10    | 08    | 295   | 81           | 1211    | 242            |
| Proportion of Vehicles A                | rriving on Green $(P)$  | 0.32 | 2 0 3  | 32 (         | 0.32         | 0.32    | 0.32     | 2    | 0.32     | 0.48    | 0     | 48    | 0.48  | 0.48         | 0.48    | 0.48           |
| Incremental Delay Facto                 | or (k)  |      | 0.1    | 3            | 0.02         | 0.01    | 0.15     | 5    | 0.01     |         | 0.    | 13    |       |              | 0.13    | 0110           |
| indicinental Boldy Factor               |   |      | 0.     |              |              |         | 0.10     |      |          |         | 0.    | 10    |       |              | 0.10    |                |
| Signal Timing / Movem                   | nent Groups   | E    | BL     | EB           | T/R          | WB      | SL       | W    | BT/R     | NE      | 3L    | N     | BT/R  | SBL          |         | SBT/R          |
| Lost Time (tL)                          |   |      |        | 6.           | .6           |         |          | 6    | 6.6      |         |       |       | 6.6   |              |         | 6.6            |
| Green Ratio (g/C)                       |   |      |        | 0.3          | 32           |         |          | 0    | ).32     |         |       | (     | ).48  |              |         | 0.48           |
| Permitted Saturation Flo                | ow Rate ( <i>s</i> ₀), veh/h/ln   |      |        | 10           | 43           |         |          | 1    | 063      |         |       | 1     | 215   |              |         | 869            |
| Shared Saturation Flow                  | Rate (ssh), veh/h/ln  |      |        | 14           | 62           |         |          | 14   | 495      |         |       | 1     | 521   |              |         | 1509           |
| Permitted Effective Gree                | en Time ( <i>g</i> ₂), s  |      |        | 20           | ).8          |         |          | 2    | 20.8     |         |       | 3     | 31.4  |              |         | 31.4           |
| Permitted Service Time                  | ed Effective Green Time ( $g_p$ ), s<br>ed Service Time ( $g_u$ ), s  |      |        |              | .2           |         |          | 6    | 6.1      |         |       | 2     | 26.7  |              |         | 6.7            |
| Permitted Queue Servic                  | nitted Service Time ( $g_u$ ), s<br>nitted Queue Service Time ( $g_{ps}$ ), s   |      |        |              | .0           |         |          | (    | 0.9      |         |       | · ·   | 16.5  |              |         | 0.0            |
| Time to First Blockage (                | ime to First Blockage ( $g_f$ ), s  |      |        |              | .1           |         |          | 7    | 7.1      |         |       |       | 8.3   |              |         | 20.6           |
| Queue Service Time Be                   | ueue Service Time Before Blockage ( $g_{fs}$ ), s   |      |        |              | .1           |         |          | 7    | 7.1      |         |       |       | 8.3   |              |         | 3.8            |
| Protected Right Saturati                | rotected Right Saturation Flow ( $s_R$ ), veh/h/ln  |      |        |              |              |         |          |      |          |         |       |       |       |              |         |                |
| Protected Right Effective               | tected Right Effective Green Time ( $g_R$ ), s  |      |        |              |              |         |          |      |          |         |       |       |       |              |         |                |
| Multimodal                              | Iltimodal   |      |        |              |              |         | W        | В    |          |         | Ν     | l₿    |       |              | SB      |                |
| Pedestrian Fw / Fv                      | 0.9   | 972  | 0.0    | 000          | 0.97         | 2       | 0.       | .000 | 0.9      | 72      | 0     | .000  | 0.97  | 2 (          | 0.000   |                |
| Pedestrian Fs / Fdelay                  | edestrian Fw / Fv<br>edestrian Fs / F <sub>delay</sub>  |      |        |              | 09           | 0.00    | 0        | 0.   | .109     | 0.0     | 00    | 0     | .087  | 0.00         | 0 (     | 0.087          |
| Pedestrian Mcorner / Mcw                | destrian <i>Fs i Faelay</i><br>destrian <i>Mcomer   Mcw</i>   |      |        |              |              | 0.0     | 0        |      |          | 0.0     | 00    |       |       | 0.00         |         |                |
| Bicycle cb / db                         | / <i>M</i> cw   |      |        | 15.          | .20          | 634.    | 74       | 15   | 5.20     | 960     | .48   | 5     | 3.81  | 960.4        | 8       | 8.81           |
| Bicycle F <sub>w</sub> / F <sub>v</sub> |   | -3.  | .64    | 0.6          | 64           | -3.6    | 4        | 0    | .67      | -3.     | 64    |       | 1.05  | -3.64        | 1       | 0.33           |

US 42-SR 29 PM Peak - 2043 No-Build.xus

## HCS Signalized Intersection Results Graphical Summary

|                        |           |                       |   |          |          |             |          |        |           |          | -        |     |                          |                             |                |
|------------------------|-----------|-----------------------|---|----------|----------|-------------|----------|--------|-----------|----------|----------|-----|--------------------------|-----------------------------|----------------|
| General Inform         | nation    |                       |   |          |          |             |          | lr     | ntersect  | ion Inf  | ormatio  | n   |                          | .4.4.4+.                    | × 1 <u>4</u>   |
| Agency                 |           | SINGH + Associate     | s   |          |          |             |          | D      | uration,  | h        | 0.250    |     |                          | -ţ+a                        |                |
| Analyst                |           | Greg Gedemer          |   | Analys   | sis Date | 12/19/2     | 2023     | A      | rea Type  | Э        | Other    |     |                          |                             | <u>≯</u><br>≿– |
| Jurisdiction           |           | ODOT                  |   | Time F   | Period   | PM Pe       | ak       | P      | HF        |          | 0.96     |     | <b>♦</b> - <b>♦</b>      | W A E                       | 🔶 🔶            |
| Urban Street           |           | MAD US 42 14.00       |   | Analys   | sis Year | 2043 N      | lo-Builc | I A    | nalysis I | Period   | 1> 7:0   | 0   | ال <del>ال</del> ا<br>14 |                             | ት<br>ድ         |
| Intersection           |           | US 42 at SR 29        |   | File Na  | ame      | US 42-      | -SR 29   | PM Pea | ak - 2043 | 3 No-B   | uild.xus |     |                          | *                           |                |
| Project Descript       | tion      | US 42 Safety Study    | /   |          |          |             |          |        |           |          |          |     | 1                        | 1 *1 1 * <del>1</del> *1 *1 | × (*           |
|                        |           |                       |   | _        |          |             | 1        |        |           | 1        |          |     | 1                        |                             |                |
| Demand Inform          | nation    |                       |   | <u> </u> | EB       |             | <u> </u> | WB     |           | <u> </u> | NB       |     | <u> </u>                 | SB                          | -              |
| Approach Move          | ement     |                       |   | L        | T        | R           | L        | T      | R         | L        | T        | R   | L                        | T                           | R              |
| Demand ( <i>v</i> ), v | eh/h      |                       |   | 50       | 290      | 30          | 50       | 320    | 20        | 80       | 410      | 120 | 10                       | 150                         | 30             |
| Signal Informa         | tion      |                       |   |          |          | 8           |          |        |           |          |          |     |                          |                             |                |
| Cycle s                | 65.2      | Reference Phase       | 2   |          | 243      | 28          |          |        |           |          |          |     | <b>N</b> 2               |                             | Ζ              |
| Offset s               | 00.2      | Reference Point       | End                                       |          |          | ' <u>-3</u> |          |        |           |          |          | 1   | 2                        | 3                           | <b>Y</b> 4     |
| Uncoordinated          | Yes       | Simult Gap F/W        | On  | Green    | 31.3     | 20.7        | 0.0      | 0.0    | 0.0       | 0.0      | _        |     |                          |                             | ₩<br>→         |
| Force Mode             | Fixed     | Simult Gap N/S        | On  | Red      | 5.0      | 5.6         | 0.0      | 0.0    | 0.0       | 0.0      | _        | 5   | 6                        | 7                           | ₹ 8            |
|                        | i ixcu    |                       | On  |          | 1.0      | 1.0         | 0.0      | 0.0    | 0.0       | 0.0      |          |     |                          |                             |                |
| Movement Gro           | up Res    | sults                 |   |          | EB       |             |          | WB     |           |          | NB       |     |                          | SB                          |                |
| Approach Move          | ment      |                       |   | L        | Т        | R           | L        | Т      | R         | L        | Т        | R   | L                        | Т                           | R              |
| Back of Queue          | (Q), fl   | VIn (95 th percentile | e)  |          | 223.5    |             |          | 241.1  |           |          | 300.6    |     |                          | 66.3                        |                |
| Back of Queue          | (Q), ve   | eh/In ( 95 th percent | íle)                                      |          | 8.0      |             |          | 8.6    |           |          | 10.5     |     |                          | 2.3                         |                |
| Queue Storage          | Ratio (   | RQ) (95 th percen     | tile)                                     |          | 0.00     |             |          | 0.00   |           |          | 0.00     |     |                          | 0.00                        |                |
| Control Delay (        | d ), s/ve | eh                    |   |          | 22.0     |             |          | 22.9   |           |          | 17.6     |     |                          | 10.3                        |                |
| Level of Service       | e (LOS)   |                       |   |          | С        |             |          | С      |           |          | В        |     |                          | В                           |                |
| Approach Delay         | , s/veh   | / LOS                 |   | 22.0     | )        | С           | 22.9     |        | С         | 17.6     | 3        | В   | 10.3                     | 3                           | В              |
| Intersection Del       | lay, s/ve | h / LOS               |   |          |          | 19          | .1       |        |           |          |          |     | В                        |                             |                |
|                        |           |                       |   |          |          |             |          |        |           |          |          |     |                          |                             |                |
|                        |           | 8                     |   |          | 22.0     | 2.3<br>10.3 | 22.9     |        |           |          | • 8.6    | -   |                          |                             |                |
|                        |           |                       | LOS A<br>LOS C<br>LOS D<br>LOS E<br>LOS F |          |          | 10.5        |          |        | Queue —   |          | Delay    |     |                          |                             |                |

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## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 PM Peak - 2043 No-Build.xus Generated: 2/15/2024 11:05:32 AM

|  |        |         |          | ŀ       | HCS | S Rou            | nda | abou           | uts  | Rep  | oort   |           |           |       |      |        |        |       |        |
|--|--------|---------|----------|---------|-----|------------------|-----|----------------|------|------|--------|-----------|-----------|-------|------|--------|--------|-------|--------|
| General Information                      |        |         |          |         | _   |                  | _   | Sit            | e In | forr | matio  | n         |           |       | _    |        | _      |       |        |
| Analyst                                  | Greg   | Gedem   | er       |         | Т   |                  | *   |                |      |      | Inters | ection    |           |       | U    | S 42 a | t SR 2 | 9     |        |
| Agency or Co.                            | SING   | H + Ass | ociates  |         |     |                  |     | <del>(</del> - |      |      | E/W S  | Street Na | ame       |       | S    | R 29   |        |       |        |
| Date Performed                           | 2/16/  | 2024    |          |         |     | $\left[ \right]$ |     | N              | Y    | 1    | N/S S  | treet Na  | ime       |       | U    | S 42   |        |       |        |
| Analysis Year                            | 2023   |         |          |         |     | $\checkmark$     | W   | + E<br>S       |      | ↑ ≻  | Analy  | sis Time  | Period, ł | irs   | 0.   | .25    |        |       |        |
| Time Analyzed                            | AM P   | eak Hou | ır - 204 | 3 Build |     |                  |     |                |      |      | Peak   | Hour Fa   | ctor      |       | 0    | .96    |        |       |        |
| Project Description                      | US 42  | Safety  | Study    |         |     |                  |     | →<br>▼*        | 1    |      | Jurisc | liction   |           |       | С    | DOT    |        |       |        |
| Volume Adjustments                       | and S  | ite C   | harac    | teris   | tic | s                |     |                |      |      |        |           |           |       |      |        |        |       |        |
| Approach                                 |        |         | EB       |         | Π   |                  | Ņ   | WB             |      |      |        | 1         | NB        |       | Т    |        |        | SB    |        |
| Movement                                 | U      | L       | Т        | R       | :   | U                | L   | Т              | Т    | R    | U      | L         | Т         | R     | l    | J      | L      | Т     | R      |
| Number of Lanes (N)                      | 0      | 0       | 1        | 0       |     | 0                | 0   | 1              | T    | 0    | 0      | 0         | 1         | 0     |      | 0      | 0      | 1     | 0      |
| Lane Assignment                          |        |         |          | LTR     |     |                  |     |                | LTR  |      |        |           | LT        | R     |      |        |        |       | LTR    |
| Volume (V), veh/h                        | 0      | 30      | 300      | 30      | )   | 0                | 60  | 24             | 0    | 20   | 0      | 70        | 150       | 50    | (    | 0      | 10     | 240   | 40     |
| Percent Heavy Vehicles, %                | 3      | 2       | 15       | 19      | 9   | 3                | 18  | 15             | ;    | 6    | 3      | 21        | 10        | 40    | :    | 3      | 67     | 18    | 18     |
| Flow Rate (VPCE), pc/h                   | 0      | 32      | 359      | 37      | 7   | 0                | 74  | 28             | 7    | 22   | 0      | 88        | 172       | 73    | (    | 0      | 17     | 295   | 49     |
| Right-Turn Bypass                        |        | N       | one      |         |     |                  | N   | lone           |      |      |        | N         | one       |       |      |        | N      | one   |        |
| Conflicting Lanes                        |        |         | 1        |         |     |                  |     | 1              |      |      |        |           | 1         |       |      |        |        | 1     |        |
| Pedestrians Crossing, p/h                |        |         | 0        |         |     |                  |     | 0              |      |      |        |           | 0         |       | Τ    |        |        | 0     |        |
| Proportion of CAVs                       |        |         |          |         |     |                  |     |                |      |      | 0      |           |           |       |      |        |        |       |        |
| <b>Critical and Follow-U</b>             | p Hea  | dway    | Adju     | ıstm    | ent | t                |     |                |      |      |        |           |           |       |      |        |        |       |        |
| Approach                                 |        |         | EB       |         |     |                  | Ň   | WB             |      |      |        | ١         | ۱B        |       |      |        |        | SB    |        |
| Lane                                     | Left   | Ri      | ght      | Bypas   | ss  | Left             | R   | ight           | Ву   | pass | Left   | Ri        | ght E     | ypass |      | Left   | R      | ght   | Bypass |
| Critical Headway, s                      |        | 4.9     | 9763     |         |     |                  | 4.  | 9763           |      |      |        | 4.9       | 763       |       |      |        | 4.9    | 9763  |        |
| Follow-Up Headway, s                     |        | 2.6     | 5087     |         |     |                  | 2.  | 6087           |      |      |        | 2.6       | 087       |       |      |        | 2.6    | 5087  |        |
| Flow Computations,                       | Capaci | ity an  | d v/o    | : Rat   | ios | ;                |     |                |      |      |        |           |           |       |      |        |        |       |        |
| Approach                                 |        |         | EB       |         |     |                  | Ň   | WB             |      |      |        | 1         | ۱B        |       |      |        |        | SB    |        |
| Lane                                     | Left   | Ri      | ght      | Вура    | ss  | Left             | R   | ight           | Ву   | pass | Left   | Ri        | ght E     | ypass |      | Left   | R      | ght   | Bypass |
| Entry Flow (ve), pc/h                    |        | 4       | 28       |         |     |                  | 3   | 383            |      |      |        | 3         | 33        |       |      |        | 3      | 61    |        |
| Entry Volume, veh/h                      |        | 3       | 75       |         |     |                  | :   | 333            |      |      |        | 2         | 81        |       |      |        | 3      | 02    |        |
| Circulating Flow (v <sub>c</sub> ), pc/h |        | 3       | 86       |         |     |                  | ź   | 292            |      |      |        | 4         | 08        |       |      |        | 4      | 49    |        |
| Exiting Flow (v <sub>ex</sub> ), pc/h    |        | 4       | 49       |         |     |                  | 4   | 424            |      |      |        | 2         | 26        |       |      |        | 4      | 06    |        |
| Capacity (c <sub>pce</sub> ), pc/h       |        | g       | 31       |         |     |                  | 1   | 025            |      |      |        | 9         | 10        |       |      |        | 8      | 73    |        |
| Capacity (c), veh/h                      |        | 8       | 15       |         |     |                  | 8   | 391            |      |      |        | 7         | 69        |       |      |        | 7      | 30    |        |
| v/c Ratio (x)                            |        | 0       | .46      |         |     |                  | C   | ).37           |      |      |        | 0         | .37       |       |      |        | 0      | .41   |        |
| Delay and Level of Se                    | rvice  |         |          |         |     |                  |     |                |      |      |        |           |           |       |      |        |        |       |        |
| Approach                                 | E      |         |          |         |     |                  | Т   |                | W    | 'B   |        |           | NB        |       |      |        |        | SB    |        |
| Lane                                     |        |         | Left     | Ri      | ght | Bypas            | s l | _eft           | Rig  | jht  | Bypass | Left      | Right     | Ву    | bass | Left   | :      | Right | Bypass |
| Lane Control Delay (d), s/veh            |        |         |          | 1       | 0.4 |                  |     |                | 8.   | 3    |        |           | 9.2       |       |      |        |        | 10.4  |        |
| Lane LOS                                 |        |         |          |         | В   |                  |     |                | A    | 1    |        |           | Α         |       |      |        |        | В     |        |
| 95% Queue, veh                           |        |         | 2        | 2.4     |     |                  |     | 1.             | 7    |      |        | 1.7       |           |       |      |        | 2.0    |       |        |
| Approach Delay, s/veh   LOS              |        | 10      | ).4      |         | В   |                  | 8.3 |                |      | А    | 9.2    | 2         | А         |       | 1    | 0.4    |        | В     |        |
| Intersection Delay, s/veh   LOS          |        |         |          |         |     | 9.6              |     |                |      |      |        |           |           | A     | 4    |        |        |       |        |

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|  |        |         |          | Η       | CS  | Rour         | ndal                | bou        | ts Re      | port   |        |         |           |       |     |         |       |       |        |
|--|--------|---------|----------|---------|-----|--------------|---------------------|------------|------------|--------|--------|---------|-----------|-------|-----|---------|-------|-------|--------|
| General Information                      |        |         |          |         | _   |              |                     | Site       | e Infor    | matio  | on     |         |           |       | _   |         | _     |       |        |
| Analyst                                  | Greg   | Gedeme  | er       |         |     |              | *                   |            |            | Inte   | ersec  | ction   |           |       | U   | S 42 at | SR 29 | 9     |        |
| Agency or Co.                            | SING   | H + Ass | ociates  |         |     |              | -                   | _          |            | E/W    | / Str  | reet Na | me        |       | SF  | R 29    |       |       |        |
| Date Performed                           | 2/16/  | 2024    |          |         |     |              | N                   |            |            | N/S    | Str    | eet Nai | me        |       | U   | S 42    |       |       |        |
| Analysis Year                            | 2023   |         |          |         |     | {↓ (         | w <del>î</del><br>s | Ē          | † <b>}</b> | Ana    | alysis | s Time  | Period, h | rs    | 0.  | 25      |       |       |        |
| Time Analyzed                            | PM Pe  | eak Hou | ır - 204 | 3 Build |     | $\mathbf{A}$ |                     |            |            | Pea    | k Ho   | our Fac | tor       |       | 0.  | 96      |       |       |        |
| Project Description                      | US 42  | Safety  | Study    |         |     |              |                     | +<br>  • • |            | Juri   | sdic   | tion    |           |       | 0   | DOT     |       |       |        |
| Volume Adjustments                       | and S  | ite Cl  | harac    | terist  | ics |              |                     |            |            |        |        |         |           |       |     |         |       |       |        |
| Approach                                 |        |         | EB       |         | Т   |              | W                   | 'B         |            |        |        | N       | В         |       |     |         | S     | В     |        |
| Movement                                 | U      | L       | Т        | R       |     | U            | L                   | Т          | R          | U      | Τ      | L       | Т         | R     | ι   | J       | L     | Т     | R      |
| Number of Lanes (N)                      | 0      | 0       | 1        | 0       | T   | 0            | 0                   | 1          | 0          | 0      | T      | 0       | 1         | 0     | C   | )       | 0     | 1     | 0      |
| Lane Assignment                          |        |         |          | LTR     |     |              |                     |            | LTR        |        |        |         | LT        | R     |     |         |       |       | LTR    |
| Volume (V), veh/h                        | 0      | 50      | 290      | 30      |     | 0            | 50                  | 320        | 20         | 0      | Т      | 80      | 410       | 120   | C   | ) .     | 10    | 150   | 30     |
| Percent Heavy Vehicles, %                | 3      | 19      | 13       | 29      |     | 3            | 46                  | 12         | 0          | 3      | Ť      | 36      | 9         | 41    | 3   | 3       | 0     | 18    | 42     |
| Flow Rate (VPCE), pc/h                   | 0      | 62      | 341      | 40      | T   | 0            | 76                  | 373        | 21         | 0      | T      | 113     | 466       | 176   | C   | ) .     | 10    | 184   | 44     |
| Right-Turn Bypass                        |        | N       | one      |         |     |              | No                  | ne         |            |        |        | No      | ne        |       |     |         | No    | one   |        |
| Conflicting Lanes                        |        |         | 1        |         |     |              | 1                   |            |            |        |        | 1       | 1         |       |     |         |       | 1     |        |
| Pedestrians Crossing, p/h                |        |         | 0        |         |     |              | 0                   | )          |            |        |        | (       | )         |       |     |         | (     | C     |        |
| Proportion of CAVs                       |        |         |          |         |     |              |                     |            |            | 0      |        |         |           |       |     |         |       |       |        |
| <b>Critical and Follow-U</b>             | p Hea  | dway    | Adju     | ıstme   | ent |              |                     |            |            |        |        |         |           |       |     |         |       |       |        |
| Approach                                 |        |         | EB       |         |     |              | W                   | 'B         |            |        |        | N       | В         |       |     |         | S     | В     |        |
| Lane                                     | Left   | Ri      | ght      | Bypass  | ;   | Left         | Rig                 | jht        | Bypass     | Le     | ft     | Rig     | ght B     | ypass | L   | .eft    | Rig   | ght   | Bypass |
| Critical Headway, s                      |        | 4.9     | 9763     |         |     |              | 4.97                | 763        |            |        |        | 4.97    | 763       |       |     |         | 4.9   | 763   |        |
| Follow-Up Headway, s                     |        | 2.6     | 5087     |         |     |              | 2.60                | 087        |            |        |        | 2.60    | 087       |       |     |         | 2.6   | 087   |        |
| Flow Computations,                       | Capaci | ity an  | d v/o    | : Rati  | os  |              |                     |            |            |        |        |         |           |       |     |         |       |       |        |
| Approach                                 |        | I       | EB       |         | Τ   |              | W                   | 'B         |            |        |        | N       | В         |       |     |         | S     | В     |        |
| Lane                                     | Left   | Ri      | ght      | Bypass  | ;   | Left         | Rig                 | jht        | Bypass     | Le     | ft     | Rig     | ght B     | ypass | L   | .eft    | Rig   | ght   | Bypass |
| Entry Flow (v <sub>e</sub> ), pc/h       |        | 4       | 43       |         |     |              | 47                  | '0         |            |        |        | 75      | 55        |       |     |         | 2     | 38    |        |
| Entry Volume, veh/h                      |        | 3       | 85       |         |     |              | 40                  | 06         |            |        |        | 63      | 35        |       |     |         | 19    | 97    |        |
| Circulating Flow (v <sub>c</sub> ), pc/h |        | 2       | 70       |         |     |              | 64                  | 1          |            |        |        | 41      | 13        |       |     |         | 5     | 62    |        |
| Exiting Flow (v <sub>ex</sub> ), pc/h    |        | 5       | 27       |         |     |              | 53                  | 80         |            |        |        | 54      | 19        |       |     |         | 30    | 00    |        |
| Capacity (c <sub>pce</sub> ), pc/h       |        | 1(      | 048      |         |     |              | 71                  | 8          |            |        |        | 90      | 06        |       |     |         | 7     | 78    |        |
| Capacity (c), veh/h                      |        | 10      |          | Τ       |     | 62           | 20                  |            |            |        | 76     | 52      |           |       |     | 64      | 44    |       |        |
| v/c Ratio (x)                            |        | 0       | .42      |         |     |              | 0.6                 | 55         |            |        |        | 0.8     | 33        |       |     |         | 0.    | 31    |        |
| Delay and Level of Se                    | rvice  |         |          |         |     |              |                     |            |            |        |        |         |           |       |     |         |       |       |        |
| Approach                                 | EB     |         |          |         |     |              |                     |            | WB         |        | Т      |         | NB        |       |     |         |       | SB    |        |
| Lane                                     |        |         | Left     | Rig     | ht  | Bypass       | Le                  | ft         | Right      | Bypass | ;      | Left    | Right     | Вура  | ass | Left    | 1     | Right | Bypass |
| Lane Control Delay (d), s/veh            |        |         |          | 8.      | 9   |              |                     |            | 19.4       |        |        |         | 27.8      |       |     |         |       | 9.6   |        |
| Lane LOS                                 |        |         |          | A       |     |              |                     |            | С          |        |        |         | D         |       |     |         | T     | А     |        |
| 95% Queue, veh                           |        |         | 2.       | 1       |     |              |                     | 4.8        |            |        |        | 9.4     |           |       |     |         | 1.3   |       |        |
| Approach Delay, s/veh   LOS              |        | 8       | 9        |         | А   |              | 19.4                |            | С          |        | 27.8   | 3       | D         |       | 9.  | 6       |       | А     |        |
| Intersection Delay, s/veh   LOS          |        |         |          |         | 1   | 9.0          |                     |            |            |        |        |         |           | C     | ;   |         |       |       |        |

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## **HCS Signalized Intersection Input Data**

|                                      |   |   |          | Jigna     | iizeu       | intera  | Sectio  |               | iput D                                     | ata      | 4       |            |          |                      |               |                  |
|--------------------------------------|---|---|----------|-----------|-------------|---------|---------|---------------|--|----------|---------|------------|----------|----------------------|---------------|------------------|
| General Inform                       | nation  |   |          |           |             |         |         |               | Interse                                    | ectio    | on Info | ormatio    | n        | J.                   | ****          | <u>د لړ</u>      |
| Agency                               | lation  | SINGH + Associate                           | s        |           |             |         |         |               | Duratio                                    | on h     |         | 0 250      |          |                      | -4 L          |                  |
| Analyst                              |   | Grea Gedemer                                | <u> </u> | Analys    | is Date     | 12/19/  | 2023    | _             | Area T                                     | vne      |         | Other      |          | <br>                 |               | <u>ار</u><br>لله |
| lurisdiction                         |   |   |          | Time F    |             |         | ak      |               | PHE  | ype      |         | 0 96       |          | - <mark>*</mark> _ * | w‡e           |                  |
| Lirban Street                        |   | MAD US 42 14 00                             |          | Analys    | is Vear     | 20/13 1 | oft Tur | 2             | Analys                                     | ie Pa    | ariod   | 1> 7.0     | 0        |                      |               | + +<br>*         |
| orban officer                        |   | 14.00                                       |          | / marys   |             | Lanes   |         |               | / that yo                                  | 1010     | Shou    | 1.         |          |                      | R fe          | <u>~</u>         |
| Intersection                         |   | US 42 at SR 29                              |          | File Na   | ame         | US 42   | -SR 29  | AM F          | Peak - 2                                   | 043 I    | Left Tı | urn.xus    |          |                      | 114M1         | • <b>(*</b>      |
| Project Descrip                      | tion  | US 42 Safety Study                          | ,        |           |             |         |         |               |  |          |         |            |          |                      |               |                  |
| Domond Inform                        |   |   |          |           | <b>ED</b>   |         |         | 14            | /D   |          |         |            |          |                      | CD            |                  |
| Demand Inform                        | nation  |   |          |           | EB          |         |         | VV            |  |          |         |            |          | <u> </u>             | <u>58</u>     |                  |
| Approach wove                        | ob/b  |   |          | 20        | 300         | 20      | L<br>60 | 2/            | і г<br>10 2                                |          | L<br>70 | 150        | <b>K</b> | 10                   | 240           | K<br>40          |
|                                      |   |   |          | - 30      | 300         | - 30    | 00      | 24            | +0 2                                       | 0        | 70      | 130        | 50       | 10                   | 240           | 40               |
| Signal Informa                       | ation   |   |          |           |             | 5       |         | 1             |  |          |         |            |          |                      |               | 1                |
| Cycle, s                             | 75.5  | Reference Phase                             | 2        | 1         | 542         | , B 2   | 7       |               |  |          |         |            |          | $ \Psi $             | _             | 4                |
| Offset, s                            | 0   | Reference Point                             | End      | Croon     | 22.4        | 10.2    | 15.0    |               |  | 0        | 0.0     | _          | 1        | 2                    | 3             | 4                |
| Uncoordinated                        | Yes   | Simult. Gap E/W                             | On       | Yellow    | 22.4<br>5.6 | 5.6     | 5.6     | 0.0           | $\begin{array}{c} 0 \\ 0 \\ 0 \end{array}$ | 0        | 0.0     | -          |          |                      |               | $\rightarrow$    |
| Force Mode                           | Fixed   | Simult. Gap N/S                             | On       | Red       | 1.0         | 1.0     | 1.0     | 0.0           | ) 0.                                       | 0        | 0.0     |            | 5        | 6                    | 7             | 8                |
|                                      |   | A   |          |           |             |         |         |               |  |          |         |            |          |                      |               |                  |
| Traffic Informa                      | ation   |   |          |           | EB          |         |         | WE            | 3  |          |         | NB         |          |                      | SB            |                  |
| Approach Move                        | ement   |   |          | L         | Т           | R       | L       | Т             | R  | _        | L       | Т          | R        | L                    | Т             | R                |
| Demand ( <i>v</i> ), ve              | eh/h  | reh/h<br>w Rate ( <i>s₀</i> ), veh/h        |          |           | 300         | 30      | 60      | 240           | ) 20                                       | +        | 70      | 150        | 50       | 10                   | 240           | 40               |
| Initial Queue (C                     | <b>♀</b> ), veh/  | veh/h<br>ow Rate ( <i>s</i> ₀), veh/h<br>′h |          |           | 0           | 0       | 0       | 0             | 0  |          | 0       | 0          | 0        | 0                    | 0             | 0                |
| Base Saturation                      | n Flow F  | Rate ( <i>s</i> ₀), veh/h                   | 1900     | 1900      | 1900        | 1900    | 190     | 0 190         | 0 1  | 1900     | 1900    | 1900       | 1900     | 1900                 | 1900          |                  |
| Parking ( <i>N</i> <sub>m</sub> ), m | nan/h   |   |          | None      |             |         | Non     | e             | +  | 10       | None    |            |          | None                 |               |                  |
| Heavy Vehicles                       | s ( <i>Рн</i> v), Ч   | %   | 14       | 14        | 0           | 15      | 15      |               | +  | 18       | 18      | 0          | 20       | 20                   |               |                  |
| Ped / Bike / RT                      | es ( <i>P</i> нv), %<br>TOR, /h<br>uses/h                           |   |          | 0         | 0           | 0       | 0       | 0             | 0  | ╋        | 0       | 0          | 0        | 0                    | 0             | 0                |
| Buses ( <i>IVb</i> ), bus            | e / RTOR, /h<br>), buses/h  |   |          | 0         | 0           | 0       | 0       | 0             | 0  | ╋        | 0       | 0          | 0        | 0                    | 0             | 0                |
| Anivar Type (An                      | $\frac{1}{1}$   |   |          | 3<br>1 00 | 1 00        | 1 00    | 1 00    | 1 0           | 1 1 00                                     |          | 3       | 1 00       | 1 00     | 1 00                 | 1 00          | 1 00             |
| Upsileant Filler                     | (/) ft  |   |          | 12.0      | 12.0        | 1.00    | 12.0    | 12            | יד ד.טנ<br>ר                               | <b>-</b> | 12.0    | 12.0       | 1.00     | 12.0                 | 12.0          | 1.00             |
| Turn Bay Lengt                       | h ft  |   |          | 0         | 0           |         | 0       | 0             |  | +        | 0       | 0          |          | 0                    | 0             |                  |
| Grade (Pg) %                         | ,   |   |          |           | 0           |         | Ū       | 0             | -  |          | -       | 0          | _        | Ū                    | 0             |                  |
| Speed Limit, mi                      | i/h   |   |          | 55        | 55          | 55      | 55      | 55            | 55   |          | 55      | 55         | 55       | 55                   | 55            | 55               |
| ,,                                   |   |   |          |           |             |         |         |               |  |          |         |            |          |                      |               |                  |
| Phase Informa                        | tion  |   |          | EBL       |             | EBT     | WBI     | -             | WBT  |          | NBL     | 1          | NBT      | SBL                  |               | SBT              |
| Maximum Gree                         | en ( <i>G</i> max)  | ) or Phase Split, s                         |          |           |             | 30.0    |         |               | 30.0                                       | ┶        |         |            | 60.0     |                      | (             | 60.0             |
| Yellow Change                        | Interval  | (Y), s                                      |          |           |             | 5.6     |         |               | 5.6  | +        |         |            | 5.6      |                      |               | 5.6              |
| Red Clearance                        | Interval  | ( <i>Rc</i> ), s                            |          |           |             | 1.0     |         | $\rightarrow$ | 1.0  | +        |         |            | 1.0      |                      |               | 1.0              |
| Minimum Green                        | n ( <i>Gmin</i> )   | , S   |          |           |             | 10      |         | _             | 10   | +        |         |            | 20       |                      |               | 20               |
| Start-Up Lost I                      | ime ( <i>It</i> )   | , S<br>Dec en (c) c                         |          | 2.0       | _           | 2.0     | 2.0     | $\rightarrow$ | 2.0  | ╋        | 2.0     | _          | 2.0      | 2.0                  | $\rightarrow$ | 2.0              |
| Extension of Ef                      |   | Green (e), s                                |          | 2.0       | _           | 2.0     | 2.0     | -             | 2.0  | ╋        | 2.0     |            | 2.0      | 2.0                  | _             | 2.0              |
| Passage (PT), s                      | s   |   |          |           | 3.5<br>Off  |         |         | 3.5<br>Off    | ╈  |          |         | 3.5<br>Min |          | _                    | 3.5<br>Min    |                  |
|                                      | ll Mode<br>Entry  |   |          |           |             | Ves     |         | -             | Vos  | ÷        |         |            | Voc      |                      |               | Vos              |
|                                      | Entry<br>( <i>Walk</i> ), s   |   |          |           | +           | 0.0     |         | $\rightarrow$ | 0.0  | ╈        |         |            | 0.0      |                      | _             | 0.0              |
| Pedestrian Clea                      | alk ( <i>Walk</i> ), s<br>edestrian Clearance Time ( <i>PC</i> ), s |   |          |           |             | 0.0     |         | -             | 0.0  | ÷        |         |            | 0.0      |                      |               | 0.0              |
|                                      | destrian Clearance Time ( <i>PC</i> ), s                            |   |          |           |             | 5.5     |         |               | 0.0  |          |         |            | 5.5      |                      |               | 5.5              |
| Multimodal Inf                       | imodal Information  |   |          |           | EB          |         |         | WE            | 3  | Т        |         | NB         |          |                      | SB            |                  |
| 85th % Speed /                       | n % Speed / Rest in Walk / Corner Radius                            |   |          | 0.0       | No          | 25.0    | 0.0     | No            | 25.0                                       | )        | 0.0     | No         | 25.0     | 0.0                  | No            | 25.0             |
| Walkway / Cros                       | sswalk Width / Length, ft   |   |          | 9.0       | 12.0        | 0.0     | 9.0     | 12.0          | 0.0  |          | 9.0     | 12.0       | 0.0      | 9.0                  | 12.0          | 0.0              |
| Street Width / Is                    | h / Island / Curb, ft   |   |          | 0.0       | 0           | No      | 0.0     | 0             | No   |          | 0.0     | 0          | No       | 0.0                  | 0             | No               |
| Width Outside /                      | Bike La   | ane / Shoulder, ft                          |          | 12.0      | 5.0         | 2.0     | 12.0    | 5.0           | 2.0  | Ŀ        | 12.0    | 5.0        | 2.0      | 12.0                 | 5.0           | 2.0              |
| Pedestrian Sigr                      | nal / Oco   | cupied Parking                              | No       |           | 0.50        | No      |         | 0.50          |  | No       | (       | 0.50       | No       | (                    | 0.50          |                  |

US 42-SR 29 AM Peak - 2043 Left Turn.xus

#### HCS Signalized Intersection Results Summary

|                   |                        |                        | Ŭ    |               |        |         |             |          |                |               |          | ĺ        |         |      |       |         |         |
|-------------------|------------------------|------------------------|------|---------------|--------|---------|-------------|----------|----------------|---------------|----------|----------|---------|------|-------|---------|---------|
| General Inform    | nation                 |                        |      |               |        |         |             |          |                | In            | tersect  | tion Inf | ormati  | on   |       | ***     | 1× 14   |
| Agency            |                        | SINGH + Associate      | s    |               |        |         |             |          |                | Dı            | uration, | h        | 0.250   | )    |       | -4 L    |         |
| Analyst           |                        | Greg Gedemer           |      | Analys        | is Dat | te 12/1 | 9/2         | 2023     |                | Ar            | ea Typ   | е        | Othe    | r    | 4     |         | بر<br>4 |
| Jurisdiction      |                        | ODOT                   |      | Time F        | eriod  | AM      | >ea         | ak       |                | PH            | HF       |          | 0.96    |      |       | w ‡ ∈   | <br>∕∲  |
| Urban Street      |                        | MAD US 42 14.00        |      | Analys        | is Yea | ar 2043 | 3 L         | eft Turr | ۱              | Ar            | nalysis  | Period   | 1> 7:   | 00   |       |         | 1       |
|                   |                        |                        |      |               |        | Lane    | s           | 00.00    |                |               |          | <u></u>  |         |      |       | ግ ት     |         |
| Intersection      | <i>.</i> .             | US 42 at SR 29         |      | File Na       | ame    | 052     | 12-         | SR 29    | AM H           | -ea           | k - 204  | 3 Left I | urn.xus | 3    |       | * 1 * 1 | * †* f* |
| Project Descrip   | tion                   | US 42 Safety Study     | ,    |               |        |         |             |          |                |               |          |          |         |      |       |         |         |
| Demand Inform     | nation                 |                        |      |               | EB     |         |             |          | V              | ٧B            |          |          | NB      |      |       | SB      |         |
| Approach Move     | ement                  |                        |      | L             | Т      | R       |             | L        |                | Т             | R        | L        | Т       | R    | L     | Т       | R       |
| Demand ( v ), v   | eh/h                   |                        |      | 30            | 300    | ) 30    | )           | 60       | 2              | 40            | 20       | 70       | 150     | 50   | 10    | 240     | 40      |
|                   | <u> </u>               |                        |      |               | 1 11:  | _       | 5           | 1        |                |               | _        | _        |         |      |       |         |         |
| Signal Informa    | tion                   | Deference Dhees        | 0    |               | 245    | 2       | ¥           |          |                |               |          |          |         |      | к†а   |         | 7       |
| Cycle, s          | 75.5                   | Reference Phase        | Z    |               | - M    | γR.     | E.          |          |                |               |          |          |         | 1    | 2     | 3       |         |
| Uncoordinated     | Voc                    | Simult Con E/M         |      | Green         | 22.4   | 18.2    | 2           | 15.0     | 0.             | 0             | 0.0      | 0.0      |         |      |       |         | -<br>A- |
| Eorce Mode        | Fixed                  | Simult. Gap E/W        | On   | Yellow<br>Red | 5.6    | 5.6     |             | 5.6      | 0.             | 0             | 0.0      | 0.0      | -       | 5    |       | 7       | ¥ .     |
| T OICE MODE       | TIXEU                  | Sindit. Gap N/S        | On   | Iteu          | 1.0    | 1.0     |             | 1.0      | 0.             | 0             | 0.0      | 0.0      |         |      | 0     | 1       |         |
| Timer Results     | _                      |                        | EBL  | .             | EBT    | Т       | WBI         | -        | ٧              | VBT           | NBL      | -        | NBT     | SBI  | -     | SBT     |         |
| Assigned Phase    | Э                      |                        |      |               | 4      | Т       |             |          |                | 8             |          |          | 2       |      |       | 6       |         |
| Case Number       |                        |                        |      |               | 10.0   | Т       |             |          | 1              | 0.0           |          |          | 6.0     |      |       | 6.0     |         |
| Phase Duration    | , S                    |                        |      |               | 24.8   | Т       |             |          | 2              | 21.6          |          |          | 29.0    |      |       | 29.0    |         |
| Change Period,    | (Y+R                   | c ), S                 |      |               | 6.6    | Τ       |             |          | (              | 6.6           |          |          | 6.6     |      |       | 6.6     |         |
| Max Allow Head    | dway( <i>N</i>         | <i>MAH</i> ), s        |      |               | 4.4    |         |             |          | 4              | 4.4           |          |          | 4.6     |      |       | 4.6     |         |
| Queue Clearan     | ce Time                | e ( g s ), s           |      |               | 16.9   |         |             |          | 1              | 3.8           |          |          | 19.5    |      |       | 14.2    |         |
| Green Extensio    | n Time                 | (ge),s                 |      |               | 1.3    |         |             |          |                | 1.2           |          |          | 2.8     |      |       | 2.8     |         |
| Phase Call Prol   | bability               |                        |      |               |        | 1.00    | 4           |          | $ \rightarrow$ | 1             | .00      |          |         | 1.00 |       |         | 1.00    |
| Max Out Proba     | bility                 |                        |      |               |        | 0.02    | 1           |          |                | 0             | 0.00     |          |         | 0.00 |       |         | 0.00    |
| Movement Gro      |                        | ulte                   |      |               | EB     |         | T           |          | \٨/            | B             |          |          | NB      |      |       | SB      |         |
| Approach Move     | ment                   | Suits                  |      |               | <br>   | R       | ÷           | 1        | Т              |               | R        |          | Т       | R    | 1     | Т       | R       |
| Assigned Move     | ment                   |                        |      | 7             | 4      | 14      | ╈           | 3        | 8              | $\rightarrow$ | 18       | 5        | 2       | 12   | 1     | 6       | 16      |
| Adjusted Flow F   | Rate ( v               | ), veh/h               |      | 31            | . 344  |         | t           | 63       | 27             | 1             |          | 73       | 208     |      | . 10  | 292     |         |
| Adjusted Satura   | ation Flo              | w Rate ( s ). veh/h/l  | n    | 1612          | 1665   | 5       | t           | 1598     | 165            | 55            |          | 950      | 1563    |      | 1006  | 1563    |         |
| Queue Service     | Time ( d               | ( s ), S               |      | 1.1           | 14.9   |         | T           | 2.5      | 11.            | 8             | _        | 5.4      | 8.2     |      | 0.6   | 12.2    |         |
| Cycle Queue C     | learance               | e Time ( g c ), s      |      | 1.1           | 14.9   |         | 1           | 2.5      | 11.            | 8             |          | 17.5     | 8.2     |      | 8.7   | 12.2    |         |
| Green Ratio ( g   | /C )                   |                        |      | 0.24          | 0.24   |         | Т           | 0.20     | 0.2            | 0             |          | 0.30     | 0.30    |      | 0.30  | 0.30    |         |
| Capacity ( c ), v | /eh/h                  |                        |      | 389           | 402    | 1       | T           | 318      | 33             | 0             |          | 226      | 465     |      | 287   | 465     |         |
| Volume-to-Capa    | acity Ra               | itio(X)                |      | 0.080         | 0.85   | 5       | Т           | 0.196    | 0.82           | 21            |          | 0.323    | 0.448   |      | 0.036 | 0.627   |         |
| Back of Queue     | (Q), ft                | /In ( 95 th percentile | )    | 19.6          | 276    |         |             | 43.5     | 231            | .2            |          | 60.5     | 138.3   |      | 7.4   | 212.2   |         |
| Back of Queue     | ( Q ), ve              | eh/In ( 95 th percenti | le)  | 0.7           | 9.9    |         |             | 1.6      | 8.3            | 3             |          | 2.1      | 4.8     |      | 0.3   | 7.3     |         |
| Queue Storage     | Ratio (                | RQ) (95 th percent     | ile) | 0.00          | 0.00   |         |             | 0.00     | 0.0            | 0             |          | 0.00     | 0.00    |      | 0.00  | 0.00    |         |
| Uniform Delay (   | ( d 1 ), s             | /veh                   |      | 22.2          | 27.4   |         | 4           | 25.2     | 29.            | 0             |          | 30.5     | 21.5    |      | 25.0  | 22.9    |         |
| Incremental De    | lay ( <i>d</i> 2       | ( d 2 ), s/veh         |      |               | 6.9    |         | 4           | 0.4      | 6.´            | 1             |          | 1.0      | 0.8     |      | 0.1   | 1.7     |         |
| Initial Queue De  | e Delay ( d ȝ ), s/veh |                        |      |               | 0.0    |         | 4           | 0.0      | 0.0            | )             |          | 0.0      | 0.0     |      | 0.0   | 0.0     |         |
| Control Delay (   | ( d ), s/veh           |                        |      | 22.3          | 34.4   | -       | 4           | 25.6     | 35.            | 1             |          | 31.5     | 22.3    |      | 25.1  | 24.6    |         |
| Level of Service  | e (LOS)                | (1.00                  |      | C             | C      |         | 4           | C        | D              |               | 0        | C        |         |      | C     | C       |         |
| Approach Delay    | /, s/veh               | veh / LOS              |      |               |        | C       |             | 33.3     | 5              |               | C        | 24.7     |         | C    | 24.6  |         | C       |
|                   | ay, s/ve               | en / LUS<br>           |      |               |        |         | <u>29</u> . | .4       |                |               |          |          |         |      |       |         |         |
| Multimodal Re     | sults                  |                        |      |               | EB     |         | T           |          | W              | В             |          |          | NB      |      |       | SB      |         |
| Pedestrian LOS    | Score                  | /LOS                   |      | 1.93          |        | В       | t           | 1.94     |                |               | В        | 1.91     |         | В    | 1.91  |         | В       |
| Bicycle LOS Sc    | ore / LC               | DS                     |      | 1.11          |        | А       | Ť           | 1.04     |                |               | А        | 0.95     | 5       | А    | 0.99  | )       | A       |

US 42-SR 29 AM Peak - 2043 Left Turn.xus

#### **HCS Signalized Intersection Intermediate Values**

| Interaction Information           Agency         SINGH + Associates         Duration, no         0.250           Analysis         Greg Gedemer         Analysis Val         [2192/223         Area Type         Duration, no         0.250           Juriadicin         ODOT         Time Paired         AMP US 42 14.00         Analysis Val         Val         US 42 SR 29 AN Pairs         US 42 SR 29 AN Pairs <th< th=""><th></th><th></th><th></th><th>3</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th><th></th><th></th><th></th></th<>  |   |   |                                   | 3        |            |           |       |          |             |          |        |          |                   | -        |       |        |                     |               |
|--|---|---|-----------------------------------|----------|------------|-----------|-------|----------|-------------|----------|--------|----------|-------------------|----------|-------|--------|---------------------|---------------|
| Agency         SINCH + Associates         Duration, In         0.200           Analyst         Greg Gedemer         Analysis Date (219/9/2023)         Area Type         Other         0.90           Unans Streat         MAD US 42 14.00         Analysis Year         2043 Left Turn         Analysis Pare         0.90           Internanction         US 42 at SR 29         File Name         US 42.3R 20 AM Feak         2043 Left Turn         Analysis Pare         0.90           Demand Information         US 42 at SR 29 Study         US 42.3R 20 AM Feak         204 20         20         70         50         50         10         204         40           Signal Information         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T  | General Inform  | nation  |                                   |          |            |           |       |          |             |          | Inter  | sectio   | n Infc            | rmat     | tion  |        | ┙┥ <sup>┑</sup> ┿╸↓ | be l <u>e</u> |
| Aralysis         Greg Gadamer         Analysis Data         1/21/9/2023         Area Type         Other           Jurisdiction         ODOT         Time Period         AM         Peak         PHF         0.98           Jurisdiction         US 42 at SR 29         File Name         US 40 at SR 20 <t< td=""><td>Agency</td><td></td><td>SINGH + Associates</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Durat</td><td>tion, h</td><td></td><td>0.25</td><td>50</td><td></td><td>4 L</td><td></td></t<>   | Agency  |   | SINGH + Associates                |          |            |           |       |          |             |          | Durat  | tion, h  |                   | 0.25     | 50    |        | 4 L                 |               |
| Junisdiction         OOT         Time Period         AM Peak         PHF         0.90           Uban Street         MAD US 42 14.00         Analysis Year 02.03 Left Turn<br>Lots         Analysis Period         1> 7.00           Intersection         US 42 at SR 20         File Name         US 42 at SR 20 AM Peak - 2043 AM Teak - 2045 Turn xus         Image: 200 MM Peak - 2043 AM Teak - 2045 Turn xus         Image: 200 MM Peak - 2043 AM Teak - 2045 Turn xus           Demand (V), volh         US 42 at SR 20         File Name         US 42 at SR 20 AM Peak - 2043 AM Teak - 2045 Turn xus         NB         SB           Signal Information         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L         T         R         L <td>Analyst</td> <td></td> <td>Greg Gedemer</td> <td></td> <td>Anal</td> <td>vsis</td> <td>Date</td> <td>12/19/20</td> <td>)23</td> <td></td> <td>Area</td> <td>Type</td> <td></td> <td>Oth</td> <td>er</td> <td>_*<br/></td> <td></td> <td>たよ</td>   | Analyst   |   | Greg Gedemer                      |          | Anal       | vsis      | Date  | 12/19/20 | )23         |          | Area   | Type     |                   | Oth      | er    | _*<br> |                     | たよ            |
| Ubbs         Street         MAD         Vis 2 14.00         Analysis Year         D23.1 eft Turn         Analysis Period         1> 7.00         Street         Stret         Street         Street<   | Jurisdiction  |   | ODOT                              |          | Time       | Per       | iod   | AM Pea   | k           |          | PHF    |          |                   | 0.96     | 3     |        | w ‡ ∈               |               |
| Lanes         Lanes <t< td=""><td>Urban Street</td><td></td><td>MAD US 42 14.00</td><td>_</td><td>Anal</td><td>ysis `</td><td>Year</td><td>2043 Le</td><td>ft Tur</td><td>'n</td><td>Analy</td><td>sis Pe</td><td>eriod</td><td>1&gt;7</td><td>7:00</td><td></td><td></td><td>+<br/>*</td></t<>  | Urban Street  |   | MAD US 42 14.00                   | _        | Anal       | ysis `    | Year  | 2043 Le  | ft Tur      | 'n       | Analy  | sis Pe   | eriod             | 1>7      | 7:00  |        |                     | +<br>*        |
| Intersection       US A2 as Nr 29       File Name       US A2 SN 29 AM Peak - 2014 Left TUR.VUS       Star Description         Demand Information       US A2 SN 29 AM Peak - 2014 Left TUR.VUS       No   |   |   |                                   |          |            |           |       | Lanes    | <b>D</b> 00 |          |        | 00101    | <i>6</i> <b>T</b> |          |       | _ `¬   | ግ ት                 |               |
| Project Discription         US 42 Safety Study           Demand Information         L         T         R         L  | Intersection  |   | US 42 at SR 29                    |          | File I     | Nam       | e     | US 42-S  | R 29        | AM       | Peak - | 2043     | _eft Iu           | ırn.xı   | JS    |        | <u>ነ ቀ</u> ነቀ ነ     | 7 4           |
| Demand Information         Image: Figure 10 (mode)         Image: Figure 10 (  | Project Descrip   | tion  | US 42 Safety Study                |          |            |           |       |          |             |          |        |          |                   |          |       |        |                     |               |
| Approach Movement       L       T       R  | Demand Inform   | nation  |                                   |          |            |           | EB    |          |             | \        | NB     |          |                   | N        | В     |        | SB                  |               |
| Demand (v). veh/h         30         300         300         60         240         70         150         60         10         240           Signal Information<br>Oxide. s         75.5         Reference Phase<br>Incordinated<br>Yes         2           Offset. s         0         Reference Phase<br>Signal Information<br>Uncordinated Yes         Simult. Gap EW         On<br>Red         T         R.         L         T         R.         L <td>Approach Move</td> <td>ement</td> <td></td> <td></td> <td>L</td> <td></td> <td>Т</td> <td>R</td> <td>L</td> <td></td> <td>Т</td> <td>R</td> <td>L</td> <td>Т</td> <td>R</td> <td>L</td> <td>Т</td> <td>R</td>  | Approach Move   | ement   |                                   |          | L          |           | Т     | R        | L           |          | Т      | R        | L                 | Т        | R     | L      | Т                   | R             |
| Signal Information         Cycle.s         7.5.6         Reference Phase         2.0           Offset, s         0         Reference Phase         2.0         15.0         0.0  | Demand ( <i>v</i> ), v  | eh/h  |                                   |          | 30         |           | 300   | 30       | 60          | 2        | 240    | 20       | 70                | 15       | 0 50  | 10     | 240                 | 40            |
| Signal information         Signal information         Cycle.s         Set all information         S  |   |   |                                   |          | 1          | 1         |       |          |             |          |        |          |                   |          |       |        |                     |               |
| Cycle, s         7.5.         Netlefence Priate         C <thc<< td=""><td>Signal Informa</td><td>ition</td><td></td><td>0</td><td></td><td>Z</td><td>15.  </td><td>28</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>sta</td><td></td><td></td></thc<<>   | Signal Informa  | ition   |                                   | 0        |            | Z         | 15.   | 28       |             |          |        |          |                   |          |       | sta    |                     |               |
| Oliset, solution         U         Reference Point         End         Green         22.4         18.2         15.0         0.00         0.00<   | Cycle, s  | 75.5  | Reference Phase                   | 2        |            |           | 517   | ₹"       |             |          |        |          |                   |          | 1     |        | 3                   | ➡ ₄           |
| Oncoordinational Tests         Othic Serie Model         Tested         Simult. Seap N/S         On         Red         1.0         1.0         0.0         0.0         0.0         1.00         1.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.000<  | Unset, s  | U<br>Voo  | Simult Con E/W                    | na<br>On | Gree       | n 2       | 2.4   | 18.2     | 15.0        | 0        | 0.0 (  | 0.0      | 0.0               |          |       |        |                     | A             |
| Saturation Flow / Delay       L       T       R </td <td>Eorce Mode</td> <td>Fixed</td> <td>Simult Cap N/S</td> <td>On</td> <td>Yello</td> <td>w 5</td> <td>.6</td> <td>5.6</td> <td>5.6</td> <td>0</td> <td></td> <td>).0</td> <td>0.0</td> <td>-11</td> <td>5</td> <td>₽</td> <td>7</td> <td>¥ .</td>  | Eorce Mode  | Fixed   | Simult Cap N/S                    | On       | Yello      | w 5       | .6    | 5.6      | 5.6         | 0        |        | ).0      | 0.0               | -11      | 5     | ₽      | 7                   | ¥ .           |
| Saturation Flow / Delay         L         T         R <td></td> <td>Tixeu</td> <td></td> <td></td> <td>i teu</td> <td>1</td> <td>.0</td> <td>1.0</td> <td>1.0</td> <td>0</td> <td></td> <td></td> <td>0.0</td> <td></td> <td></td> <td></td> <td></td> <td>0</td>  |   | Tixeu   |                                   |          | i teu      | 1         | .0    | 1.0      | 1.0         | 0        |        |          | 0.0               |          |       |        |                     | 0             |
| Lane Width Adjustment Factor ( $f_{n'}$ )       1.000<   | Saturation Flo  | w / Dela  | IV                                | L        |            | Т         | R     | L        | 1           | Г        | R      | L        |                   | Т        | R     | L      | Т                   | R             |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | Lane Width Adj  | ustment   | Factor ( <i>f</i> <sub>w</sub> )  | 1.00     | 0 1.       | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| Parking Activity Adjustment Factor ( $f_{0}$ )       1.000       1   | Heavy Vehicles  | and Gr  | ade Factor (fHVg)                 | 0.89     | )1 0.      | 891       | 1.000 | 0.883    | 0.8         | 883      | 1.000  | 0.86     | 0 0.              | 860      | 1.000 | 0.844  | 0.844               | 1.000         |
| Bus Blockage Adjustment Factor ( $fa_0$ )       1.000<   | Parking Activity Adjustment Factor (fp)<br>Bus Blockage Adjustment Factor (fbb) |   | nent Factor (fp)                  | 1.00     | 0 1.       | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| Area Type Adjustment Factor ( $f_{2}$ )1.000 <td colspan="2">Bus Blockage Adjustment Factor (<i>fbb</i>)</td> <td>1.00</td> <td>0 1.</td> <td>000</td> <td>1.000</td> <td>1.000</td> <td>1.0</td> <td>000</td> <td>1.000</td> <td>1.00</td> <td>0 1.</td> <td>000</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> <td>1.000</td>  | Bus Blockage Adjustment Factor ( <i>fbb</i> )                                   |   | 1.00                              | 0 1.     | 000        | 1.000     | 1.000 | 1.0      | 000         | 1.000    | 1.00   | 0 1.     | 000               | 1.000    | 1.000 | 1.000  | 1.000               |               |
| Lane Utilization Adjustment Factor ( <i>f</i> )1.0001.0  | Area Type Adjustment Factor ( <i>f<sub>a</sub></i> )                            |   | actor ( <i>f<sub>a</sub></i> )    | 1.00     | 0 1.       | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| Left-Turn Adjustment Factor ( <i>i</i> .r)0.9520.0000.9520.000<  | Lane Utilization  | Adjustr   | nent Factor ( <i>f</i> LU)        | 1.00     | 00 1.      | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| Right-Turn Adjustment Factor (frer)     Image: free destinan Adjustment Factor (free)     Image: free destinant f   | Left-Turn Adjus   | tment F   | actor ( <i>f</i> LT)              | 0.95     | 52 0.      | 000       |       | 0.952    | 0.0         | 000      |        | 0.50     | 0 0.              | 000      |       | 0.530  | 0.000               |               |
| Left-Turn Pedestrian Adjustment Factor ( $f_{rev}$ )1.000I1.000I1.000II1.000II <td>Right-Turn Adju</td> <td>stment</td> <td>Factor (<i>f</i><sub>R7</sub>)</td> <td></td> <td>0.</td> <td>984</td> <td>0.984</td> <td>·</td> <td>0.9</td> <td>86</td> <td>0.986</td> <td></td> <td>0.</td> <td>957</td> <td>0.957</td> <td></td> <td>0.975</td> <td>0.975</td>   | Right-Turn Adju   | stment  | Factor ( <i>f</i> <sub>R7</sub> ) |          | 0.         | 984       | 0.984 | ·        | 0.9         | 86       | 0.986  |          | 0.                | 957      | 0.957 |        | 0.975               | 0.975         |
| Right-Turn Ped-Bike Adjustment Factor ( $\hbar \rho \mu$ )1.000 <th< td=""><td>Left-Turn Pedes</td><td>strian Ao</td><td>ljustment Factor (fLpb)</td><td>1.00</td><td>00</td><td></td><td></td><td>1.000</td><td></td><td></td><td></td><td>1.00</td><td>0</td><td></td><td></td><td>1.000</td><td></td><td></td></th<>  | Left-Turn Pedes   | strian Ao                                       | ljustment Factor (fLpb)           | 1.00     | 00         |           |       | 1.000    |             |          |        | 1.00     | 0                 |          |       | 1.000  |                     |               |
| Work Zone Adjustment Factor ( $f_{M2}$ )1.000 <td>Right-Turn Ped</td> <td>-Bike Ac</td> <td>ljustment Factor (fRpb)</td> <td></td> <td></td> <td></td> <td>1.000</td> <td>·</td> <td></td> <td></td> <td>1.000</td> <td></td> <td></td> <td></td> <td>1.000</td> <td></td> <td></td> <td>1.000</td>   | Right-Turn Ped  | -Bike Ac  | ljustment Factor (fRpb)           |          |            |           | 1.000 | ·        |             |          | 1.000  |          |                   |          | 1.000 |        |                     | 1.000         |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | Work Zone Adju  | ustment   | Factor (fwz)                      | 1.00     | 0 1.       | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| $ \begin{array}{ c c c c c } \med \medskip \medski$ | DDI Factor (fool  | Turn Prot. CAV Adj. Factor ( <i>fcAV,prot</i> ) |                                   |          | 00 1.      | 000       | 1.000 | 1.000    | 1.0         | 000      | 1.000  | 1.00     | 0 1.              | 000      | 1.000 | 1.000  | 1.000               | 1.000         |
| Left Ium Perm. CAV Adj. Factor (rcAv.perm)       Image: Constraint of the sector (rcAv.perm)       Image: Co   | Left-Turn Prot.   | CAV Adj   | . Factor (fCAV,prot)              | <u> </u> | _          |           |       | <u> </u> |             |          |        |          |                   |          |       | 1.00   |                     |               |
| Movement Saturation Flow Rate (s), ven/m       1612       1514       1518       1596       1527       127       950       1172       391       1006       1340       223         Proportion of Vehicles Arriving on Green (P)       0.24       0.24       0.24       0.20       0.20       0.3  | Left-Turn Perm.   | . CAV A   | dj. Factor ( <i>f</i> CAV,perm)   | 4.04     | 0 4        | - 4 4     | 454   | 4500     | 45          | 07       | 407    | 1.0      |                   | 170      | 004   | 1.00   | 1010                | 000           |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $   | Novement Satu   | Iration F                                       | Now Rate (s), ven/n               | 161      | 2 1:       | 24        | 151   | 1598     | 15          | 27       | 127    | 950      |                   | 20       | 391   | 1006   | 1340                | 223           |
| Signal Timing / Movement Groups       EBL       EBT/R       WBL       WBT/R       NBL       NBT/R       SBL       SBT/R         Lost Time (t.)       4.0       6.6       6.6       6.6       6.6       6.6       6.6       6.6       0.30       0.30       0.30       0.30         Permitted Saturation Flow Rate (sp), veh/h/ln       1612       1598       950       1006       30.0       0.30 <td>Incremental De</td> <td>lav Fact</td> <td>r(k)</td> <td>0.2</td> <td>4 0<br/>3 0</td> <td>.24<br/>15</td> <td>0.24</td> <td>0.20</td> <td>0.4</td> <td>20<br/>13</td> <td>0.20</td> <td>0.3</td> <td>3 0</td> <td>.30</td> <td>0.30</td> <td>0.30</td> <td>0.30</td> <td>0.30</td>  | Incremental De  | lav Fact  | r(k)                              | 0.2      | 4 0<br>3 0 | .24<br>15 | 0.24  | 0.20     | 0.4         | 20<br>13 | 0.20   | 0.3      | 3 0               | .30      | 0.30  | 0.30   | 0.30                | 0.30          |
| Signal Timing / Movement Groups         EBL         EBL //         WBL         WBT /R         NBL         NBT /R         SBL         SBT /R           Lost Time (t.)         4.0         6.6         6.7         6.7         6.7         6.7         6.7         6.7         6.7         6.7         6.7         6.7         6.7 <td< td=""><td>Incremental De</td><td>lay Faci</td><td></td><td>0.1</td><td>3 0</td><td>15</td><td></td><td colspan="2">0.13 0.1</td><td>13</td><td colspan="2">3</td><td colspan="2">0.13 0.</td><td></td><td>0.13</td><td>0.13</td><td></td></td<>  | Incremental De  | lay Faci  |                                   | 0.1      | 3 0        | 15        |       | 0.13 0.1 |             | 13       | 3      |          | 0.13 0.           |          |       | 0.13   | 0.13                |               |
| Lost Time (t.)       4.0       6.6       6.6       6.6       6.6       6.6         Green Ratio (g/C)       0.2       0.24       0.20       0.20       0.30       0.30         Permitted Saturation Flow Rate (s_b), veh/h/ln       1612       1598       950       1006         Shared Saturation Flow Rate (s_b), veh/h/ln       M       6.6       0.0       0.0       22.5       1006         Permitted Effective Green Time (g_b), s       0.0       0.0       0.0       22.5       22.5         Permitted Queue Service Time (g_b), s       0.0       0.0       10.4       14.4         Permitted Queue Service Time (g_b), s       0.0       0.0       0.0       0.0       0.0       0.6         Time to First Blockage (gr), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage (g_b), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Protected Right Effective Green Time (g_r), s       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I       I   | Signal Timing   | / Mover   | nent Groups                       | E        | BL         | E         | BT/R  | WE       | 3L          | W        | /BT/R  | N        | IBL               | Ν        | NBT/R | SBL    | _ 5                 | BT/R          |
| Green Ratio (g/C)       0.24       0.20       0.30       0.30         Permitted Saturation Flow Rate (sp), veh/h/ln       1612       1598       950       1006         Shared Saturation Flow Rate (sp), veh/h/ln          1598       950       1006         Shared Saturation Flow Rate (sp), veh/h/ln            1006         Permitted Effective Green Time (gp), s       0.0       0.0       0.0       22.5       22.5         Permitted Service Time (gu), s       0.0       0.0       0.0       10.4       22.5         Permitted Queue Service Time (gps), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage (gr), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage (gr), s       0.0       0.0       0.0       0.000       0.000       0.00       0.000       <  | Lost Time ( <i>t</i> <sub>L</sub> )   |   |                                   |          |            |           | 4.0   |          |             | 6.6      |        |          |                   |          | 6.6   |        |                     | 6.6           |
| Permitted Saturation Flow Rate ( $s_p$ ), veh/h/ln       1612       1598       950       1006         Shared Saturation Flow Rate ( $s_{sh}$ ), veh/h/ln              1006         Permitted Effective Green Time ( $g_p$ ), s       0.0       0.0       0.0       22.5       22.5       22.5         Permitted Service Time ( $g_u$ ), s       0.0       0.0       0.0       10.4       14.4         Permitted Queue Service Time ( $g_{ps}$ ), s       0.0       0.0       0.0       10.4       0.6         Time to First Blockage ( $g_r$ ), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage ( $g_{rs}$ ), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage ( $g_{rs}$ ), s       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.  | Green Ratio (g/   | ′C)   |                                   |          |            | (         | 0.24  |          |             | (        | 0.20   |          |                   |          | 0.30  |        |                     | 0.30          |
| Shared Saturation Flow Rate ( $s_{sh}$ ), veh/h/lnImage: formal system of the system of th                                     | Permitted Satur   | ration Fl                                       | ow Rate ( $s_{\rho}$ ), veh/h/ln  |          |            | 1         | 1612  |          |             | 1        | 598    |          |                   |          | 950   |        | -                   | 1006          |
| Permitted Effective Green Time $(g_p)$ , s0.00.022.522.5Permitted Service Time $(g_u)$ , s0.00.010.414.4Permitted Queue Service Time $(g_{ps})$ , s5.40.6Time to First Blockage $(g_r)$ , s0.00.00.00.00.00.0Queue Service Time Before Blockage $(g_{rb})$ , s0.00.00.00.00.0Queue Service Time Before Blockage $(g_{rb})$ , sProtected Right Saturation Flow $(s_R)$ , veh/h/lnProtected Right Effective Green Time $(g_R)$ , sMultimodalEBWBNBPedestrian $F_w / F_v$ 1.1980.0001.1980.0001.1980.0001.1170.0000.117Pedestrian $M_{corner} / M_{cw}$ 0.000.020.040.000.040.00 <td>Shared Saturat</td> <td>ion Flow</td> <td>/ Rate (ssh), veh/h/ln</td> <td></td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td>  | Shared Saturat  | ion Flow  | / Rate (ssh), veh/h/ln            |          |            |           |       |          |             |          |        |          |                   | <u> </u> |       |        |                     |               |
| Permitted Service Time $(g_{u})$ , s       0.0       0.0       10.4       14.4         Permitted Queue Service Time $(g_{ps})$ , s       0.0       0.0       5.4       0.6         Time to First Blockage $(g_{f})$ , s       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Queue Service Time Before Blockage $(g_{fs})$ , s       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Protected Right Saturation Flow $(s_{R})$ , veh/h/ln       C       C       C       C       C       C       C       C         Protected Right Effective Green Time $(g_{R})$ , s       C<   | Permitted Effec   | tive Gre  | en Time ( $g_p$ ), s              |          |            |           | 0.0   | -        |             |          | 0.0    |          |                   | -        | 22.5  |        | _                   | 22.5          |
| Permitted Queue Service Time $(g_{PS})$ , sImage: Final Problem (G_{PS}), s <thimage: fina<="" td=""><td>Permitted Servi</td><td>ce lime</td><td>(<i>g</i>u), s</td><td><u> </u></td><td></td><td>-</td><td>0.0</td><td></td><td></td><td></td><td>0.0</td><td><u> </u></td><td></td><td>-</td><td>10.4</td><td></td><td></td><td>14.4</td></thimage:>   | Permitted Servi   | ce lime   | ( <i>g</i> u), s                  | <u> </u> |            | -         | 0.0   |          |             |          | 0.0    | <u> </u> |                   | -        | 10.4  |        |                     | 14.4          |
| Time to First Blockage (g), sImage of the body of the blockage (g), sImage of the block  | Permitted Quel  | ie Servi  | ce lime ( $g_{ps}$ ), s           |          |            | -         | 0.0   | -        |             |          | 0.0    | <u> </u> |                   | -        | 5.4   |        |                     | 0.6           |
| Queue Service Time Before Blockage ( $gf_s$ ), sImage: Final                                     | Time to First Bi  | оскаде<br>Тіта р                                | (gf), S                           | -        |            | -         | 0.0   | -        |             |          | 0.0    |          |                   |          | 0.0   |        |                     | 0.0           |
| Multimodal       Image: Second state and the formula in  | Queue Service   | Satura  | tion Flow (sa) wohle !!           |          |            | -         |       |          |             |          |        | -        |                   |          |       |        |                     |               |
| Multimodal $\mathbb{E}$ $\mathbb{W}$ $\mathbb{N}$ $\mathbb{S}$ Pedestrian $F_w/F_v$ 1.198       0.000       1.198       0.000       1.198       0.000       1.198       0.000       1.198       0.000       0.117       0.000       0.117         Pedestrian $K_s/F_delay$ 0.00       0.128       0.000       0.146       0.000       0.117       0.000       0.117         Pedestrian $M_{corner}/M_{cw}$ 0.00       0.00       0.00       0.000       0.000       0.000       0.000  | Protected Right   | Effectiv  |                                   |          |            | -         |       |          |             | _        |        |          |                   | -        |       |        |                     |               |
| Pedestrian Fw / Fv         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         1.198         0.000         0.117         0.000         0.117           Pedestrian Mcomer / Mcw         0.00 </td <td>Multimodal</td> <td></td> <td></td> <td></td> <td></td> <td>-R</td> <td></td> <td></td> <td>14</td> <td>VR</td> <td></td> <td></td> <td></td> <td>NR</td> <td></td> <td></td> <td>SR</td> <td></td>  | Multimodal  |   |                                   |          |            | -R        |       |          | 14          | VR       |        |          |                   | NR       |       |        | SR                  |               |
| Pedestrian Fs / Fdelay         0.000         0.128         0.000         0.146         0.000         0.117         0.000         0.117           Pedestrian Mcorner / Mcw         0.00         0.00         0.00         0.146         0.000         0.117         0.000         0.117   | Pedestrian F.   | Fv  |                                   | 1        | 198        |           | 000   | 1 10     | 78          |          | 000    | 1        | 198               |          | 000   | 1 10   | 8 0                 | ) 000         |
| Pedestrian Mcorner / Mcw         0.00         0.00         0.00         0.00         0.00         0.00           Disurds of / de         300.04         34.20         204.22         45.72         504.00         40.05         504.00         40.05   | Pedestrian F <sub>s</sub> /   | F <sub>delav</sub>                              |                                   | 0        | 000        |           | .128  | 0.00     | )0          | 0        | .146   | 0        | 000               |          | ).117 | 0.00   |                     | ).117         |
|  | Pedestrian Moor   | ner / Mcm                                       | ,                                 | 0        | .00        |           |       | 0.0      | 0           |          |        | 0        | .00               |          |       | 0.00   |                     |               |
| Bicycle <i>cb</i> / <i>db</i> 398.04 24.20 -201.32 45.73 594.09 18.05 594.09 18.05   | Bicycle <i>c</i> <sub>b</sub> / <i>d</i> <sub>b</sub>                           |   |                                   | 39       | 8.64       | 2         | 24.20 | -201     | .32         | 4        | 5.73   | 59       | 4.09              | •        | 18.65 | 594.0  | 9 -                 | 8.65          |

| Bicycle F <sub>w</sub> / F <sub>v</sub>                    | -3.64   | 0.62 | -3.64        | 0.55         | -3.64 | 0.46   | -3.64          | 0.50       |
|--|---------|------|--------------|--------------|-------|--------|----------------|------------|
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US 42-SR 29 AM Peak - 2043 Left Turn.xus

#### HCS Signalized Intersection Results Graphical Summary

|                          |                    |              |         |          |                    |               |        |           |             | <b>,</b> |      |                  |                  |                |
|--------------------------|--------------------|--------------|---------|----------|--------------------|---------------|--------|-----------|-------------|----------|------|------------------|------------------|----------------|
| General Information      |                    |              |         |          |                    |               | li     | ntersec   | tion Inf    | ormatio  | on   |                  | Jatatata ↓.      | þa l <u>a</u>  |
| Agency                   | SINGH + Associates | ;            |         |          |                    |               | C      | Juration, | h           | 0.250    |      |                  | 44               |                |
| Analyst                  | Greg Gedemer       |              | Analys  | sis Date | 12/19/             | 2023          | A      | rea Typ   | е           | Other    |      | 4                |                  | ۲.<br>۸.<br>۲. |
| Jurisdiction             | ODOT               |              | Time F  | Period   | AM Pe              | eak           | P      | PHF       |             | 0.96     |      |                  | WÂE              |                |
| Urban Street             | MAD US 42 14.00    |              | Analys  | sis Year | 2043 L<br>Lanes    | eft Tur       | n A    | nalysis   | Period      | 1> 7:(   | 00   | 7 <del>1</del> 2 |                  | *<br>•         |
| Intersection             | US 42 at SR 29     |              | File Na | ame      | US 42              | -SR 29        | AM Pea | ak - 204  | 3 Left T    | urn.xus  |      |                  | ן (<br>המלקליף ו | ÷ ۲            |
| Project Description      | US 42 Safety Study |              |         |          |                    |               |        |           |             |          |      |                  |                  |                |
| Demand Information       |                    |              |         | FB       |                    |               | WB     |           |             | NB       |      |                  | SB               |                |
| Approach Movement        |                    |              | 1       | Т        | R                  |               | Т      | R         |             | Т        | R    | 1.1              | Т                | R              |
| Demand $(v)$ , veh/h     |                    |              | 30      | 300      | 30                 | 60            | 240    | 20        | 70          | 150      | 50   | 10               | 240              | 40             |
|                          |                    |              |         | 000      | 00                 |               | 210    | 20        | 10          | 100      | 00   | 10               | 210              | 10             |
| Signal Information       |                    |              |         |          | - 2                |               |        |           |             |          |      |                  |                  |                |
| Cycle, s 75.5            | Reference Phase    | 2            |         | S-02     | , B 2              | -             |        |           |             |          |      | $ \Psi $         | _                | - <b>A</b>     |
| Offset, s 0              | Reference Point    | End          | Groop   | 22.4     | 19.2               | 15.0          | 0.0    | 0.0       | 0.0         | _        | 1    | 2                | 3                | 4              |
| Uncoordinated Yes        | Simult. Gap E/W    | On           | Yellow  | 5.6      | 5.6                | 5.6           | 0.0    | 0.0       | 0.0         | _        |      |                  |                  | $\rightarrow$  |
| Force Mode Fixed         | Simult. Gap N/S    | On           | Red     | 1.0      | 1.0                | 1.0           | 0.0    | 0.0       | 0.0         |          | 5    | 6                | 7                | ■ 8            |
|                          |                    |              |         |          |                    |               |        |           |             |          |      |                  |                  |                |
| Movement Group Res       | sults              |              |         | EB       |                    |               | WB     |           |             | NB       |      |                  | SB               |                |
| Approach Movement        |                    |              | L       | Т        | R                  | L             | Т      | R         | L           | Т        | R    | L                | Т                | R              |
| Back of Queue (Q), f     |                    | 19.6         | 276     |          | 43.5               | 231.2         |        | 60.5      | 138.3       |          | 7.4  | 212.2            | 1                |                |
| Back of Queue (Q), v     | e)                 | 0.7          | 9.9     |          | 1.6                | 8.3           |        | 2.1       | 4.8         |          | 0.3  | 7.3              |                  |                |
| Queue Storage Ratio (    | le)                | 0.00         | 0.00    |          | 0.00               | 0.00          |        | 0.00      | 0.00        |          | 0.00 | 0.00             |                  |                |
| Control Delay ( d ), s/v |                    | 22.3         | 34.4    |          | 25.6               | 35.1          |        | 31.5      | 22.3        |          | 25.1 | 24.6             |                  |                |
| Level of Service (LOS)   |                    | С            | С       |          | С                  | D             |        | С         | С           |          | С    | С                |                  |                |
| Approach Delay, s/veh    | / LOS              |              | 33.4    |          | С                  | 33.3          | 3      | С         | 24.7        | 7        | С    | 24.              | 6                | С              |
| Intersection Delay, s/ve | eh / LOS           |              |         |          | 29                 | .4            |        |           |             |          |      | С                |                  |                |
|                          |                    |              |         |          |                    |               |        |           |             |          |      |                  |                  |                |
|                          |                    |              |         |          | 7.3                | 0.3           |        |           |             |          | _    |                  |                  |                |
|                          | 0.0                |              | 0.7     | 22.3     |                    | 35.1          |        |           |             | 0.2      |      |                  |                  |                |
|                          | 3.3                |              |         | 34.4     |                    | 55.1 <u> </u> |        |           |             | 0.5      |      |                  |                  |                |
|                          |                    |              |         |          |                    | 25.6          |        | 1.6       |             |          |      |                  |                  |                |
|                          |                    | OS A<br>OS B |         | 3        | 1.5<br>22.3<br>2.1 |               | ſ      | Queue     | - <b></b> - | Delay    | -    |                  |                  |                |

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US 42-SR 29 AM Peak - 2043 Left Turn.xus



## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 AM Peak - 2043 Left Turn.xus Generated: 2/16/2024 7:50:12 AM

#### **HCS Signalized Intersection Input Data**

|  |                                      | J                         |     |         |         |        |           |      |           |          |         |      |          |             |              |
|--|--------------------------------------|---------------------------|-----|---------|---------|--------|-----------|------|-----------|----------|---------|------|----------|-------------|--------------|
| General Inform                               | nation                               |                           |     |         |         |        |           |      | Intersec  | tion Inf | ormatic | n    | 4        | at at at a  | s l <u>s</u> |
| Agency                                       |                                      | SINGH + Associate         | s   |         |         |        |           |      | Duration  | , h      | 0.250   |      |          | 4 5         |              |
| Analyst                                      |                                      | Greg Gedemer              |     | Analys  | is Date | 12/19/ | 2023      |      | Area Typ  | e        | Other   |      |          |             | د.<br>4      |
| Jurisdiction                                 |                                      | ODOT                      |     | Time P  | eriod   | PM Pe  | eak       |      | PHF       |          | 0.96    |      |          | W + E       | ¥<br>∕∲      |
| Urban Street                                 |                                      | MAD US 42 14.00           |     | Analys  | is Year | 2043 I | _eft Turi | n    | Analysis  | Period   | 1> 7:(  | )0   |          |             | *            |
| Intersection                                 |                                      | US 42 at SR 29            |     | File Na | me      | US 42  | -SR 29    | PM F | eak - 204 | 3 Left T | urn.xus |      |          | ግኑ          | ×            |
| Project Descrip                              | tion                                 | US 42 Safety Study        | ,   | л       |         |        |           |      |           |          |         |      | ĩ        | * 1 * * * 1 | * (*         |
|  |                                      |                           |     |         |         |        | r         |      |           | 1        |         |      |          |             |              |
| Demand Inform                                | nation                               |                           |     |         | EB      |        |           | W    | B         | <u> </u> | NB      | 1 -  |          | SB          |              |
| Approach Move                                | ement                                |                           |     | L       | Т       | R      | L         |      | R         | L        | Т       | R    | L        | Т           | R            |
| Demand ( v ), v                              | eh/h                                 |                           |     | 50      | 290     | 30     | 50        | 32   | 20   20   | 80       | 410     | 120  | 10       | 150         | 30           |
| Signal Informa                               | tion                                 |                           |     |         |         | 8      |           |      | _         |          |         |      |          |             |              |
| Cycle s                                      | 54.5                                 | Reference Phase           | 2   |         | 245     | . La 2 |           |      |           |          |         |      | <b>N</b> |             |              |
| Offset s                                     | 0                                    | Reference Point           | End |         |         | ° Tš   |           |      |           |          |         | 1    | 2        | 3           | <b>Y</b> 4   |
| Uncoordinated                                | Yes                                  | Simult Gap F/W            | On  | Green   | 23.6    | 17.7   | 0.0       | 0.0  | 0.0       | 0.0      | _       |      |          |             | -            |
| Force Mode                                   | Fixed                                | Simult, Gap N/S           | On  | Red     | 1.0     | 1.0    | 0.0       | 0.0  | ) 0.0     | 0.0      | _       | 5    | 6        | 7           | 8            |
|  | 1 Med                                |                           | •   |         |         |        |           |      |           |          |         |      |          |             |              |
| Traffic Informa                              | tion                                 |                           |     |         | EB      |        |           | WE   | 3         |          | NB      |      |          | SB          |              |
| Approach Move                                | ement                                |                           |     | L       | Т       | R      | L         | Т    | R         | L        | Т       | R    | L        | Т           | R            |
| Demand (v), ve                               | h/h                                  |                           |     | 50      | 290     | 30     | 50        | 320  | ) 20      | 80       | 410     | 120  | 10       | 150         | 30           |
| Initial Queue (C                             | <b>♀</b> ), veh/                     | ĥ                         |     | 0       | 0       | 0      | 0         | 0    | 0         | 0        | 0       | 0    | 0        | 0           | 0            |
| Base Saturation                              | n Flow F                             | Rate ( <i>s</i> ₀), veh/h |     | 1900    | 1900    | 1900   | 1900      | 190  | 0 1900    | 1900     | 1900    | 1900 | 1900     | 1900        | 1900         |
| Parking ( <i>N</i> <sub>m</sub> ), man/h     |                                      |                           |     |         | None    |        |           | Non  | e         |          | None    |      |          | None        |              |
| Heavy Vehicles ( <i>P</i> <sub>HV</sub> ), % |                                      |                           |     | 0       | 14      |        | 0         | 15   |           | 0        | 18      |      | 0        | 20          |              |
| Ped / Bike / RTOR, /h                        |                                      |                           |     | 0       | 0       | 0      | 0         | 0    | 0         | 0        | 0       | 0    | 0        | 0           | 0            |
| Buses (Nb), bus                              | ses/h                                |                           |     | 0       | 0       | 0      | 0         | 0    | 0         | 0        | 0       | 0    | 0        | 0           | 0            |
| Arrival Type (A                              | Т)                                   |                           |     | 3       | 3       | 3      | 3         | 3    | 3         | 3        | 3       | 3    | 3        | 3           | 3            |
| Upstream Filter                              | ing (I)                              |                           |     | 1.00    | 1.00    | 1.00   | 1.00      | 1.00 | ) 1.00    | 1.00     | 1.00    | 1.00 | 1.00     | 1.00        | 1.00         |
| Lane Width ( W                               | / ), ft                              |                           |     | 12.0    | 12.0    |        | 12.0      | 12.0 | )         | 12.0     | 12.0    |      | 12.0     | 12.0        |              |
| Turn Bay Lengt                               | h, ft                                |                           |     | 0       | 0       |        | 0         | 0    |           | 0        | 0       |      | 0        | 0           |              |
| Grade ( <i>Pg</i> ), %                       |                                      |                           |     |         | 0       |        |           | 0    |           |          | 0       |      |          | 0           |              |
| Speed Limit, mi                              | i/h                                  |                           |     | 55      | 55      | 55     | 55        | 55   | 55        | 55       | 55      | 55   | 55       | 55          | 55           |
| Phase Informa                                | tion                                 |                           |     | FBI     |         | EBT    | WBI       |      | WBT       | NBI      |         | NBT  | SBI      |             | SBT          |
| Maximum Gree                                 | n (Gmax                              | ) or Phase Split s        |     |         |         | 30.0   | WBL       |      | 30.0      | INDL     |         | 60.0 |          |             | 60 0         |
| Yellow Change                                | Interval                             | (Y) s                     |     |         |         | 5.6    |           | -    | 5.6       |          |         | 5.6  |          |             | 5.6          |
| Red Clearance                                | Interval                             | ( <i>R</i> c).s           | _   |         |         | 1.0    |           |      | 1.0       |          |         | 1.0  |          |             | 1.0          |
| Minimum Greer                                | ר ( <i>Gmin</i> )                    | . s                       |     |         |         | 10     | <u> </u>  |      | 10        |          |         | 20   |          |             | 20           |
| Start-Up Lost T                              | ime ( <i>It</i> )                    | , S                       |     | 2.0     |         | 2.0    | 2.0       |      | 2.0       | 2.0      |         | 2.0  | 2.0      |             | 2.0          |
| Extension of Ef                              | fective (                            | Green (e), s              |     | 2.0     |         | 2.0    | 2.0       |      | 2.0       | 2.0      |         | 2.0  | 2.0      |             | 2.0          |
| Passage ( <i>PT</i> ),                       | s                                    |                           |     |         |         | 3.5    |           |      | 3.5       |          |         | 3.5  |          |             | 3.5          |
| Recall Mode                                  |                                      |                           |     |         |         | Off    |           |      | Off       |          |         | Min  |          |             | Min          |
| Dual Entry                                   |                                      |                           |     |         |         | Yes    |           |      | Yes       |          |         | Yes  |          |             | Yes          |
| Walk ( <i>Walk</i> ), s                      |                                      |                           |     |         |         | 0.0    |           |      | 0.0       |          |         | 0.0  |          |             | 0.0          |
| Pedestrian Clea                              | arance                               | Гіте ( <i>PC</i> ), s     |     |         |         | 0.0    |           |      | 0.0       |          |         | 0.0  |          |             | 0.0          |
|  |                                      |                           |     |         |         |        |           |      |           |          |         |      |          |             |              |
| Multimodal Inf                               | Multimodal Information               |                           |     |         | EB      |        |           | WB   |           |          | NB      |      |          | SB          |              |
| 85th % Speed /                               | Rest in                              | Walk / Corner Radi        | us  | 0.0     | No      | 25.0   | 0.0       | No   | 25.0      | 0.0      | No      | 25.0 | 0.0      | No          | 25.0         |
| Walkway / Cros                               | swalk V                              | Vidth / Length, ft        |     | 9.0     | 12.0    | 0.0    | 9.0       | 12.0 | 0.0       | 9.0      | 12.0    | 0.0  | 9.0      | 12.0        | 0.0          |
| Street Width / Is                            | siand / (                            | Curb, ft                  |     | 0.0     | 0       | No     | 0.0       | 0    | No        | 0.0      | 0       | No   | 0.0      | 0           | No           |
| vviath Outside /                             | Bike La                              | ane / Shoulder, ft        |     | 12.0    | 5.0     | 2.0    | 12.0      | 5.0  | 2.0       | 12.0     | 5.0     | 2.0  | 12.0     | 5.0         | 2.0          |
| Pedestrian Sigr                              | Pedestrian Signal / Occupied Parking |                           |     | No      |         | J.50   | No        |      | 0.50      | No       |         | 0.50 | No       |             | 0.50         |

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HCS™ Streets Version 2023

## HCS Signalized Intersection Results Summary

| General Inform  | nation  |                              |      |          |         |         |          |               | Int    | ersect            | ion Inf  | ormatio  | n           | <u>_</u>  | ****       | ≜ l <u>a</u>  |  |
|---|---|------------------------------|------|----------|---------|---------|----------|---------------|--------|-------------------|----------|----------|-------------|-----------|------------|---------------|--|
| Agency  |   | SINGH + Associate            | s    |          |         |         |          |               | Du     | ration,           | h        | 0.250    |             |           | *† S       |               |  |
| Analyst   |   | Greg Gedemer                 |      | Analys   | sis Dat | e 12/19 | /2023    |               | Are    | еа Тур            | е        | Other    |             | <u></u> 4 |            | 4<br>4        |  |
| Jurisdiction  |   | ODOT                         |      | Time F   | Period  | PM P    | eak      |               | PH     | lF                |          | 0.96     |             |           | w∔e<br>s   |               |  |
| Urban Street  |   | MAD US 42 14.00              |      | Analys   | sis Yea | ar 2043 | Left Tur | n             | An     | alysis            | Period   | 1> 7:0   | 0           | 7         |            | <b>ت</b><br>ح |  |
| Intersection  |   | US 42 at SR 29               |      | File Na  | ame     | US 42   | 2-SR 29  | PM F          | Peak   | <b>&lt; -</b> 204 | 3 Left T | urn.xus  |             |           | ግ ቱ        |               |  |
| Project Descrip                                       | tion  | US 42 Safety Study           | /    | А        |         |         |          |               |        |                   |          |          |             | 1         | * 1 4 17 1 | • <b>(</b> *  |  |
|   |   |                              |      |          |         |         | J.       |               |        |                   |          |          |             |           |            |               |  |
| Demand Inform   | nation  |                              |      |          | EB      |         |          | W             | /B     |                   |          | NB       |             |           | SB         |               |  |
| Approach Move   | ement   |                              |      | L        | Т       | R       | L        |               | Г      | R                 | <u> </u> | Т        | R           | L         | Т          | R             |  |
| Demand ( v ), v                                       | eh/h  |                              |      | 50       | 290     | ) 30    | 50       | 32            | 20     | 20                | 80       | 410      | 120         | 10        | 150        | 30            |  |
| 0   | <i>c</i> .                                    |                              |      | 1        |         |         |          |               |        | - li              |          |          |             |           |            |               |  |
| Signal Informa  | tion  |                              | 0    |          | 245     |         |          |               |        |                   |          |          |             | KŤ2       |            |               |  |
| Cycle, s  | 54.5  | Reference Phase              | 2    |          | 51      | γR '    |          |               |        |                   |          |          | 1           | 2         | 3          | <b>↔</b> 4    |  |
| Offset, s   | 0   | Reference Point              | End  | Green    | 23.6    | 17.7    | 0.0      | 0.0           | 0      | 0.0               | 0.0      |          |             |           |            | <u> </u>      |  |
| Uncoordinated   | Yes   | Simult. Gap E/W              | On   | Yellow   | 5.6     | 5.6     | 0.0      | 0.0           | 0      | 0.0               | 0.0      | _        |             |           |            |               |  |
| Force Mode  | Fixed   | Simult. Gap N/S              | On   | Red      | 1.0     | 1.0     | 0.0      | 0.0           | 0      | 0.0               | 0.0      |          | 5           | 6         | 7          | 8             |  |
| Timer Desults   |   |                              | _    |          | _       | EDT     |          |               | 10     | (DT               | NDI      | _        |             | 0.01      |            | ODT           |  |
| Assigned Deep   |   |                              |      | EBL      | -       |         | VVB      |               |        | /ВТ<br>о          | NBI      | -        | NB I        | SBL       | ·          | 6             |  |
| Assigned Phase  | e   |                              |      | <u> </u> |         | 4       | <u> </u> | $\rightarrow$ | 6      | 0                 |          | _        | 2           | <u> </u>  |            | 6.0           |  |
| Case Number   |   |                              |      |          | -       | 0.0     | <u> </u> |               | 0      | 0.U               |          |          | 0.0         | <u> </u>  |            | 0.0           |  |
| Change Duration                                       | I, 5  |                              |      |          |         | 24.5    | <u> </u> | $\rightarrow$ | 24     | +.3               |          | <u> </u> | 50.Z        | <u> </u>  |            | 6.6           |  |
|   | (I + K)                                       | (), S                        |      |          | -       | 0.0     |          |               | 0      | 5                 |          |          | 0.0         | <u> </u>  | _          | 0.0           |  |
|   | uway ( A                                      | $(\alpha)$ s                 |      | <u> </u> | -       | 4.0     |          |               | 4      | 5<br>2.6          | 3        |          | 4.0<br>10 0 | <u> </u>  | _          | 4.0           |  |
| Green Extension Time $(q_{s})$ , s                    |   |                              |      | <u> </u> |         | 14.5    | <u> </u> |               | 2      | 3.3               |          | _        | 10.0        | <u> </u>  | _          | 19.5          |  |
| Bhase Cell Bro  | hobility                                      | (ge), s                      |      | <u> </u> | -       | 3.2     | <u> </u> | -             | ۍ<br>۱ | 00                |          | _        | 4.3         | <u> </u>  | _          | 4.3           |  |
| Max Out Probability                                   |   |                              |      |          | 0.00    |         | -+-      | 1.            | .00    |                   |          | 1.00     | <u> </u>    |           | 2.00       |               |  |
| Max Out Probability                                   |   |                              |      |          | 0.09    |         |          | 0.            | .07    |                   |          | 5.00     |             |           | 5.00       |               |  |
| Movement Gro  | oup Res                                       | ults                         |      |          | EB      |         |          | WE            | 3      |                   |          | NB       |             |           | SB         |               |  |
| Approach Move   | ement   |                              |      | L        | Т       | R       | L        | Т             | Т      | R                 | L        | Т        | R           | L         | Т          | R             |  |
| Assigned Move   | ment  |                              |      | 7        | 4       | 14      | 3        | 8             |        | 18                | 5        | 2        | 12          | 1         | 6          | 16            |  |
| Adjusted Flow I                                       | Rate ( v                                      | ), veh/h                     |      | 52       | 333     |         | 52       | 354           | 1      |                   | 83       | 552      |             | 10        | 188        |               |  |
| Adjusted Satura                                       | ation Flo                                     | w Rate ( <i>s</i> ), veh/h/l | n    | 1043     | 1664    |         | 1063     | 166           | 0      |                   | 1215     | 1569     |             | 869       | 1557       |               |  |
| Queue Service   | Time ( g                                      | g s ), S                     |      | 2.5      | 9.2     |         | 2.4      | 10.0          | 0      |                   | 2.6      | 16.8     |             | 0.6       | 4.2        |               |  |
| Cycle Queue C   | learance                                      | e Time ( <i>g c</i> ), s     |      | 12.5     | 9.2     |         | 11.6     | 10.0          | 0      |                   | 6.7      | 16.8     |             | 17.3      | 4.2        |               |  |
| Green Ratio ( g                                       | /C)   |                              |      | 0.33     | 0.33    |         | 0.33     | 0.3           | 3      |                   | 0.43     | 0.43     |             | 0.43      | 0.43       |               |  |
| Capacity ( c ), v                                     | /eh/h   |                              |      | 280      | 542     |         | 298      | 540           | )      |                   | 566      | 679      |             | 242       | 673        |               |  |
| Volume-to-Cap   | acity Ra                                      | tio(X)                       |      | 0.186    | 0.615   | 5       | 0.175    | 0.65          | 55     |                   | 0.147    | 0.814    |             | 0.043     | 0.279      |               |  |
| Back of Queue   | Back of Queue ( Q ), ft/In (95 th percentile) |                              | :)   | 23.5     | 139.6   | 6       | 22.8     | 152.          | .7     |                   | 24       | 226.6    |             | 4.6       | 53.5       |               |  |
| Back of Queue ( Q ), veh/ln ( 95 th percentile)       |   | ile)                         | 0.9  | 5.0      |         | 0.9     | 5.5      | 5             |        | 1.0               | 7.9      |          | 0.2         | 1.8       |            |               |  |
| Queue Storage Ratio ( <i>RQ</i> ) ( 95 th percentile) |   | tile)                        | 0.00 | 0.00     |         | 0.00    | 0.0      | 0             |        | 0.00              | 0.00     |          | 0.00        | 0.00      |            |               |  |
| Uniform Delay ( <i>d</i> 1), s/veh                    |   |                              | 21.1 | 15.5     |         | 20.4    | 15.8     | 8             |        | 12.1              | 13.5     |          | 21.1        | 10.0      |            |               |  |
| Incremental Delay ( <i>d</i> ₂ ), s/veh               |   |                              | 0.4  | 1.4      |         | 0.3     | 1.6      | 5             |        | 0.1               | 2.9      |          | 0.1         | 0.3       |            |               |  |
| Initial Queue Delay ( d ȝ ), s/veh                    |   |                              | 0.0  | 0.0      |         | 0.0     | 0.0      | )             |        | 0.0               | 0.0      |          | 0.0         | 0.0       |            |               |  |
| Control Delay ( d ), s/veh                            |   |                              | 21.5 | 16.9     | 1       | 20.7    | 17.4     | 4             |        | 12.2              | 16.5     |          | 21.2        | 10.3      |            |               |  |
| Level of Service (LOS)                                |   |                              | С    | В        |         | С       | В        |               |        | В                 | В        |          | С           | В         |            |               |  |
| Approach Delay  | y, s/veh                                      | /LOS                         |      | 17.5     | 5       | В       | 17.8     | 3             | I      | В                 | 15.9     | )        | В           | 10.8      |            | В             |  |
| Intersection De                                       | lay, s/ve                                     | h / LOS                      |      |          |         | 1       | 5.1      |               |        |                   |          | В        |             |           |            |               |  |
|   |   |                              |      |          |         |         |          |               |        |                   |          |          |             |           |            |               |  |
| Multimodal Re   | sults   |                              |      |          | EB      |         | WB       |               | 3      |                   | NB       |          |             | SB        |            |               |  |
| Pedestrian LOS  | S Score                                       | /LOS                         |      | 1.90     |         | В       | 1.90     |               | I      | В                 | 1.88     | 3        | В           |           |            | В             |  |
| Bicycle LOS Sc  | ore / LC                                      | )S                           |      | 1.12     | 2       | А       | 1.16     | 6             |        | A                 | 1.54     |          | В           | 0.81      |            | A             |  |

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HCS™ Streets Version 2023

US 42-SR 29 PM Peak - 2043 Left Turn.xus

# HCS Signalized Intersection Intermediate Values

| General Inform   | nation                                   |   |          |               |           |         |                |       |       | Inter  | sectio  | n Inf  | ormat   | ion          |                      | ↓ 4 Y 4 + | 1× 14       |
|--|--|---|----------|---------------|-----------|---------|----------------|-------|-------|--------|---------|--------|---------|--------------|----------------------|-----------|-------------|
| Agency   |  | SINGH + Associates                            |          |               |           |         |                |       |       | Dura   | tion, h |        | 0.25    | 50           |                      | *† 54     | R.          |
| Analyst  |  | Greg Gedemer                                  |          | Ana           | ysis      | Date    | 12/19/20       | )23   |       | Area   | Туре    |        | Oth     | er           | 4                    |           | 4           |
| Jurisdiction   |  | ODOT  |          | Time          | e Per     | iod     | PM Pea         | k     |       | PHF    |         |        | 0.96    | 6            |                      | w∱e       | +<br>↓<br>↓ |
| Urban Street   |  | MAD US 42 14.00                               |          | Analysis Year |           |         | 2043 Left Turn |       |       | Anal   | ysis Pe | eriod  | 1> 7    | <b>7</b> :00 |                      |           | 7<br>7      |
| Intersection   |  | US 42 at SR 29                                |          | File          | Nam       | e       | US 42-S        | SR 29 | ΡM    | Peak - | 2043    | _eft 1 | ันrn.xเ | JS           |                      | ግ የ       |             |
| Project Descrip  | tion                                     | US 42 Safety Study                            |          |               |           |         |                |       |       |        |         |        |         |              |                      | ነ ላ ነ ቀ ሦ | <u>۴</u>    |
|  |  |   |          |               |           |         |                |       |       |        |         |        |         |              | 1                    |           |             |
| Demand Inform  | nation                                   |   |          |               |           | EB      |                |       | V     | NB     | _       |        | N       | 3            |                      | SB        |             |
| Approach Move  | ement                                    |   | _        | L             |           | T       | R              | L     | +     | T      | R       | L      | T       | R            | L                    | T         | R           |
| Demand ( <i>v</i> ), v   | eh/h                                     |   |          | 50            |           | 290     | 30             | 50    | 3     | 320    | 20      | 80     | 41      | 0   120      | 10                   | 150       | 30          |
| Signal Informa   | tion                                     |   |          |               |           |         | ß              |       |       |        |         |        |         |              |                      |           |             |
|  | 54 5                                     | Reference Phase                               | 2        |               | 2         | ώa<br>Γ | ~ 돈            |       |       |        |         |        |         |              | 572                  |           | Z           |
| Offset s   | 04.0                                     | Reference Point                               | End      |               |           | 512     |                |       |       |        |         |        |         | 1            | 2                    | 3         | 4           |
| Uncoordinated  | Yes                                      | Simult Gap F/W                                | On       | Gree          | en 2      | 3.6     | 17.7           | 0.0   | 0     | 0.0    | 0.0     | 0.0    | -11     |              | <b>k</b>             |           | -           |
| Force Mode   | Fixed                                    | Simult Gap N/S                                | On       | Red           | )w 5<br>1 | 0.0     | 5.0<br>1.0     | 0.0   |       | 0      | 0.0     | 0.0    | -11     | 5            | <b>↓</b> <sup></sup> | 7         | 8           |
| T Gree mode  | 1 IXOU                                   |   |          | Ttou          |           | .0      | 1.0            | 0.0   |       |        | 0.0     | 0.0    |         | l l          |                      |           |             |
| Saturation Flo   | w / Dela                                 | ly  | L        |               | Т         | R       | L              | Т     | -     | R      | L       |        | Т       | R            | L                    | Т         | R           |
| Lane Width Adj   | ustment                                  | Factor (fw)                                   | 1.00     | 0 1.          | 000       | 1.000   | 1.000          | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| Heavy Vehicles   | and Gr                                   | ade Factor (fHVg)                             | 1.00     | 0 0.          | 891       | 1.000   | 1.000          | 0.8   | 83    | 1.000  | 1.00    | 0 0    | .860    | 1.000        | 1.000                | 0.844     | 1.000       |
| Parking Activity   | Adjustn                                  | nent Factor (fp)                              | 1.00     | 0 1.          | 000       | 1.000   | 1.000          | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| Bus Blockage A   | djustme                                  | ent Factor (fbb)                              | 1.00     | 0 1.          | 000       | 1.000   | 1.000          | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| Area Type Adjustment Factor (fa)                                   |  | 1.00  | 0 1.     | 000           | 1.000     | 1.000   | 1.0            | 00    | 1.000 | 1.00   | 0 1     | .000   | 1.000   | 1.000        | 1.000                | 1.000     |             |
| Lane Utilization Adjustment Factor (fLU)                           |  |   | 1.00     | 0 1.          | 000       | 1.000   | 1.000          | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| Left-Turn Adjustment Factor (fLT)                                  |  |   | 0.54     | 9 0.          | 000       |         | 0.560          | 0.0   | 00    |        | 0.63    | 9 (    | .000    |              | 0.458                | 0.000     |             |
| Right-Turn Adjustment Factor ( <i>f</i> <sub>RT</sub> )            |  |   |          | 0.            | 983       | 0.983   | 3              | 0.9   | 90    | 0.990  |         | C      | .961    | 0.961        |                      | 0.971     | 0.971       |
| Left-Turn Pedestrian Adjustment Factor ( <i>f</i> <sub>Lpb</sub> ) |  |   | 1.00     | 0             |           |         | 1.000          |       |       |        | 1.00    | 0      |         |              | 1.000                |           |             |
| Right-Turn Ped-Bike Adjustment Factor ( <i>f</i> <sub>Rpb</sub> )  |  |   |          |               | 1.000     | )       |                |       | 1.000 |        |         |        | 1.000   |              |                      | 1.000     |             |
| Work Zone Adju   | ustment                                  | Factor ( <i>f</i> <sub>wz</sub> )             | 1.00     | 0 1.          | 000       | 1.000   | 0 1.000        | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| DDI Factor (fool   | y)                                       |   | 1.00     | 0 1.          | 000       | 1.000   | 1.000          | 1.0   | 00    | 1.000  | 1.00    | 0 1    | .000    | 1.000        | 1.000                | 1.000     | 1.000       |
| Left-Turn Prot.  | CAV Adj                                  | . Factor (fCAV,prot)                          |          |               |           |         |                |       |       |        |         |        |         |              |                      |           |             |
| Left-Turn Perm.  | CAV A                                    | dj. Factor ( <i>f</i> CAV,perm)               | 1.0      | 0             |           |         | 1.00           |       |       |        | 1.0     | 0      |         |              | 1.00                 |           |             |
| Movement Satu  | ration F                                 | low Rate ( <i>s</i> ), veh/h                  | 104      | 3 1           | 508       | 156     | 1063           | 15    | 62    | 98     | 121     | 5      | 1214    | 355          | 869                  | 1297      | 259         |
| Proportion of Ve   | ehicles A                                | Arriving on Green (P)                         | 0.3      | 3 0           | .33       | 0.33    | 0.33           | 0.3   | 33    | 0.33   | 0.4     | 3      | 0.43    | 0.43         | 0.43                 | 0.43      | 0.43        |
| Incremental De   | lay Fact                                 | or ( <i>k</i> )                               | 0.1      | 3 0           | .13       |         | 0.13           | 0.1   | 13    |        | 0.1     | 3      | 0.13    |              | 0.13                 | 0.13      |             |
|  | , <b></b>                                |   |          |               |           |         |                |       |       |        |         |        |         |              | 0.51                 |           |             |
| Signal Timing  | / Mover                                  | nent Groups                                   | <u> </u> | BL            | ╞         | BI/R    | VVE            | 3L    | VV    | /BI/R  |         | NBL    |         | NBT/R        | SBL                  | -         | SB1/R       |
| Lost Time (tL)   | $\sim$                                   |   | -        |               |           | 0.0     | -              |       | 0     | 0.0    | -       |        | +       | 0.0          |                      |           | 0.0         |
| Green Rallo (g/  | C)                                       | ow Data (a) vah/h/h                           | -        |               |           | 1042    | -              |       | 1     | J.33   | -       |        |         | 0.43         |                      |           | 0.43        |
| Shared Saturati  | auon Fl                                  | UW Rate (Sp), Ven/n/ln                        |          |               |           | 1043    | -              |       | 1     | 003    |         |        | +       | 1213         |                      |           | 009         |
| Dermitted Effect   | tivo Gro                                 | en Time $(a_n)$ s                             | -        |               | -         | 17 7    | -              |       | 1     | 17 7   | -       |        | +       | 23.6         |                      |           | 23.6        |
| Permitted Servi  | ce Time                                  | $(\alpha_{\mu})$ s                            | -        |               | ┢         | 77      | -              |       | 17.7  |        | -       |        | +       | 19.5         |                      |           | 69          |
| Permitted Queu   | hitted Queue Service Time $(g_{ps})$ , s |   |          |               |           | 2.5     |                |       |       | 2.4    | -       |        | +       | 2.6          |                      |           | 0.6         |
| Time to First Blockage ( <i>gt</i> ), s                            |  |   |          | $\vdash$      | 0.0       |         |                |       | 0.0   |        |         | +      | 0.0     |              |                      | 0.0       |             |
| Queue Service  | Time Be                                  | efore Blockage (grs), s                       |          |               |           |         |                |       |       |        | -       |        | +       |              |                      |           |             |
| Protected Right  | Satura                                   | tion Flow ( <i>s</i> <sub>R</sub> ), veh/h/ln |          |               |           |         |                |       |       |        |         |        |         |              |                      |           |             |
| Protected Right  | Effectiv                                 | ve Green Time ( <i>g</i> <sub>R</sub> ), s    |          |               |           |         |                |       |       |        |         |        |         |              |                      |           |             |
| Multimodal   |  |   |          |               | EB        |         |                | V     | /B    |        | 1       |        | NB      |              |                      | SB        |             |
| Pedestrian Fw/   | Fv                                       |   | 1.       | 198           |           | 0.000   | 1.19           | 98    | 0     | .000   | 1.      | 198    | (       | 0.000        | 1.19                 | в (       | 0.000       |
| Pedestrian <i>F</i> s /  | Fdelay                                   |   | 0.0      | 000           | C         | 0.101   | 0.0            | 00    | 0     | .101   | 0.      | 000    | (       | 0.087        | 0.00                 | о (       | 0.087       |
| Pedestrian Mcor  | ner / <b>M</b> cw                        |   | 0.       | .00           |           |         | 0.0            | 0     |       |        | 0.00    |        |         |              | 0.00                 |           |             |
| Bicycle cb / db  |  |   | 65       | 0.50          | 1         | 12.40   | 650.           | .50   | 1     | 2.40   | 86      | 4.86   |         | 8.77         | 864.8                | 6         | 8.77        |
| Bicycle Fw / Fv  |  |   | -3       | .64           |           | 0.64    | -3.6           | -3.64 |       | 0.67   | -3      | -3.64  |         | 1.05         | -3.64                | 1         | 0.33        |

US 42-SR 29 PM Peak - 2043 Left Turn.xus

#### HCS Signalized Intersection Results Graphical Summary

| General Inform                                       | nation                      |                       |                |  |                       |             |                             | In     | tersect  | ion Inf | at at ataba t to ta |     |      |          |             |
|--|-----------------------------|-----------------------|----------------|--|-----------------------|-------------|-----------------------------|--------|----------|---------|---------------------|-----|------|----------|-------------|
| Agency   |                             | SINGH + Associate     | s              |  |                       |             |                             | D      | uration. | h       | 0.250               |     |      | 47       |             |
| Analyst  |                             | Greg Gedemer          |                | Analys   | sis Date              | 12/19/2     | 2023                        | A      | rea Typ  | e       | Other               |     | 4    |          | د.<br>4     |
| Jurisdiction   |                             | ODOT                  |                | Time F   | Period                | PM Pe       | ak                          | ak PHF |          |         |                     |     |      | w ‡ E    | -4<br>+<br> |
| Urban Street   |                             | MAD US 42 14.00       |                | Analysis Year 2043 Left Turn                       |                       |             |                             | n A    | nalysis  | Period  | 1> 7:(              | 00  | 7    |          | →<br>*      |
| Intersection   |                             | US 42 at SR 29        |                | File Name US 42-SR 29 PM Peak - 2043 Left Turn xus |                       |             |                             |        |          |         |                     |     | ኻቱ   |          |             |
| Project Descrip                                      | otion                       | US 42 Safety Study    | /              |  |                       |             |                             |        |          |         |                     |     |      | * 1 # 17 | <u>۲</u>    |
|  |                             |                       | ,<br>          |  |                       |             |                             |        |          |         |                     |     |      |          |             |
| Demand Inform  | mation                      |                       |                |  | EB                    | N N         |                             | WB     | VB       |         | NB                  |     |      | SB       |             |
| Approach Move  | ement                       |                       |                | L  | Т                     | R           | L                           | Т      | R        | L       | Т                   | R   | L    | Т        | R           |
| Demand ( v ), v                                      | /eh/h                       |                       |                | 50   | 290                   | 30          | 50                          | 320    | 20       | 80      | 410                 | 120 | 10   | 150      | 30          |
|  |                             |                       |                |  |                       |             |                             |        |          |         |                     |     |      |          |             |
| Signal Informa                                       | ation                       | (                     |                |  | 215                   |             |                             |        |          |         |                     |     | -+-  |          | -           |
| Cycle, s   | 54.5                        | Reference Phase       | 2              |  | 512                   | 'B          |                             |        |          |         |                     | 1   |      | 3        | € ₄         |
| Offset, s  | 0                           | Reference Point       | End            | Green  | 23.6                  | 17.7        | 0.0                         | 0.0    | 0.0      | 0.0     |                     |     |      |          | <u> </u>    |
| Uncoordinated  | Yes                         | Simult. Gap E/W       | On             | Yellow   | 5.6                   | 5.6         | 0.0                         | 0.0    | 0.0      | 0.0     |                     |     |      |          |             |
| Force Mode   | Fixed                       | Simult. Gap N/S       | On             | Red  | 1.0                   | 1.0         | 0.0                         | 0.0    | 0.0      | 0.0     | _                   | 5   | 6    | 7        | 8           |
|  |                             |                       |                |  |                       |             |                             |        |          |         |                     |     |      |          |             |
| Movement Gro   | oup Res                     | sults                 |                | <u> </u>   | EB                    | _           |                             | WB     | _        |         | NB                  | -   |      | SB       |             |
| Approach Move  | ement                       |                       |                | L  | Т                     | R           | L                           | Т      | R        | L       | Т                   | R   | L    | Т        | R           |
| Back of Queue  | (Q), f                      | In (95 th percentile  | e)             | 23.5   | 139.6                 |             | 22.8                        | 152.7  |          | 24      | 226.6               |     | 4.6  | 53.5     | <u> </u>    |
| Back of Queue  | (Q), Ve                     | eh/In ( 95 th percent | ile)           | 0.9  | 5.0                   |             | 0.9                         | 5.5    |          | 1.0     | 7.9                 |     | 0.2  | 1.8      |             |
| Queue Storage Ratio ( <i>RQ</i> ) (95 th percentile) |                             |                       |                | 0.00   | 0.00                  |             | 0.00                        | 0.00   |          | 0.00    | 0.00                |     | 0.00 | 0.00     | <u> </u>    |
| Control Delay ( d ), s/veh                           |                             |                       |                | 21.5   | 16.9                  |             | 20.7                        | 17.4   |          | 12.2    | 16.5                |     | 21.2 | 10.3     |             |
| Level of Service (LOS)                               |                             |                       |                | С  | В                     |             | С                           | В      |          | В       | B                   |     | С    | В        |             |
| Approach Dela  | Approach Delay, s/veh / LOS |                       |                | 17.5   | 5                     | В           | 17.8                        | 3      | В        | 15.9    | )                   | В   | 10.8 | 8        | В           |
| Intersection De                                      | lay, s/ve                   | eh / LOS              |                |  |                       | 16          | .1                          |        |          |         |                     |     | В    |          |             |
|  |                             | 5 -                   |                | 0.9  | 21.5                  | 1.8<br>10.3 | 0.2<br>21.2<br>17.4<br>20.7 |        | .9       | 5.5     |                     | _   |      |          |             |
|  |                             | =                     | LOS A<br>LOS B |  | 12<br> <br> <br> <br> | 2.2 16.5    |                             | E      | Queue 🗕  | -       | Delay               | -   |      |          |             |

US 42-SR 29 PM Peak - 2043 Left Turn.xus



## No errors or warnings exist.

--- Comments ----

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HCS<sup>™</sup> Streets Version 2023 US 42-SR 29 PM Peak - 2043 Left Turn.xus Generated: 2/16/2024 7:54:38 AM

# **APPENDIX G**

**Concept Plans** 

Roundabout

Left-Turn Lanes Traffic Signal Alternative




# **APPENDIX H**

**Cost Estimates** 

Roundabout

Left-Turn Lanes Traffic Signal Alternative

### ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST MAD-US 42-14.00 - ROUNDABOUT ALTERNATIVE

Project number: PID 119698

Date: March 19, 2024

Client name: ODOT District 6

(Based upon 2023 Construction Costs)

| Ref. No. | Item No. | Description   | Total<br>Estimated<br>Quantity | Unit  | Es | timated Unit<br>Cost | Total Estimated<br>Cost |            |  |  |
|----------|----------|---|--------------------------------|-------|----|----------------------|-------------------------|------------|--|--|
|          |          | ROADWAY   |                                |       |    |                      |                         |            |  |  |
| 1        | 201      | CLEARING AND GRUBBING                                   | 1                              | LS    | \$ | 20,000.00            | \$                      | 20,000.00  |  |  |
| 2        | 202      | PAVEMENT REMOVED  | 3,400                          | SQ YD | \$ | 20.00                | \$                      | 68,000.00  |  |  |
| 3        | 202      | FENCE REMOVED   | 250                            | FT    | \$ | 10.00                | \$                      | 2,500.00   |  |  |
| 4        | 203      | EXCAVATION  | 3,100                          | CU YD | \$ | 40.00                | \$                      | 124,000.00 |  |  |
| 5        | 204      | EMBANKMENT  | 3,100                          | CU YD | \$ | 25.00                | \$                      | 77,500.00  |  |  |
| 6        | 204      | SUBGRADE COMPACTION                                     | 7,500                          | SQ YD | \$ | 3.00                 | \$                      | 22,500.00  |  |  |
| 7        | 204      | PROOF ROLLING   | 3                              | HOUR  | \$ | 250.00               | \$                      | 750.00     |  |  |
| 8        | 206      | CEMENT STABILIZED SUBGRADE, 16 INCHES DEEP              | 7,500                          | SQ YD | \$ | 4.00                 | \$                      | 30,000.00  |  |  |
| 9        | 206      | LIME  | 275                            | TON   | \$ | 184.00               | \$                      | 50,600.00  |  |  |
| 10       | 206      | CURING COAT   | 7,500                          | SQ YD | \$ | 1.20                 | \$                      | 9,000.00   |  |  |
| 11       | 206      | TEST ROLLING  | 2                              | HOUR  | \$ | 250.00               | \$                      | 500.00     |  |  |
| 12       | 206      | MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS          | 1                              | LS    | \$ | 25,000.00            | \$                      | 25,000.00  |  |  |
|          |          | EROSION CONTROL   |                                |       |    |                      |                         |            |  |  |
| 13       | 832      | TOPSOIL, SEEDING AND MULCHING                           | 13,700                         | SQ YD | \$ | 8.00                 | \$                      | 109,600.00 |  |  |
| 14       | 832      | CONSTRUCTION EROSION CONTROL                            | 40,000                         | EACH  | \$ | 1.00                 | \$                      | 40,000.00  |  |  |
| 15       | 832      | SWPPP   | 1                              | LS    | \$ | 5,000.00             | \$                      | 5,000.00   |  |  |
| 16       | 832      | SWPPP INSPECTIONS                                       | 1                              | LS    | \$ | 5,000.00             | \$                      | 5,000.00   |  |  |
| 17       | 832      | SWPPP SOFTWARE  | , SOFTWARE 1 LS \$ 5,000.00 \$ |       |    |                      |                         |            |  |  |
|          |          | PAVEMENT  |                                |       |    |                      |                         |            |  |  |
| 18       | 252      | FULL DEPTH PAVEMENT SAWING                              | 4,725                          | FT    | \$ | 3.00                 | \$                      | 14,175.00  |  |  |
| 19       | 254      | PAVEMENT PLANING, ASPHALT CONCRETE (VARIABLE DEPTH)     | 3,145                          | SQ YD | \$ | 6.00                 | \$                      | 18,870.00  |  |  |
| 20       | 302      | ASPHALT CONCRETE BASE, PG64-22, (449)                   | 920                            | CU YD | \$ | 250.00               | \$                      | 230,000.00 |  |  |
| 21       | 304      | AGGREGATE BASE 1160 CU YD \$ 85.00 \$ 98,600.00         | 1,160                          | CU YD | \$ | 85.00                | \$                      | 98,600.00  |  |  |
| 22       | 407      | NON-TRACKING TACK COAT                                  | 790                            | GAL   | \$ | 4.00                 | \$                      | 3,160.00   |  |  |
| 23       | 441      | ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (449)     | 385                            | CU YD | \$ | 345.00               | \$                      | 132,825.00 |  |  |
| 24       | 441      | ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22, (449) | 330                            | CU YD | \$ | 300.00               | \$                      | 99,000.00  |  |  |
| 25       | 441      | ASPHALT CONCRETE WEDGE COURSE, TYPE 2, (449)            | 82                             | CU YD | \$ | 330.00               | \$                      | 27,060.00  |  |  |
| 26       | 452      | NON-REINFORCED CONCRETE PAVEMENT (ISLANDS)              | 810                            | SQ YD | \$ | 80.00                | \$                      | 64,800.00  |  |  |
| 27       | 452      | NON-REINFORCED CONCRETE PAVEMENT (DRIVEWAYS)            | 110                            | SQ YD | \$ | 110.00               | \$                      | 12,100.00  |  |  |
| 28       | 452      | NON-REINFORCED CONCRETE PAVEMENT (TRUCK APRON)          | 760                            | SQ YD | \$ | 140.00               | \$                      | 106,400.00 |  |  |
| 29       | 609      | CURB TYPE 6 1,585 FT \$ 35.00 \$                        |                                |       |    |                      |                         |            |  |  |
| 30       | 609      | COMBINATION CURB AND GUTTER, TYPE 2                     | 1,400                          | FT    | \$ | 63,000.00            |                         |            |  |  |
| 31       | 609      | COMBINATION CURB AND GUTTER, TYPE 9                     | 300                            | FT    | \$ | 40.00                | \$                      | 12,000.00  |  |  |
|          |          | DRAINAGE  |                                |       |    |                      |                         |            |  |  |
| 32       | 605      | 4" BASE PIPE UNDERDRAINS                                | 1,695                          | FT    | \$ | 12.00                | \$                      | 20,340.00  |  |  |
| 33       | 611      | DRAINAGE (STORM SEWER AND STRUCTURES)                   | 1                              | LS    | \$ | 120,000.00           | \$                      | 120,000.00 |  |  |
| 34       | 611      | 30" CONDUIT, TYPE B                                     | 25                             | FT    | \$ | 265.00               | \$                      | 6,625.00   |  |  |
| 35       | 611      | STORM WATER BMP   | 1                              | LS    | \$ | 25,000.00            | \$                      | 25,000.00  |  |  |

### ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST MAD-US 42-14.00 - ROUNDABOUT ALTERNATIVE

Date: March 19, 2024

Project number: PID 119698

Client name: ODOT District 6

(Based upon 2023 Construction Costs)

| TRAFFIC CONTROL, SIGNALS & LIGHTING                                    |     |  |                 |           |      |            |    |              |  |  |
|--|-----|--|-----------------|-----------|------|------------|----|--------------|--|--|
| 36   | 625 | LIGHTING                                 | 1               | LS        | \$   | 120,000.00 | \$ | 120,000.00   |  |  |
| 37   | 630 | GROUND MOUNTED SIGNAGE                   | 1               | LS        | \$   | 20,000.00  | \$ | 20,000.00    |  |  |
| 38   | 644 | LS                                       | \$              | 12,000.00 | \$   | 12,000.00  |    |              |  |  |
| MISCELLANEOUS  |     |  |                 |           |      |            |    |              |  |  |
| 39   | 614 | MAINTAINING TRAFFIC                      | 1               | LS        | \$   | 149,000.00 | \$ | 149,000.00   |  |  |
| 40   | 619 | FIELD OFFICE                             | 8               | MONTH     | \$   | 2,500.00   | \$ | 20,000.00    |  |  |
| 41   | 623 | CONSTRUCTION LAYOUT STAKES AND SURVEYING | 1               | LS        | \$   | 21,000.00  | \$ | 21,000.00    |  |  |
| 42   | 624 | MOBILIZATION                             | 1               | LS        | \$   | 75,000.00  | \$ | 75,000.00    |  |  |
|  |     |  |                 |           |      |            |    |              |  |  |
| SUBTOTAL ESTIMATED CONSTRUCTION COST                                   |     |  |                 |           |      |            |    |              |  |  |
|  |     | SUBTOTAL ESTIM                           | IATED UTILITY F | RELOCATIO | )n a | LLOWANCE   | \$ | 200,000.00   |  |  |
|  |     | SU                                       | BTOTAL ESTIMA   | TED RIGH  | t of | WAY COST   | \$ | 312,000.00   |  |  |
|  |     |  |                 |           |      | subtotal   | \$ | 2,633,380.00 |  |  |
|  |     | CONST                                    | TRUCTION CON    | FINGENCY  |      | 30%        | \$ | 790,014.00   |  |  |
|  |     | ENGINEERING, DESIGN & CONSTRU            | UCTION ADMINI   | STRATION  |      | 30%        | \$ | 790,014.00   |  |  |
| subtotal   |     |  |                 |           |      |            |    |              |  |  |
| INFLATION CONTINGENCY (CONSTRUCTION MIDPOINT ESTIMATED 7/1/2028) 24.2% |     |  |                 |           |      |            |    |              |  |  |
|  |     |  |                 |           |      |            |    |              |  |  |
| TOTAL ESTIMATED PROJECT COST   |     |  |                 |           |      |            |    | 4,850,158.00 |  |  |

ASSUMPTIONS:

- (1) Partial Detour and Maintaining Traffic are the assumed MOT scheme.
- (2) Utility relocation costs are assumed to be non-reimbursable (inside existing right of way) to utility owners.

Allowance included above right of way costs for potential reimbursable utility relocations unknown at time of concept development. (3) Earthwork balanced site.

|   | MAD-US-42-14.00 - ROUNDABOUT ALTERNATIVE<br>MADISON COUNTY, OHIO<br>RIGHT OF WAY ESTIMATE - updated 3/19/2024 |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|---|---|--------------|---------------|--|-------------|--------------------|-------------|--------|----------------------------|---------------------|------------------------------|--------------------|---------------------------------|------------------------------|--------------------|------------|-------------------|-----------------|-----------------------------|
| Owner   | CAD<br>ID   | Parcel ID    | Address       | Land Use   | Land Value  | Structure<br>Value | Total       | Area   | (Land Value/<br>Acre)*115% | Structure<br>Impact | Area:<br>Standard<br>Highway | Area:<br>Temporary | Acquisiton<br>Services<br>Costs | Cost:<br>Standard<br>Highway | Cost:<br>Temporary | Relocation | Sub-Total<br>Cost | Cost to<br>Cure | Comments                    |
| SR 29 WEST JEFF LLC   | 1   | 08-00902.005 | 1800 NE US 42 | 400-COMMERCIAL-VACANT LAND   | \$1,385,470 | \$0                | \$1,385,470 | 24.670 | \$ 64,590                  | NO                  | 0.470                        | 0.202              | \$10,000                        | \$30,377                     | \$2,609            |            | \$42,986          |                 | NO STRUCTURE ON<br>PROPERTY |
| GREEN RICHARD L & ANITA S<br>TRUSTEES OF THE RICHARD L<br>& ANITA S GREEN REVOCABLE<br>TRUST DATED JUNE 1, 2017 | 2   | 08-00429.003 | US 42         | 400-COMMERCIAL-VACANT LAND   | \$244,630   | \$0                | \$244,630   | 43.560 | \$ 6,460                   | NO                  | 0.453                        | 0.190              | \$10,000                        | \$2,928                      | \$300              |            | \$13,228          |                 | NO STRUCTURE ON<br>PROPERTY |
| COLBY CORNER LLC  | 3   | 08-00424.000 | 1870 US 42    | 400-COMMERCIAL-VACANT LAND   | \$30,690    | \$0                | \$30,690    | 1.464  | \$ 24,110                  | NO                  | 0.147                        | 0.083              | \$10,000                        | \$3,551                      | \$401              |            | \$13,952          |                 | NO STRUCTURE ON<br>PROPERTY |
| COLBY HOLDINGS LLC  | 4   | 08-00228.003 | 1935 US 42    | 455-COMMERCIAL GARAGES   | \$148,170   | \$127,430          | \$275,600   | 15.384 | \$ 11,080                  | NO                  | 0.162                        | 0.124              | \$10,000                        | \$1,797                      | \$300              |            | \$12,097          |                 |                             |
| GREEN RICHARD L & ANITA S<br>TRUSTEES OF THE RICHARD L<br>& ANITA S GREEN REVOCABLE<br>TRUST DATED JUNE 1, 2017 | 5   | 08-00228.001 | 1885 US 42    | 499-OTHER COMMERCIAL<br>STRUCTURES   | \$57,450    | \$660              | \$58,110    | 1.230  | \$ 53,720                  | NO                  | 0.029                        | 0.029              | \$10,000                        | \$1,542                      | \$308              |            | \$11,850          |                 |                             |
| COLBY CORNER LLC  | 6   | 08-00937.000 | 1890 US 42    | 510-SINGLE FAMILY DWELLING   | \$44,980    | \$85,830           | \$130,810   | 0.459  | \$ 112,700                 | NO                  | 0.030                        | 0.030              | \$10,000                        | \$3,370                      | \$674              |            | \$14,044          |                 |                             |
| C PROPERTIES LLC  | 7   | 08-00228.002 | 1933 US 42    | 480-COMMERCIAL WAREHOUSES  | \$41,140    | \$167,830          | \$208,970   | 1.465  | \$ 32,300                  | NO                  | 0.026                        | 0.026              | \$10,000                        | \$824                        | \$300              |            | \$11,124          |                 |                             |
| PUTHIPREAK WATT KHMER   | 8   | 08-00469.555 | 3570 SR 29    | 111-CASH-GRAIN OR GENERAL FARM<br>"QUALIFIED FOR CURRENT<br>AGRICULURAL USE VALUE" | \$610,790   | \$50,520           | \$661,310   | 52.890 | \$ 13,290                  | NO                  | 0.048                        | 0.101              | \$10,000                        | \$638                        | \$300              |            | \$10,938          |                 |                             |
|   | 9   |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 10  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 12  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 13  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 14  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 15  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 16  |              |               |  |             |                    |             |        |                            |                     |                              |                    |                                 |                              |                    |            |                   |                 |                             |

\$2,563,320

141.122 \$ 20,890

Sub-Totals \$45,026

Subtotal

Administrative Costs Jury trial Costs [( Jury trial Costs [( Incidental transfer Costs [(s Contingency Costs Total Cost

\*Acquisition Serv (per ODOT Cost Estimating

|   | Titles &  | Detailed  | Negotiation | l |
|---|-----------|-----------|-------------|---|
| vice Cost Includes the following:         | Detailed  | Appraisal | &           | l |
| g Procedures For Acquiring Rights of Way) | Appraisal | Review    | Relocation  | l |
|   | \$4,900   | \$2,000   | \$1,100     | ſ |
|   | \$4,900   | \$2,000   | \$6,700     | ĺ |

2. Land and Structure Values estimated per county auditor records and/or Zillow estimates
 3. Acquisition costs estimated per ODOT Right of Way Manual
 4. An equal amount of additional temporary right of way is assumed for grading purposes

<u>Notes:</u> 1. All areas are in acres.

Closings

\$400 \$400

Negotiation

Project

Manageme

nt

\$550 \$550

| \$5,192            | \$0   | \$130,218 |
|--------------------|-------|-----------|
| (sub-total)x0.15]x | 1.20  | \$23,439  |
| (sub-total)x0.10]x | 1.50  | \$19,533  |
| sub-total)x0.90]x0 | 0.025 | \$2,930   |
| 77%                |       | \$135,613 |
|                    |       | \$312,000 |

\$0

\$10,000 No Relocation \$14,550 With Relocation

### ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST MAD-US-42-14.00 - SIGNAL ALTERNATIVE

Date: 2/15/2024

**Client name:** ODOT District 6

119698

Project number:

(Based upon 2022 Construction Costs)

| Ref. No.        | Item No. | Description   | Total<br>Estimated<br>Quantity  | Unit  | Esti            | mated Unit<br>Cost | it Total Estimated<br>Cost |            |  |  |  |
|-----------------|----------|---|---|-------|-----------------|--------------------|----------------------------|------------|--|--|--|
|                 | •        | ROADWAY   | •   |       |                 |                    |                            |            |  |  |  |
| 1               | 201      | CLEARING AND GRUBBING                                   | G AND GRUBBING 1 LS \$ 20,000.00 \$   |       |                 |                    |                            |            |  |  |  |
| 2               | 202      | PAVEMENT REMOVED 4000 SQ YD \$ 20.00 \$                 |   |       |                 |                    |                            |            |  |  |  |
| 3               | 202      | FENCE REMOVED   | 1195  | FT    | \$              | 10.00              | \$                         | 11,950.00  |  |  |  |
| 4               | 203      | EXCAVATION  | 8000  | CU YD | \$              | 40.00              | \$                         | 320,000.00 |  |  |  |
| 5               | 204      | EMBANKMENT  | 2000  | CU YD | \$              | 25.00              | \$                         | 50,000.00  |  |  |  |
| 6               | 204      | SUBGRADE COMPACTION                                     | 12675   | SQ YD | \$              | 3.00               | \$                         | 38,025.00  |  |  |  |
| 7               | 204      | PROOF ROLLING   | 5   | HOUR  | \$              | 250.00             | \$                         | 1,250.00   |  |  |  |
| 8               | 206      | CEMENT STABILIZED SUBGRADE, 16 INCHES DEEP              | 12,700  | SQ YD | \$              | 4.00               | \$                         | 50,800.00  |  |  |  |
| 9               | 206      | LIME  | 450   | TON   | \$              | 184.00             | \$                         | 82,800.00  |  |  |  |
| 10              | 206      | CURING COAT   | 12,700  | SQ YD | \$              | 1.20               | \$                         | 15,240.00  |  |  |  |
| 11              | 206      | TEST ROLLING 4 HOUR \$ 250.00 \$                        |   |       |                 |                    |                            |            |  |  |  |
| 12              | 206      | MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS          | 1   | LS    | \$              | 25,000.00          | \$                         | 25,000.00  |  |  |  |
| EROSION CONTROL |          |   |   |       |                 |                    |                            |            |  |  |  |
| 13              | 659      | TOPSOIL, SEEDING AND MULCHING                           | 38300   | SQ YD | \$              | 8.00               | \$                         | 306,400.00 |  |  |  |
| 14              | 832      | CONSTRUCTION EROSION CONTROL                            | 40000   | EACH  | \$              | 1.00               | \$                         | 40,000.00  |  |  |  |
| 15              | 832      | SWPPP   | 1   | LS    | \$              | 5,000.00           | \$                         | 5,000.00   |  |  |  |
| 16              | 832      | SWPPP INSPECTIONS                                       | 1   | LS    | \$              | 5,000.00           | \$                         | 5,000.00   |  |  |  |
| 17              | 832      | SWPPP SOFTWARE  | 1   | LS    | \$              | 5,000.00           | \$                         | 5,000.00   |  |  |  |
|                 |          | PAVEMENT  | •   |       |                 |                    |                            |            |  |  |  |
| 18              | 252      | FULL DEPTH PAVEMENT SAWING                              | 12440   | FT    | \$              | 3.00               | \$                         | 37,320.00  |  |  |  |
| 19              | 254      | PAVEMENT PLANING, ASPHALT CONCRETE (VARIABLE DEPTH)     | 11900   | SQ YD | \$              | 6.00               | \$                         | 71,400.00  |  |  |  |
| 20              | 302      | ASPHALT CONCRETE BASE, PG64-22, (449)                   | 2420  | CU YD | \$              | 250.00             | \$                         | 605,000.00 |  |  |  |
| 21              | 304      | AGGREGATE BASE  | 2110  | CU YD | \$              | 85.00              | \$                         | 179,350.00 |  |  |  |
| 22              | 407      | NON-TRACKING TACK COAT                                  | 2380  | GAL   | AL \$ 4.00 \$ 9 |                    |                            |            |  |  |  |
| 23              | 441      | ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (449)     | 1185  | CU YD | \$              | 408,825.00         |                            |            |  |  |  |
| 24              | 441      | ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22, (449) | 1015  | CU YD | \$              | 300.00             | \$                         | 304,500.00 |  |  |  |
| 25              | 441      | ASPHALT CONCRETE WEDGE COURSE, TYPE 2, (449)            | 254   | CU YD | \$              | 330.00             | \$                         | 83,820.00  |  |  |  |
| 26              | 452      | 8" NON-REINFORCED CONCRETE PAVEMENT (DRIVEWAYS)         | EINFORCED CONCRETE PAVEMENT (DRIVEWAYS)         220         SQ YD         \$ 110.00         \$ 22 |       |                 |                    |                            |            |  |  |  |

### ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST MAD-US-42-14.00 - SIGNAL ALTERNATIVE

Date: 2/15/2024

**Client name:** ODOT District 6

119698

Project number:

(Based upon 2022 Construction Costs)

| Ref. No. | Item No. | Description  | Total<br>Estimated<br>Quantity | Unit        | Estimated Unit<br>Cost | Total Estimated<br>Cost |  |  |  |
|----------|----------|--|--------------------------------|-------------|------------------------|-------------------------|--|--|--|
|          |          | DRAINAGE   |                                |             |                        |                         |  |  |  |
| 27       | 605      | 4" BASE PIPE UNDERDRAINS   | 9000                           | FT          | \$ 12.00               | \$ 108,000.00           |  |  |  |
| 28       | 611      | DRAINAGE MISCELLANEOUS   | 1                              | LS          | \$ 80,000.00           | \$ 80,000.00            |  |  |  |
| 29       | 611      | 30" CONDUIT, TYPE B  | 60                             | LF          | \$ 265.00              | \$ 15,900.00            |  |  |  |
| 30       | 611      | STORM WATER BMP  | 1                              | LS          | \$ 50,000.00           | \$ 50,000.00            |  |  |  |
|          |          | TRAFFIC CONTROL & LIGHTING   |                                |             |                        |                         |  |  |  |
| 31       | 625      | LIGHTING   | 1                              | LS          | \$120,000.00           | \$ 120,000.00           |  |  |  |
| 32       | 630      | GROUND MOUNTED SIGNAGE   | 1                              | LS          | \$20,000.00            | \$ 20,000.00            |  |  |  |
| 33       | 644      | PAVEMENT MARKINGS  | 1                              | LS          | \$12,000.00            | \$ 12,000.00            |  |  |  |
|          |          | TRAFFIC SIGNAL   |                                |             |                        |                         |  |  |  |
| 34       | 625      | CONNECTION, FUSED PULL APART   | 4                              | EACH        | \$ 125.00              | \$ 500.00               |  |  |  |
| 35       | 625      | CONNECTION, UNFUSED PULL APART   | 4                              | EACH        | \$ 125.00              | \$ 500.00               |  |  |  |
| 36       | 625      | BRACKET ARM, 30'   | 4                              | EACH        | \$ 1,500.00            | \$ 6,000.00             |  |  |  |
| 37       | 625      | NO. 10 AWG 600 VOLT DISTRIBUTION CABLE   | 1300                           | FT          | \$ 2.00                | \$ 2,600.00             |  |  |  |
| 38       | 625      | NO. 10 AWG POLE AND BRACKET CABLE  | 450                            | FT          | \$ 2.50                | \$ 1,125.00             |  |  |  |
| 39       | 625      | LUMINAIRE, CONVENTIONAL, SOLID STATE (LED)   | .ED) 4 EACH \$ 650.00 \$       |             |                        |                         |  |  |  |
| 40       | 625      | CONDUIT, 3", 725.04  | 150                            | FT          | \$ 45.00               | \$ 6,750.00             |  |  |  |
| 41       | 625      | CONDUIT, JACKED OR DRILLED, 725.051, 4"  | 400                            | FT          | \$ 46.00               | \$ 18,400.00            |  |  |  |
| 42       | 625      | TRENCH   | 150                            | FT          | \$ 16.00               | \$ 2,400.00             |  |  |  |
| 43       | 625      | PULL BOX, 725.08, 24"  | 4                              | EACH        | \$ 1,500.00            | \$ 6,000.00             |  |  |  |
| 44       | 625      | GROUND ROD   | 5                              | EACH        | \$ 325.00              | \$ 1,625.00             |  |  |  |
| 45       | 625      | UNDERGROUND WARNING/MARKING TAPE   | 150                            | FT          | \$ 1.50                | \$ 225.00               |  |  |  |
| 46       | 630      | SIGN HANGER ASSEMBLY, MAST ARM   | 4                              | EACH        | \$ 450.00              | \$ 1,800.00             |  |  |  |
| 47       | 630      | SIGN, FLAT SHEET   | 30                             | SF          | \$ 31.00               | \$ 930.00               |  |  |  |
| 48       | 630      | SIGN, STREET NAME  | 4                              | EACH        | \$ 500.00              | \$ 2,000.00             |  |  |  |
| 49       | 632      | VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK, WITH BACKPLATES    | 4                              | EACH        | \$ 1,000.00            | \$ 4,000.00             |  |  |  |
| 50       | 632      | VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY,<br>POLYCARBONATE, BLACK, WITH BACKPLATES | 4                              | EACH        | \$ 1,200.00            | \$ 4,800.00             |  |  |  |
| 51       | 632      | COVERING OF VEHICULAR SIGNAL HEAD  | 8                              | EACH        | \$ 40.00               | \$ 320.00               |  |  |  |
| 52       | 632      | SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG         1000         FT         \$ 2.50         \$           |                                |             |                        |                         |  |  |  |
| 53       | 632      | NAL CABLE, 7 CONDUCTOR, NO. 14 AWG 1000 FT \$ 3.00 \$  |                                |             |                        |                         |  |  |  |
| 54       | 632      | SIGNAL SUPPORT FOUNDATION  | 4                              | EACH        | \$ 6,000.00            | \$ 24,000.00            |  |  |  |
| 55       | 632      | POWER CABLE, 3 CONDUCTOR, NO. 4 AWG  | 200                            | FT          | \$ 4.00                | \$ 800.00               |  |  |  |
| 56       | 632      | SERVICE CABLE, 2 CONDUCTOR, NO. 6 AWG  | 100                            | FT          | \$ 4.50                | \$ 450.00               |  |  |  |
| 57       | 632      | POWER SERVICE  | 1                              | EACH        | \$ 6,500.00            | \$ 6,500.00             |  |  |  |
| 58       | 632      | COMBINATION SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 13   | 4                              | EACH        | \$ 21,000.00           | \$ 84,000.00            |  |  |  |
| 59       | 632      | REMOVAL OF TRAFFIC SIGNAL INSTALLATION   | 1                              | \$ 4,500.00 |                        |                         |  |  |  |

### ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST MAD-US-42-14.00 - SIGNAL ALTERNATIVE

Date: 2/15/2024

**Client name:** ODOT District 6

Project number:

119698

(Based upon 2022 Construction Costs)

| Ref. No.  | Item No.   | Description                                   | Total<br>Estimated<br>Quantity | Unit        | Est  | timated Unit<br>Cost | Тс | otal Estimated<br>Cost |  |
|---|--|---|--------------------------------|-------------|------|----------------------|----|------------------------|--|
| 60  | 30 633 CABINET, TYPE TS-2 1 EACH \$ 10,000.00 \$ |   |                                |             |      |                      |    |                        |  |
| 61  | 633 CABINET FOUNDATION 1 EACH \$ 2,800.00 \$     |   |                                |             |      |                      |    |                        |  |
| 62  | 633  | CONTROLLER WORK PAD                           | 1                              | EACH        | \$   | 700.00               | \$ | 700.00                 |  |
| 63  | 633  | UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT | 1                              | EACH        | \$   | 8,500.00             | \$ | 8,500.00               |  |
| 64  | 809  | ADVANCE RADAR DETECTION                       | 4                              | EACH        | \$   | 8,000.00             | \$ | 32,000.00              |  |
| 65  | 809  | STOP LINE RADAR DETECTION                     | 4                              | EACH        | \$   | 8,000.00             | \$ | 32,000.00              |  |
| 66  | 809  | ATC V6.24 CONTROLLER                          | 1                              | EACH        | \$   | 9,000.00             | \$ | 9,000.00               |  |
|   |  | MISCELLANEOUS                                 |                                |             | -    |                      |    |                        |  |
| 67  | 614  | MAINTAINING TRAFFIC                           | 1                              | LS          | \$   | 278,000.00           | \$ | 278,000.00             |  |
| 68  | 3 619 FIELD OFFICE 8 MONTH \$ 2,500.00           |   |                                |             |      |                      | \$ | 20,000.00              |  |
| 69  | 623  | CONSTRUCTION LAYOUT STAKES AND SURVEYING      | 1                              | LS          | \$   | 36,000.00            | \$ | 36,000.00              |  |
| 70  | 624  | MOBILIZATION                                  | 1                              | LS          | \$   | 128,000.00           | \$ | 128,000.00             |  |
| 71  | SPEC   | UTILITY RELOCATION ALLOWANCE                  | 1                              | LS          | \$   | 200,000.00           | \$ | 200,000.00             |  |
|   |  |   |                                |             |      |                      |    |                        |  |
|   |  | SUB   | TOTAL ESTIMAT                  | ED CONST    | RU   | CTION COST           | \$ | 4,132,625.00           |  |
|   |  | SU  | BTOTAL ESTIMA                  | TED RIGH    | t of | WAY COST             | \$ | 510,000.00             |  |
|   |  |   |                                |             |      |                      | \$ | 4,642,625.00           |  |
|   |  | CONS  | TRUCTION CONT                  | TINGENCY    |      | 30%                  | \$ | 1,392,788.00           |  |
| ENGINEERING DESIGN, CONSTRUCTION INSPECTION & CONSTRUCTION ADMINISTRATION 30% |  |   |                                |             |      |                      |    |                        |  |
|   |  |   |                                |             |      |                      |    |                        |  |
|   |  | INFLATION CONTINGENCY (CONSTRUCTION MIDPO     | DINT ESTIMATED                 | ) 7/1/2028) |      | 22.0%                | \$ | 1,021,378.00           |  |
|   |  |   |                                |             |      |                      |    |                        |  |
|   |  |   | TOTAL ES                       | STIMATED    | PRC  | JECT COST            | \$ | 8,449,579.00           |  |

ASSUMPTIONS:

- 1 Partial detour and maintaining traffic are assumed MOT scheme
- 2 Utility relocations are assumed to be non-reimbursable (inside existing right of way). Allowance included for potentially
- reimbursable utility relocations unknown at time of conceptual plan development.
- 3 Earthwork balanced site

|   | MAD-US-42-14.00 - SIGNAL ALTERNATIVE<br>MADISON COUNTY, OHIO<br>RIGHT OF WAY ESTIMATE - 1/04/24 |              |  |  |             |                    |             |        |                      |                   |                 |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|---|---|--------------|--|--|-------------|--------------------|-------------|--------|----------------------|-------------------|-----------------|------------------------------|--------------------|---------------------------------|------------------------------|--------------------|------------|-------------------|-----------------|-----------------------------|
| Owner   | CAD<br>ID   | Parcel ID    | Address                                  | Land Use   | Land Value  | Structure<br>Value | Total       | Area   | (Land Va<br>Acre)*11 | ue/ Stru<br>5% Im | ucture<br>npact | Area:<br>Standard<br>Highway | Area:<br>Temporary | Acquisiton<br>Services<br>Costs | Cost:<br>Standard<br>Highway | Cost:<br>Temporary | Relocation | Sub-Total<br>Cost | Cost to<br>Cure | Comments                    |
| SR 29 WEST JEFF LLC   | 1   | 08-00902.005 | 1800 NE US 42                            | 400-COMMERCIAL-VACANT LAND   | \$1,385,470 | \$0                | \$1,385,470 | 24.670 | \$ 64,               | 590               | NO              | 1.196                        | 0.460              | \$10,000                        | \$77,250                     | \$5,942            |            | \$93,192          |                 | NO STRUCTURE ON<br>PROPERTY |
| GREEN RICHARD L & ANITA S<br>TRUSTEES OF THE RICHARD L<br>& ANITA S GREEN REVOCABLE<br>TRUST DATED JUNE 1, 2017 | 2   | 08-00429.003 | US 42                                    | 400-COMMERCIAL-VACANT LAND   | \$244,630   | \$0                | \$244,630   | 43.560 | \$6,                 | 460               | NO              | 1.126                        | 0.438              | \$10,000                        | \$7,274                      | \$566              |            | \$17,840          |                 | NO STRUCTURE ON<br>PROPERTY |
| COLBY CORNER LLC  | 3   | 08-00424.000 | 1870 US 42                               | 400-COMMERCIAL-VACANT LAND   | \$30,690    | \$0                | \$30,690    | 1.464  | \$ 24,               | 110               | NO              | 0.235                        | 0.081              | \$10,000                        | \$5,666                      | \$391              |            | \$16,056          |                 | NO STRUCTURE ON<br>PROPERTY |
| COLBY HOLDINGS LLC  | 4   | 08-00228.003 | 1935 US 42                               | 455-COMMERCIAL GARAGES   | \$148,170   | \$127,430          | \$275,600   | 15.384 | \$11,                | 080               | NO              | 0.779                        | 0.297              | \$10,000                        | \$8,631                      | \$658              |            | \$19,289          |                 |                             |
| GREEN RICHARD L & ANITA S<br>TRUSTEES OF THE RICHARD L<br>& ANITA S GREEN REVOCABLE<br>TRUST DATED JUNE 1, 2017 | 5   | 08-00228.001 | 1885 US 42                               | 499-OTHER COMMERCIAL<br>STRUCTURES   | \$57,450    | \$660              | \$58,110    | 1.230  | \$ 53                | 720               | NO              | 0.072                        | 0.029              | \$10,000                        | \$3,868                      | \$312              |            | \$14,179          |                 |                             |
| COLBY CORNER LLC  | 6   | 08-00937.000 | 1890 US 42                               | 510-SINGLE FAMILY DWELLING   | \$44,980    | \$85,830           | \$130,810   | 0.459  | \$ 112               | 700               | NO              | 0.075                        | 0.030              | \$10,000                        | \$8,453                      | \$676              |            | \$19,129          |                 |                             |
| C PROPERTIES LLC  | 7   | 08-00228.002 | 1933 US 42                               | 480-COMMERCIAL WAREHOUSES  | \$41,140    | \$167,830          | \$208,970   | 1.465  | \$ 32                | 300               | NO              | 0.085                        | 0.034              | \$10,000                        | \$2,746                      | \$300              |            | \$13,046          |                 |                             |
| PUTHIPREAK WATT KHMER   | 8   | 08-00469.555 | 3570 SR 29                               | 111-CASH-GRAIN OR GENERAL FARM<br>"QUALIFIED FOR CURRENT<br>AGRICULURAL USE VALUE" | \$610,790   | \$50,520           | \$661,310   | 52.890 | \$ 13,               | 290               | NO              | 0.938                        | 0.376              | \$10,000                        | \$12,466                     | \$999              |            | \$23,465          |                 |                             |
| DIANE L JASINSKY LLC  | 9   | 08-00464.000 | US 42                                    | 100-AGRICULTURAL VACANT LAND   | \$22,000    | \$0                | \$22,000    | 2.000  | \$ 12,               | 650               | NO              | 0.116                        | 0.047              | \$10,000                        | \$1,467                      | \$300              |            | \$11,767          |                 | NO STRUCTURE ON<br>PROPERTY |
| DIANE L JASINSKY LLC  | 10  | 08-00464.001 | US 42                                    | 100-AGRICULTURAL VACANT LAND   | \$22,000    | \$0                | \$22,000    | 2.000  | \$ 12,               | 650               | NO              | 0.058                        | 0.023              | \$10,000                        | \$734                        | \$300              |            | \$11,034          |                 | NO STRUCTURE ON<br>PROPERTY |
| DEBNANDALE FARM LLC   | 11  | 08-00518.000 | SR 29                                    | 110-AGRICULTURAL VACANT LAND<br>"QUALIFIED FOR CURRENT<br>AGRICULTURAL USE VALUE"  | \$495,000   | \$0                | \$495,000   | 45.000 | \$ 12                | 650               | NO              | 0.117                        | 0.043              | \$10,000                        | \$1,480                      | \$300              |            | \$11,780          |                 | NO STRUCTURE ON<br>PROPERTY |
| FARM CREDIT SERVICES OF<br>MID-AMERICA FLCA   | 12  | 08-00429.004 | 1705 US 42                               | 447-OFFICE BUILDINGS - 1 AND 2<br>STORIES  | \$79,860    | \$550,430          | \$630,290   | 3.220  | \$ 28                | 530               | NO              | 0.121                        | 0.049              | \$10,000                        | \$3,452                      | \$300              |            | \$13,752          |                 |                             |
| ALTEC INDUSTRIES INC  | 13  | 08-00902.006 | 1680 US 42 NE W<br>JEFFERSON OH<br>43162 | 500-RESIDENTIAL VACANT LAND  | \$74,840    | \$0                | \$74,840    | 8.224  | \$ 10,               | 470               | NO              | 0.046                        | 0.018              | \$10,000                        | \$482                        | \$300              |            | \$10,782          |                 | NO STRUCTURE ON<br>PROPERTY |
|   | 14  |              |  |  |             |                    |             |        |                      |                   |                 |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 15  |              |  |  |             |                    |             |        |                      |                   |                 |                              |                    |                                 |                              |                    |            |                   |                 |                             |
|   | 10  |              |  |  |             |                    |             |        |                      |                   |                 |                              |                    | 1                               |                              |                    |            |                   |                 |                             |

<u>Notes:</u> 1. All areas are in acres.

An areas are in acres.
 Land and Structure Values estimated per county auditor records and/or Zillow estimates
 Acquisition costs estimated per ODOT Right of Way Manual
 An equal amount of additional temporary right of way is assumed for grading purposes

201.566 \$ 18,590

Sub-Totals \$133,968

Administrative Costs Jury trial Costs [ Incidental transfer Costs [ Contingency Costs **Total Cost** 

\*Acquisition Service Cost Includes the following: (per ODOT Cost Estimating Procedures For Acquiring Rights of Way)

\$3,257,020

| Titles &  | Detailed  | Negotiation |          | Project  |          |
|-----------|-----------|-------------|----------|----------|----------|
| Detailed  | Appraisal | &           | Closings | Manageme | Subtotal |
| Appraisal | Review    | Relocation  | -        | nt       |          |
| \$4,900   | \$2,000   | \$1,100     | \$400    | \$550    | \$10,000 |
| \$4,900   | \$2,000   | \$6,700     | \$400    | \$550    | \$14,550 |
|           |           |             |          |          |          |

| \$0  | \$275,312                           |   |
|------|-------------------------------------|---|
| 1.20 | \$49,556                            |   |
| 1.50 | \$41,297                            |   |
| .025 | \$6,195                             |   |
|      | \$130,326                           |   |
|      | \$502,700                           |   |
|      | <b>\$0</b><br>1.20<br>1.50<br>0.025 | \$0         \$275,312           1.20         \$49,556           1.50         \$41,297           0.025         \$6,195           \$130,326         \$502,700 |

\$0

No Relocation With Relocation

# **APPENDIX I**

**Benefit-Cost (ECAT) Analysis** 

ECAT Summary & Safety Benefit-Cost Analysis Roundabout

ECAT Summary & Safety Benefit-Cost Analysis Left-Turn Lanes Traffic Signal Alternative

| ECAT                           | Project Informat   | ion            |                     |  |  |  |  |  |  |  |
|--------------------------------|--|----------------|---------------------|--|--|--|--|--|--|--|
| Economic Crash Analysis Tool   | General Information  |                |                     |  |  |  |  |  |  |  |
| Project Name                   | MAD US 42 14.00  | Contact Email  | ghansel@cmtengr.com |  |  |  |  |  |  |  |
| Project Description            | VAR-Statewide Safety Studies No. 2023-4 District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |  |  |  |  |
| Reference Number               | 117886   | Date Performed | 2/13/2024           |  |  |  |  |  |  |  |
| Analyst                        | GSH  | Analysis Year  | 2043                |  |  |  |  |  |  |  |
| Agency/Company                 | СМТ  |                |                     |  |  |  |  |  |  |  |
| Perform Benefit Cost Analysis? | Yes  |                |                     |  |  |  |  |  |  |  |

| Do the proposed improvements fundamentally change the conditions of the base safety performance function (SPF),<br>Or is crash data unavailable for the analysis condition,<br>Or is only predicted (and not expected) analysis needed for the existing or proposed condition? | Yes |
|--|-----|
|  |     |

(Examples: unsignalized to signalized, undivided to divided, increase or decrease in the number of lanes, change the number of approaches to an intersection, significant realignment of the roadway)

If Yes, are you analyzing the existing or proposed conditions?

Proposed

| Project Elements Description Table     |            |                              |                      |  |  |  |                         |               |
|--|------------|------------------------------|----------------------|--|--|--|-------------------------|---------------|
|  |            |                              | Location Information |  |  |  |                         |               |
| Project Element ID<br>(Must be Unique) | Site Type  | Intersection<br>Control Type | NLFID                | Begin<br>Logpoint/<br>Intersection<br>Midpoint | End Logpoint<br>(Leave<br>blank for<br>Intersection) | Length (mi)<br>OR<br>Intersection<br>Radius Buffer<br>(mi) | Cross Route<br>NLFID(s) | Common Name   |
| US42, 14.00                            | Roundabout | Unsignalized                 | SMADUS00042**C       | 14   |  | 0.05   | SMADSR0002              | US 42 & SR 29 |
|  |            |                              |                      |  |  |  |                         |               |
|  |            |                              |                      |  |  |  |                         |               |
|  |            |                              |                      |  |  |  |                         |               |
|  |            |                              |                      |  |  |  |                         |               |

| Traffic Volume Growth Rate Calculation For Benefit Cost Analysis |      |        |           |  |  |
|--|------|--------|-----------|--|--|
|  | Year | AADT   |           |  |  |
| Present ADT (PADT)   | 2023 | 10,220 | veh / day |  |  |
| Future ADT (FADT)  | 2043 | 15,600 | veh / day |  |  |
| Annual Linear Growth Rate  |      | 0.0263 |           |  |  |



| Project Elements Description Table     |           |                              |                      |  |  |  |                         |             |
|--|-----------|------------------------------|----------------------|--|--|--|-------------------------|-------------|
|  |           |                              | Location Information |  |  |  |                         |             |
| Project Element ID<br>(Must be Unique) | Site Type | Intersection<br>Control Type | NLFID                | Begin<br>Logpoint/<br>Intersection<br>Midpoint | End Logpoint<br>(Leave<br>blank for<br>Intersection) | Length (mi)<br>OR<br>Intersection<br>Radius Buffer<br>(mi) | Cross Route<br>NLFID(s) | Common Name |

|            | Select Other Non-Site Characteristic Based Countermeasures For Entire Project |                 |             |             |             |   |  |  |
|------------|---|-----------------|-------------|-------------|-------------|---|--|--|
| CMF<br>Nbr | Countermeasure  | CMF KA<br>Value | CMF B Value | CMF C Value | CMF O Value | CMF Valid for the Following<br>Site Types |  |  |
| CMF 1      |   |                 |             |             |             |   |  |  |
| CMF 2      |   |                 |             |             |             |   |  |  |
| CMF 3      |   |                 |             |             |             |   |  |  |
| CMF 4      |   |                 |             |             |             |   |  |  |
| CMF 5      |   |                 |             |             |             |   |  |  |
| CMF 6      |   |                 |             |             |             |   |  |  |
| CMF 7      |   |                 |             |             |             |   |  |  |
| CMF 8      |   |                 |             |             |             |   |  |  |
| CMF 9      |   |                 |             |             |             |   |  |  |
| CMF 10     |   |                 |             |             |             |   |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |
|------------------------------|---|----------------|---------------------|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |
| Agency/Company               | CMT   |                |                     |  |  |



| Project Summary Results (Without Animal Crashes)             |         |         |         |         |         |  |  |
|--|---------|---------|---------|---------|---------|--|--|
|  | KA      | В       | C       | 0       | Total   |  |  |
| N <sub>predicted</sub> - Existing Conditions                 | 0.3051  | 1.2973  | 1.6402  | 9.8009  | 13.0435 |  |  |
| N <sub>expected</sub> - Existing Conditions                  | 0.2941  | 1.2509  | 1.5814  | 6.4801  | 9.6065  |  |  |
| N <sub>potential for improvement</sub> - Existing Conditions | -0.0110 | -0.0464 | -0.0588 | -3.3208 | -3.4370 |  |  |
| N <sub>expected</sub> - Proposed Conditions                  | 0.0100  | 0.0848  | 0.1051  | 1.9358  | 2.1357  |  |  |





| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes) |               |                      |        |        |        |         |  |  |
|--|---------------|----------------------|--------|--------|--------|---------|--|--|
| Broject Element ID   | Common Name   | Crash Severity Level |        |        |        |         |  |  |
| Project Element ID   |               | KA                   | В      | С      | 0      | Total   |  |  |
| <u>US42, 14.00</u>   | US 42 & SR 29 | 0.3051               | 1.2973 | 1.6402 | 9.8009 | 13.0435 |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes) |               |                      |        |        |        |        |  |  |
|---|---------------|----------------------|--------|--------|--------|--------|--|--|
| Broject Element ID  | Common Name   | Crash Severity Level |        |        |        |        |  |  |
| Project Element ID  |               | KA                   | В      | C      | 0      | Total  |  |  |
| <u>US42, 14.00</u>  | US 42 & SR 29 | 0.2941               | 1.2509 | 1.5814 | 6.4801 | 9.6065 |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |
|------------------------------|---|----------------|---------------------|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |
| Agency/Company               | CMT   |                |                     |  |  |

| Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes) |               |                      |         |         |         |        |  |  |
|---|---------------|----------------------|---------|---------|---------|--------|--|--|
| Broject Element ID  | Common Nomo   | Crash Severity Level |         |         |         |        |  |  |
| Project Element ID  | Common Name   | KA                   | В       | C       | 0       | Total  |  |  |
| <u>US42, 14.00</u>  | US 42 & SR 29 | -0.011               | -0.0464 | -0.0588 | -3.3208 | -3.437 |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|--|
| Economic Crash Analysis Tool | General Information   |                |                     |  |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |  |

| Proposed Conditions Project Element Predicted Crash Summary (Without Animal Crashes) |               |                      |        |        |        |        |  |  |
|--|---------------|----------------------|--------|--------|--------|--------|--|--|
| Project Element ID   | Common Name   | Crash Severity Level |        |        |        |        |  |  |
| Project Element ID   |               | KA                   | В      | C      | 0      | Total  |  |  |
| <u>US42, 14.00</u>   | US 42 & SR 29 | 0.01                 | 0.0848 | 0.1051 | 1.9358 | 2.1357 |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|--|
| Economic Crash Analysis Tool | General   |                |                     |  |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |  |

| Summary by Crash Type |   |          |         |                              |  |  |  |  |
|-----------------------|---|----------|---------|------------------------------|--|--|--|--|
|                       |   | Existing |         | Proposed                     |  |  |  |  |
| Crash Type            | Predicted Crash Expected Crash<br>Frequency Frequency |          | PSI     | Predicted Crash<br>Frequency |  |  |  |  |
| Unknown               | 0.0151  | 0.0112   | -0.0039 | 0.0608                       |  |  |  |  |
| Head On               | 0.0955  | 0.0768   | -0.0187 | 0.0020                       |  |  |  |  |
| Rear End              | 5.7457  | 4.2008   | -1.5449 | 0.3291                       |  |  |  |  |
| Backing               | 0.6213  | 0.4156   | -0.2057 | 0.0196                       |  |  |  |  |
| Sideswipe - Meeting   | 0.2639  | 0.1941   | -0.0698 | 0.0000                       |  |  |  |  |
| Sideswipe - Passing   | 0.8988  | 0.6207   | -0.2781 | 0.6696                       |  |  |  |  |
| Angle                 | 2.6388  | 1.9965   | -0.6423 | 0.6033                       |  |  |  |  |
| Parked Vehicle        | 0.4864  | 0.3348   | -0.1516 | 0.0000                       |  |  |  |  |
| Pedestrian            | 0.1211  | 0.1114   | -0.0097 | 0.0020                       |  |  |  |  |
| Animal                | 0.0000  | 0.0000   | 0.0000  | 0.0216                       |  |  |  |  |
| Train                 | 0.0000  | 0.0000   | 0.0000  | 0.0000                       |  |  |  |  |
| Pedalcycles           | 0.0802  | 0.0706   | -0.0096 | 0.0020                       |  |  |  |  |
| Other Non-Vehicle     | 0.0000  | 0.0000   | 0.0000  | 0.0000                       |  |  |  |  |
| Fixed Object          | 0.8296  | 0.6084   | -0.2212 | 0.2162                       |  |  |  |  |
| Other Object          | 0.0264  | 0.0181   | -0.0083 | 0.0000                       |  |  |  |  |
| Overturning           | 0.0520  | 0.0433   | -0.0087 | 0.0020                       |  |  |  |  |
| Other Non-Collision   | 0.0743  | 0.0530   | -0.0213 | 0.0412                       |  |  |  |  |
| Left Turn             | 1.0944  | 0.8512   | -0.2432 | 0.0472                       |  |  |  |  |
| Right Turn            | 0.0000  | 0.0000   | 0.0000  | 0.1452                       |  |  |  |  |

| ECAT   |  | S                          | afety Benef                       | it - Cost An                            | alysis                    |  |                                  |   |   |  |
|--|--|----------------------------|-----------------------------------|---|---------------------------|--|----------------------------------|---|---|--|
| Economic Crash Analysis Tool                           |  |                            | Genera                            | I Information                           |                           |  |                                  |   |   |  |
| Project Name   | MAD US 42 14.00                            | US 42 14.00                |                                   |   | Contact Email awalton@sir |  |                                  | lton@singhinc.com                           |   |  |
| Project Description                                    | VAR-Statewide Safety Studies No. 2023-4 Di | strict 6 Task 3C           |                                   |   | Contact Phone             |  | (312) 520-9276                   |   |   |  |
| Reference Number                                       | 119698                                     |                            |                                   |   | Date Performed            |  | 3/19/2024                        |   |   |  |
| Analyst  | ADW  |                            |                                   |   | Analysis Year             |  | 2043                             |   |   |  |
| Agency/Company   | Singh & Associates, Inc.                   |                            |                                   |   |                           |  |                                  |   |   |  |
| Select Site Types to be us                             | ed in Benefit-Cost Analysis:               | Comm                       | ents:                             |   |                           |  |                                  |   |   |  |
|  |  | Countern                   | neasure Service                   | Lives, Costs, and                       | d Safety Benefits         | ;  |                                  |   |   |  |
|  | Countermeasures                            | Service<br>Life<br>(Years) | Initial Cost of<br>Countermeasure | Annual<br>Maintenance &<br>Energy Costs | Salvage Value             | Net Present<br>Cost of<br>Countermeasure | Total Cost of<br>Countermeasures | Summary of<br>Annual Crash<br>Modifications | Net Present Value<br>of Safety Benefits |  |
| Site Characteristic Improvem                           | ents (i.e. Lane widening)                  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           |   |   |  |
| Site Characteristic Improvements (i.e. Lighting)       |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 10.000                                      | ¢5 242 502                              |  |
| Site Characteristic Improvements (i.e. Signal Phasing) |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | -10.908                                     | <i>\$3,213,332</i>                      |  |
| Site Characteristic Improvem                           | ents (i.e. Added Right Turn Lane)          |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           |   |   |  |
| Roundabout Cost  |  | 20                         | \$4,213,408.00                    |   |                           | \$4,213,408.00                           | \$4,213,408.00                   | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  |  |                            | \$0.00                            |   |                           | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |  |
|  | Totolo                                     |                            | ¢4 212 408 00                     | ¢0.00                                   | ć0.00                     | ¢4 212 408 00                            | ¢4 212 409 00                    | 10.009                                      | ¢F 212 F02                              |  |





| ECAT                         | Safety Benefit - Cost Analysis                             |                |                      |  |  |  |
|------------------------------|--|----------------|----------------------|--|--|--|
| Economic Crash Analysis Tool | General Information  |                |                      |  |  |  |
| Project Name                 | MAD US 42 14.00  | Contact Email  | awalton@singhinc.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4 District 6 Task 3C | Contact Phone  | (312) 520-9276       |  |  |  |
| Reference Number             | 119698   | Date Performed | 3/19/2024            |  |  |  |
| Analyst                      | ADW  | Analysis Year  | 2043                 |  |  |  |
| Agency/Company               | Singh & Associates, Inc.                                   |                |                      |  |  |  |









| ECAT                           | Project Information  |                |                     |  |  |  |  |
|--------------------------------|--|----------------|---------------------|--|--|--|--|
| Economic Crash Analysis Tool   | General Information  |                |                     |  |  |  |  |
| Project Name                   | MAD US 42 14.00  | Contact Email  | ghansel@cmtengr.com |  |  |  |  |
| Project Description            | VAR-Statewide Safety Studies No. 2023-4 District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |  |
| Reference Number               | 117886   | Date Performed | 2/13/2024           |  |  |  |  |
| Analyst                        | GSH  | Analysis Year  | 2043                |  |  |  |  |
| Agency/Company                 | СМТ  |                |                     |  |  |  |  |
| Perform Benefit Cost Analysis? | Yes  |                |                     |  |  |  |  |

| Do the proposed improvements fundamentally change the conditions of the base safety performance function (SPF),<br>Or is crash data unavailable for the analysis condition | No |
|--|----|
| Or is only predicted (and not expected) analysis condition,<br>Or is only predicted (and not expected) analysis needed for the existing or proposed condition?             | NO |

(Examples: unsignalized to signalized, undivided to divided, increase or decrease in the number of lanes, change the number of approaches to an intersection, significant realignment of the roadway)

| Project Elements Description Table     |                                     |                              |                      |  |  |  |                         |               |
|--|-------------------------------------|------------------------------|----------------------|--|--|--|-------------------------|---------------|
|  |                                     |                              | Location Information |  |  |  |                         |               |
| Project Element ID<br>(Must be Unique) | Site Type                           | Intersection<br>Control Type | NLFID                | Begin<br>Logpoint/<br>Intersection<br>Midpoint | End Logpoint<br>(Leave<br>blank for<br>Intersection) | Length (mi)<br>OR<br>Intersection<br>Radius Buffer<br>(mi) | Cross Route<br>NLFID(s) | Common Name   |
| US42, 14.00                            | Rural Two-Lane Two Way Intersection | Signalized                   | SMADUS00042**C       | 14   |  | 0.05   | SMADSR0002              | US 42 & SR 29 |
|  |                                     |                              |                      |  |  |  |                         |               |
|  |                                     |                              |                      |  |  |  |                         |               |
|  |                                     |                              |                      |  |  |  |                         |               |
|  |                                     |                              |                      |  |  |  |                         |               |

| Traffic Volume Growth Rate Calculation For Benefit Cost Analysis |      |        |           |  |  |  |  |
|--|------|--------|-----------|--|--|--|--|
|  | Year | AADT   |           |  |  |  |  |
| Present ADT (PADT)   | 2023 | 10,220 | veh / day |  |  |  |  |
| Future ADT (FADT)  | 2043 | 15,600 | veh / day |  |  |  |  |
| Annual Linear Growth Rate  |      | 0.0263 |           |  |  |  |  |



| Project Elements Description Table     |           |                              |                      |  |  |  |                         |             |
|--|-----------|------------------------------|----------------------|--|--|--|-------------------------|-------------|
|  |           |                              | Location Information |  |  |  |                         |             |
| Project Element ID<br>(Must be Unique) | Site Type | Intersection<br>Control Type | NLFID                | Begin<br>Logpoint/<br>Intersection<br>Midpoint | End Logpoint<br>(Leave<br>blank for<br>Intersection) | Length (mi)<br>OR<br>Intersection<br>Radius Buffer<br>(mi) | Cross Route<br>NLFID(s) | Common Name |

|            | Select Other Non-Site Characteristic Based Countermeasures For Entire Project |                 |             |             |             |   |  |  |
|------------|---|-----------------|-------------|-------------|-------------|---|--|--|
| CMF<br>Nbr | Countermeasure  | CMF KA<br>Value | CMF B Value | CMF C Value | CMF O Value | CMF Valid for the Following<br>Site Types |  |  |
| CMF 1      |   |                 |             |             |             |   |  |  |
| CMF 2      |   |                 |             |             |             |   |  |  |
| CMF 3      |   |                 |             |             |             |   |  |  |
| CMF 4      |   |                 |             |             |             |   |  |  |
| CMF 5      |   |                 |             |             |             |   |  |  |
| CMF 6      |   |                 |             |             |             |   |  |  |
| CMF 7      |   |                 |             |             |             |   |  |  |
| CMF 8      |   |                 |             |             |             |   |  |  |
| CMF 9      |   |                 |             |             |             |   |  |  |
| CMF 10     |   |                 |             |             |             |   |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |



| Project Summary Results (Without Animal Crashes)                      |         |         |         |         |         |  |  |
|---|---------|---------|---------|---------|---------|--|--|
|   | KA      | В       | С       | 0       | Total   |  |  |
| N <sub>predicted</sub> - Existing Conditions                          | 0.3051  | 1.2973  | 1.6402  | 9.8009  | 13.0435 |  |  |
| N <sub>expected</sub> - Existing Conditions                           | 0.2941  | 1.2509  | 1.5814  | 6.4801  | 9.6065  |  |  |
| $\mathbf{N}_{\text{potential for improvement}}$ - Existing Conditions | -0.0110 | -0.0464 | -0.0588 | -3.3208 | -3.4370 |  |  |
| N <sub>expected</sub> - Proposed Conditions                           | 0.1323  | 0.5629  | 0.7116  | 2.9160  | 4.3228  |  |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes) |               |                      |        |        |        |         |  |
|--|---------------|----------------------|--------|--------|--------|---------|--|
| Broject Element ID   | Common Name   | Crash Severity Level |        |        |        |         |  |
| Project Element ID   |               | KA                   | В      | С      | 0      | Total   |  |
| <u>US42, 14.00</u>   | US 42 & SR 29 | 0.3051               | 1.2973 | 1.6402 | 9.8009 | 13.0435 |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes) |               |                      |        |        |        |        |  |
|---|---------------|----------------------|--------|--------|--------|--------|--|
| Broject Element ID  | Common Name   | Crash Severity Level |        |        |        |        |  |
| Project Element ID  |               | KA                   | В      | C      | 0      | Total  |  |
| <u>US42, 14.00</u>  | US 42 & SR 29 | 0.2941               | 1.2509 | 1.5814 | 6.4801 | 9.6065 |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   | nformation     |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes) |               |                      |         |         |         |        |  |
|---|---------------|----------------------|---------|---------|---------|--------|--|
| Broject Element ID  | Common Name   | Crash Severity Level |         |         |         |        |  |
| Project Element ID  |               | KA                   | В       | C       | 0       | Total  |  |
| <u>US42, 14.00</u>  | US 42 & SR 29 | -0.011               | -0.0464 | -0.0588 | -3.3208 | -3.437 |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   |                |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

| Proposed Conditions Project Element Expected Crash Summary (Without Animal Crashes) |               |                      |        |        |       |        |  |
|---|---------------|----------------------|--------|--------|-------|--------|--|
| Broject Element ID  | Common Name   | Crash Severity Level |        |        |       |        |  |
| Project Element ID  |               | KA                   | В      | C      | 0     | Total  |  |
| <u>US42, 14.00</u>  | US 42 & SR 29 | 0.1323               | 0.5629 | 0.7116 | 2.916 | 4.3228 |  |



| ECAT                         | Project Safety Performance Report                             |                |                     |  |  |  |
|------------------------------|---|----------------|---------------------|--|--|--|
| Economic Crash Analysis Tool | General I   | nformation     |                     |  |  |  |
| Project Name                 | MAD US 42 14.00   | Contact Email  | ghansel@cmtengr.com |  |  |  |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4<br>District 6 Task 3C | Contact Phone  | (614) 468-1213      |  |  |  |
| Reference Number             | 117886  | Date Performed | 2/13/2024           |  |  |  |
| Analyst                      | GSH   | Analysis Year  | 2043                |  |  |  |
| Agency/Company               | CMT   |                |                     |  |  |  |

|                     | Sum                          | mary by Crash               | Туре    |                             |
|---------------------|------------------------------|-----------------------------|---------|-----------------------------|
|                     |                              | Existing                    |         | Proposed                    |
| Crash Type          | Predicted Crash<br>Frequency | Expected Crash<br>Frequency | PSI     | Expected Crash<br>Frequency |
| Unknown             | 0.0151                       | 0.0112                      | -0.0039 | 0.0050                      |
| Head On             | 0.0955                       | 0.0768                      | -0.0187 | 0.0346                      |
| Rear End            | 5.7457                       | 4.2008                      | -1.5449 | 1.8904                      |
| Backing             | 0.6213                       | 0.4156                      | -0.2057 | 0.1870                      |
| Sideswipe - Meeting | 0.2639                       | 0.1941                      | -0.0698 | 0.0873                      |
| Sideswipe - Passing | 0.8988                       | 0.6207                      | -0.2781 | 0.2793                      |
| Angle               | 2.6388                       | 1.9965                      | -0.6423 | 0.8984                      |
| Parked Vehicle      | 0.4864                       | 0.3348                      | -0.1516 | 0.1507                      |
| Pedestrian          | 0.1211                       | 0.1114                      | -0.0097 | 0.0501                      |
| Animal              | 0.0000                       | 0.0000                      | 0.0000  | 0.0000                      |
| Train               | 0.0000                       | 0.0000                      | 0.0000  | 0.0000                      |
| Pedalcycles         | 0.0802                       | 0.0706                      | -0.0096 | 0.0318                      |
| Other Non-Vehicle   | 0.0000                       | 0.0000                      | 0.0000  | 0.0000                      |
| Fixed Object        | 0.8296                       | 0.6084                      | -0.2212 | 0.2738                      |
| Other Object        | 0.0264                       | 0.0181                      | -0.0083 | 0.0081                      |
| Overturning         | 0.0520                       | 0.0433                      | -0.0087 | 0.0195                      |
| Other Non-Collision | 0.0743                       | 0.0530                      | -0.0213 | 0.0239                      |
| Left Turn           | 1.0944                       | 0.8512                      | -0.2432 | 0.3830                      |
| Right Turn          | 0.0000                       | 0.0000                      | 0.0000  | 0.0000                      |

| ECAT                         | Safety Benefit - Cost An                                   | alysis         |                     |
|------------------------------|--|----------------|---------------------|
| Economic Crash Analysis Tool | General Information  |                |                     |
| Project Name                 | MAD US 42 14.00  | Contact Email  | ghansel@cmtengr.com |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4 District 6 Task 3C | Contact Phone  | (614) 468-1213      |
| Reference Number             | 117886   | Date Performed | 2/13/2024           |
| Analyst                      | GSH  | Analysis Year  | 2043                |
| Agency/Company               | СМТ  |                |                     |

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

#### Comments:

#### Countermeasure Service Lives, Costs, and Safety Benefits

| Countermeasures  | Service<br>Life<br>(Years) | Initial Cost of<br>Countermeasure | Annual<br>Maintenance &<br>Energy Costs | Salvage Value | Net Present<br>Cost of<br>Countermeasure | Total Cost of<br>Countermeasures | Summary of<br>Annual Crash<br>Modifications | Net Present Value<br>of Safety Benefits |
|--|----------------------------|-----------------------------------|---|---------------|--|----------------------------------|---|---|
| Site Characteristic Improvements (i.e. Lane widening)  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           |   |   |
| Site Characteristic Improvements (i.e. Lighting)       |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           |   | 40.000.000                              |
| Site Characteristic Improvements (i.e. Signal Phasing) |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | -5.284                                      | \$2,909,542                             |
| Signal Reconstruction and Added Left Turn Lane         | 20                         | \$7,428,200.00                    |   |               | \$7,428,200.00                           | \$7,428,200.00                   |   |   |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
|  |                            | \$0.00                            |   |               | \$0.00                                   | \$0.00                           | 0.000                                       | \$0                                     |
| Totals   | -                          | \$7,428,200.00                    | \$0.00                                  | \$0.00        | \$7,428,200.00                           | \$7,428,200.00                   | -5.284                                      | \$2,909,542                             |







| ECAT                         | Safety Benefit - Cost An                                   | alysis         |                     |
|------------------------------|--|----------------|---------------------|
| Economic Crash Analysis Tool | General Information  |                |                     |
| Project Name                 | MAD US 42 14.00  | Contact Email  | ghansel@cmtengr.com |
| Project Description          | VAR-Statewide Safety Studies No. 2023-4 District 6 Task 3C | Contact Phone  | (614) 468-1213      |
| Reference Number             | 117886   | Date Performed | 2/13/2024           |
| Analyst                      | GSH  | Analysis Year  | 2043                |
| Agency/Company               | CMT  |                |                     |







## **APPENDIX J**

### **CAP-X Analysis and ICE Summary**

|                      |                 |                   | Detai             | led Results \          | Vorksheet     |                    |                                    |                             |   |                 |  |  |  |
|----------------------|-----------------|-------------------|-------------------|------------------------|---------------|--------------------|------------------------------------|-----------------------------|---|-----------------|--|--|--|
| [                    | Project Nam     | e:                | MAD               | US 42-14.0             | 00            |                    | Estimated Volume-to-Capacity Ratio |                             |   |                 |  |  |  |
|                      | Project Number: |                   | Ма                | 117886<br>dison County |               | < (                | Nu<br>).750 0                      | mber of Co<br>0.750 - 0.875 | er of Configurations - 0.875 0.875 - 1.00 |                 |  |  |  |
|                      | Da              | te                | 20                | 43 AM Peak             |               |                    | 2                                  | 0                           | 0   | 0               |  |  |  |
| TYPE OF INTERSECTION |                 | Sheet             | Zone 1 (North)    | Zone 2 (South)         | Zone 3 (East) | Zone 4 (West)      | Zone 5 (Ce                         | enter)<br>Over<br>Ra        | rall v/c                                  | Bicycle         |  |  |  |
| Traffic Signa        | Traffic Signal  |                   |                   |                        |               |                    | 896 <u>0</u>                       | 0. <u>58</u> 0              | .58                                       | <b>2.50</b> 4.3 |  |  |  |
|                      |                 | Res               | ults for Gr       | ade Separ              | ated Inters   | sections           |                                    |                             |   |                 |  |  |  |
| TYPE OF INTERSECTIO  | N Sheet         | Zone 1<br>(North) | Zone 2<br>(South) | Zone 3 (East)          | Zone 4 (West) | Zone 5<br>(Center) | Zone 6<br>(Raised                  | <sup>6</sup><br>d) Over     | rall v/c<br>atio                          | Ped<br>Bike     |  |  |  |

|                       |                                 | Сар   | acit         | у А         | naly         | <b>ySIS</b><br>Detail | 5 fOi<br>led Res | Pla<br>sults V | ann<br>Vorksl | ing<br>heet   | of .          | Jun          | ctio                 | ons                          |                           |            |                          |
|-----------------------|---------------------------------|-------|--------------|-------------|--------------|-----------------------|------------------|----------------|---------------|---------------|---------------|--------------|----------------------|------------------------------|---------------------------|------------|--------------------------|
|                       |                                 |       |              |             | F            | Resul                 | ts for           | Rou            | ndab          | outs          |               |              |                      |                              |                           |            |                          |
| TYPE OF<br>ROUNDABOUT | IT Zone 1 (North) Zone 3 (East) |       |              | )<br>-ane 3 | Zo<br>Lane 1 | one 2                 | (South           | ר)<br>Lane 3   | Z<br>Lane 1   | one 4         | (West         | :)<br>Lane 3 | Overall v/c<br>Ratio | Pedestrian<br>Accommodations | Bicycle<br>Accommodations |            |                          |
| <u>1 X 1</u>          | <u>0.39</u>                     |       | <u>0.48</u>  |             |              |                       | <u>0.37</u>      |                |               |               | <u>0.43</u>   |              |                      |                              | 0.48                      | 4.16       | 4.37                     |
|                       |                                 |       |              |             | 5            | Resu                  | lts for          | Inte           | rchar         | nges          |               |              |                      |                              |                           |            |                          |
| TYPE OF INTI          | ERCHANGE                        | Sheet | Zon<br>(Rt M | e 1<br>Arg) | Zon<br>(Lt M | e 2<br>Arg)           | Zon<br>(Ctr      | e 3<br>. 1)    | Zor<br>(Ctr   | ne 4<br>r. 2) | Zona<br>(Lt M | e 5<br>lrg)  | Zor<br>(Rt I         | ne 6<br>Mrg)                 | Overall v/c<br>Ratio      | Pedestrian | Bicycle<br>ccommodations |
|                       |                                 |       | CLV          | V/C         | CLV          | V/C                   | CLV              | V/C            | CLV           | V/C           | CLV           | V/C          | CLV                  | V/C                          |                           | Ă          | Ă                        |

|                      | -               |                   | Detai             | led Results            | Worksheet    |                 |                                    |                        |                                |                         |         |  |  |
|----------------------|-----------------|-------------------|-------------------|------------------------|--------------|-----------------|------------------------------------|------------------------|--------------------------------|-------------------------|---------|--|--|
| [                    | Project Nam     | e:                | MAD               | US 42-14.              | 00           |                 | Estimated Volume-to-Capacity Ratio |                        |                                |                         |         |  |  |
|                      | Project Number: |                   | Mad               | 117886<br>dison County | ,            |                 | < 0.750                            | Number (<br>0.750 - 0. | of Configura<br>.875 0.875 - 1 | tions<br>.00            | ≥ 1.00  |  |  |
|                      | Da              | te                | 20                | 43 PM Peak             |              |                 | 2                                  | 0                      | 0                              |                         | 0       |  |  |
| TYPE OF INTERSECTION |                 | Sheet             | Zone 1 (North)    | Zone 2 (South)         | Zone 3 (East | ) Zone 4 (V     | Vest) Zone 5                       | 5 (Center)             | Overall v/c<br>Ratio           | Pedestrian<br>commodati | Bicycle |  |  |
|                      |                 |                   | CLV V/C           | CLV V/C                |              |                 |                                    | V/C                    |                                | Acc                     | Aco     |  |  |
|                      |                 | FULL              |                   |                        | V /          |                 | 1061                               | <u>0.68</u>            | 0.68                           | 2.50                    | 4.33    |  |  |
|                      |                 | Res               | ults for Gr       | ade Sepa               | rated Inte   | rsection        | S                                  |                        |                                |                         |         |  |  |
| TYPE OF INTERSECTIO  | N Sheet         | Zone 1<br>(North) | Zone 2<br>(South) | Zone 3 (East)          | Zone 4 (Wes  | St) Zone (Cente | 5 Zo<br>er) (Ra                    | one 6<br>aised)        | Overall v/c<br>Ratio           | Ped                     | Bike    |  |  |
|                       |  | Сар   | acit         | у А                                | nal   | ySIS<br>Detail     | 5 fOr<br>led Res | Pla<br>sults V     | ann<br>Vorksl | ing<br>neet                                   | of .        | Jun                | ctio | ons                  |                              |                           |      |
|-----------------------|--|-------|--------------|------------------------------------|---|--------------------|------------------|--------------------|---------------|---|-------------|--------------------|------|----------------------|------------------------------|---------------------------|------|
|                       |  |       |              |                                    | F   | Resul              | ts for           | Rou                | ndab          | outs  |             |                    |      |                      |                              |                           |      |
| TYPE OF<br>ROUNDABOUT | Zone 1 (North) Zone 3 (E<br>Lane 1 Lane 2 Lane 3 Lane 1 Lane : |       |              | B (East)                           | East) Zone 2 (South)<br>2 Lane 3 Lane 1 Lane 2 Lane 3 |                    |                  |                    | ר)<br>Lane 3  | ) Zone 4 (West)<br>ane 3 Lane 1 Lane 2 Lane 3 |             |                    |      | Overall v/c<br>Ratio | Pedestrian<br>Accommodations | Bicycle<br>Accommodations |      |
| <u>1 X 1</u>          | 0.27   |       | <u>0.40</u>  |                                    |   |                    | <u>0.74</u>      |                    |               |   | <u>0.64</u> |                    |      |                      | 0.74                         | 4.12                      | 4.33 |
|                       | Results for Interchanges                                       |       |              |                                    |   |                    |                  |                    |               |   |             |                    |      |                      |                              |                           |      |
| TYPE OF INTERCHANGE   |  | Sheet | Zon<br>(Rt M | Zone 1 Zone 2<br>(Rt Mrg) (Lt Mrg) |   | Zone 3<br>(Ctr. 1) |                  | Zone 4<br>(Ctr. 2) |               | Zone 5<br>(Lt Mrg)                            |             | Zone 6<br>(Rt Mrg) |      | Overall v/c<br>Ratio | Pedestrian                   | Bicycle<br>ccommodations  |      |
|                       |  |       | CLV          | V/C                                | CLV   | V/C                | CLV              | V/C                | CLV           | V/C   | CLV         | V/C                | CLV  | V/C                  |                              | Ă                         | Ă    |

| Outputs         | This sheet compiles the data from summary tables in individual alternatives sheets. To populate the output sheet press the "Setup Worksheets" button in the Volumes tab. |
|-----------------|--|
| Analyst:        | ТЈН  |
| Agency/Company: | CMT  |
| Intersection:   | US 42 & SR 29  |
| Route:          | MAD 42   |
| Logpoint:       | 14   |
| Common Name:    | N London-Delaware Rd & Urbana-West Jefferson Ro  |
| Date Performed: | 2/16/2024  |
| Analysis Type   | At-Grade Intersection  |

## Analysis Summary

| Cost Categories                             |    | Net Present Value of Costs |              |  |  |  |  |  |  |
|---|----|----------------------------|--------------|--|--|--|--|--|--|
|   |    | Traffic Signal             | Roundabout   |  |  |  |  |  |  |
| Planning, Construction & Right of Way Costs | \$ | 8,550,119                  | \$ 4,709,272 |  |  |  |  |  |  |
| Post-Opening Costs                          | \$ | 95,545                     | \$ 72,952    |  |  |  |  |  |  |
| Auto Passenger Delay                        | \$ | 824,480                    | \$ 724,525   |  |  |  |  |  |  |
| Truck Delay                                 | \$ | 556,495                    | \$ 489,029   |  |  |  |  |  |  |
| Safety                                      | \$ | 1,821,133                  | \$ 998,756   |  |  |  |  |  |  |
| Total cost                                  |    | \$11,847,772               | \$6,994,533  |  |  |  |  |  |  |

| Select Base Case for Benefit-Cost Comparison:<br>(Choose from list) | Traffic Signal                                      |  |  |  |  |  |
|---|---|--|--|--|--|--|
|   | Net Present Value of Benefits Relative to Base Case |  |  |  |  |  |
| Benefit Categories  | Traffic Signal                                      | Roundabout   |  |  |  |  |
| Auto Passenger Delay  |   | \$ 99,955  |  |  |  |  |
| Truck Delay   |   | \$ 67,466  |  |  |  |  |
| Safety  |   | \$ 822,377   |  |  |  |  |
| Net Present Value of Benefits                                       |   | \$ 989,798   |  |  |  |  |
| Net Present Value of Costs  |   | \$ (3,863,440)   |  |  |  |  |
| Net Present Value of Improvement                                    |   | \$ 4,853,238   |  |  |  |  |
| Benefit-Cost (B/C) Ratio  |   | Control strategy preferred. Benefits are greater than base |  |  |  |  |
| Delay B/C   |   | Control strategy preferred. Benefits are greater than base |  |  |  |  |
| Safety B/C  |   | case and cost is less than base case.                      |  |  |  |  |

