21-ZONE-0125

final report

November 12, 2021
*Revised May 25, 2022*
*August 15,2022*
*September 22, 2022*

# Traffic Impact Study

*Commerce Crossings Two*
*9710 Cooper Church Road*
*Louisville, KY*

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet


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## INTRODUCTION

The development plan for Commerce Crossings Two shows an apartment community with 336 units, 12,000 square feet of office space, and 632,820 square feet of warehouse. **Figure 1** displays a map of the site. Access to the development will be from Commerce Crossings Drive for the warehouses and office. The apartments will have an access on Commerce Crossings Drive and Cooper Church Road. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study the impact area was defined to be the intersections of Cooper Church Road with Commerce Crossings and Commerce Crossings at Preston Highway and Preston Highway at Interchange Drive.

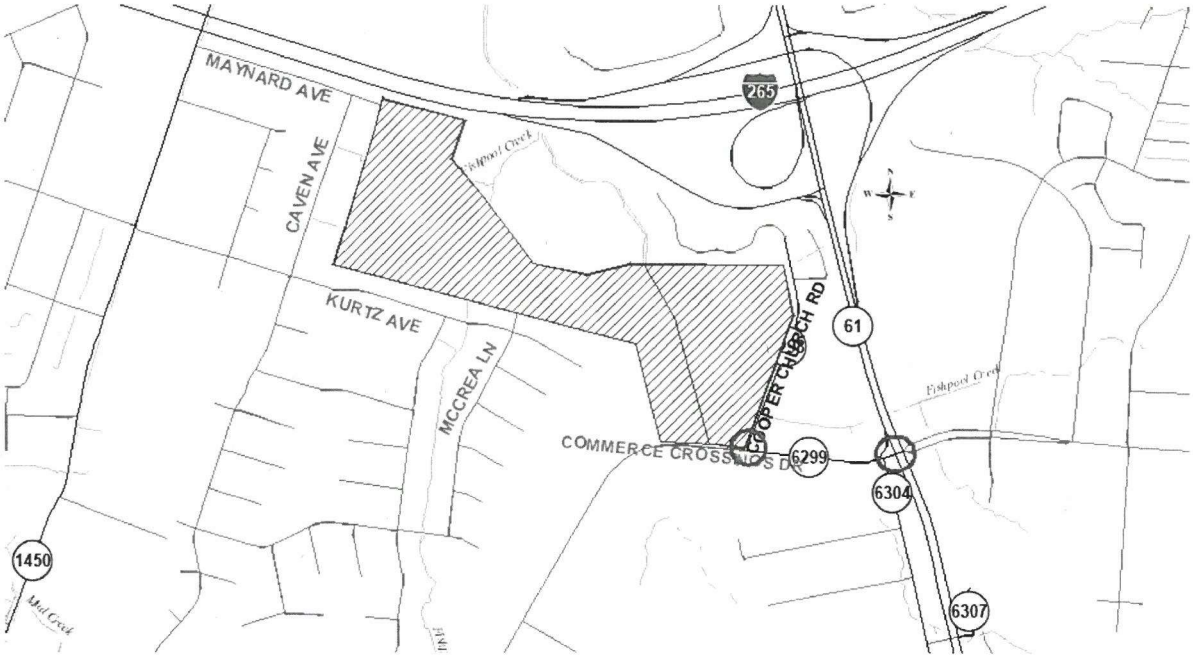



**Figure 1. Site Map**

## EXISTING CONDITIONS

Preston Highway (KY 61) is maintained by the Kentucky Transportation Cabinet with an estimated 2021 ADT of 33,700 vehicles per day south of Commerce Crossing Drive, as estimated from the turning movement count using a K factor of 9.90. The road is a four-lane road with twelve-foot lanes with ten-foot paved shoulders. Northbound widens to three lanes north of Maple Springs Drive to the interchange with I 265. The southbound third lane drops 300 feet south of the intersection at Commerce Crossings Drive. The posted speed limit is 50 mph. There are no sidewalks. The intersections with Commerce Crossing Drive and Interchange Drive are controlled with a traffic signal. At the intersection, there are dual left turn lanes on each approach, except northbound. There is a right turn lane eastbound and southbound, and dual right turn lanes on westbound Cooper Chapel Road. At the intersection with Interchange Drive there are left turn lanes on all approaches and right turn lanes on the southbound and eastbound approaches.

Commerce Crossing Drive (KY 6299) is maintained by the Kentucky Transportation Cabinet with an estimated 2021 ADT of 8,000 vehicles per day between Preston Highway and Cooper Church Road, as estimated from the Kentucky Transportation Cabinet 2020 count at station 885. The road is a two-lane road with twelve-foot lanes with curb and gutter. The posted speed limit is 25 mph. There are sidewalks. The intersection with Cooper Church Road is controlled with a stop sign. At the intersection, there are left turn lanes on Commerce Crossings Drive.

Cooper Church Road (KY 6298) is maintained by the Kentucky Transportation Cabinet with an estimated 2021 ADT of 1,000 vehicles per day north of Commerce Crossings Drive, as estimated from the turning movement count. The road is a two-lane road with twelve-foot lanes with six-foot shoulders. The posted speed limit is 35 mph. There are no sidewalks.

Peak hour traffic counts for the intersections were obtained on August 24, 2021 (see Appendix A). The a.m. peak hour occurred between 7:15 and 8:15 a.m. The p.m. peak hour occurred between 4:15 and 5:15 p.m. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes.

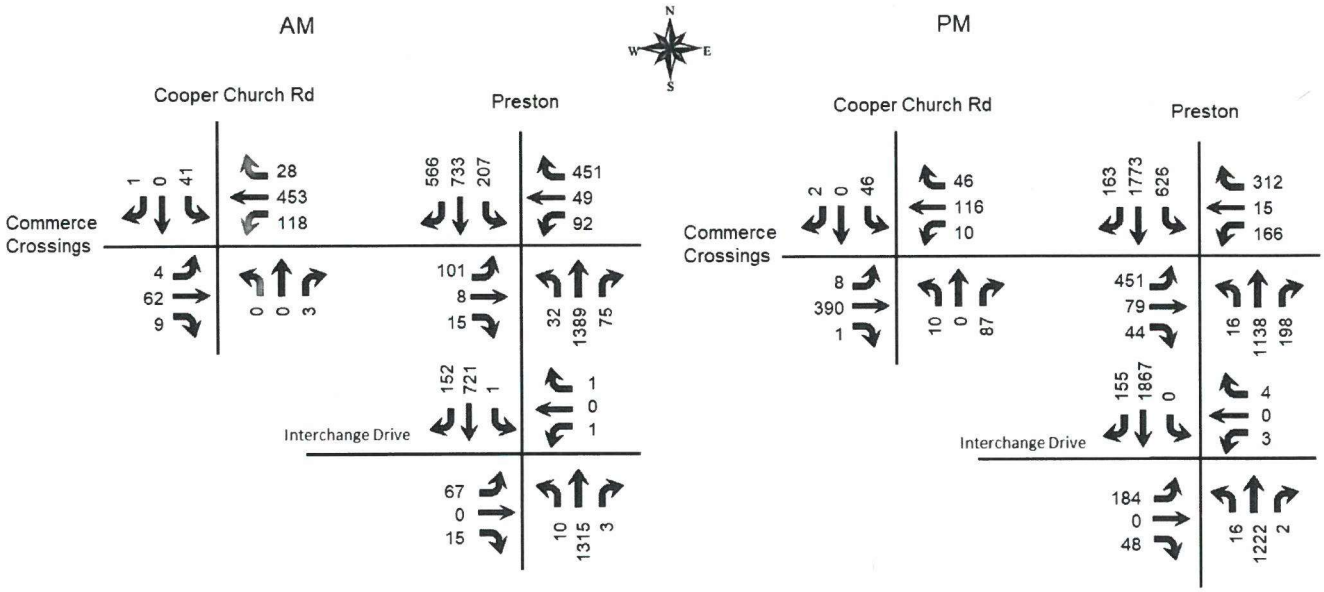



**Figure 2. Existing Peak Hour Volumes**

## FUTURE CONDITIONS

The requested analysis year for this project is 2024. To predict traffic volumes in 2024, one half percent annual growth in traffic was added to the 2021 volumes. Trip Generation for the recently approved development at Interchange Drive is also included. The traffic impact studies are "Preston Highway at Interchange Drive" dated October 7, 2021 and "Apartments Old Preston Highway" dated January 12, 2022. **Figure 3** displays the 2024 No Build volumes.

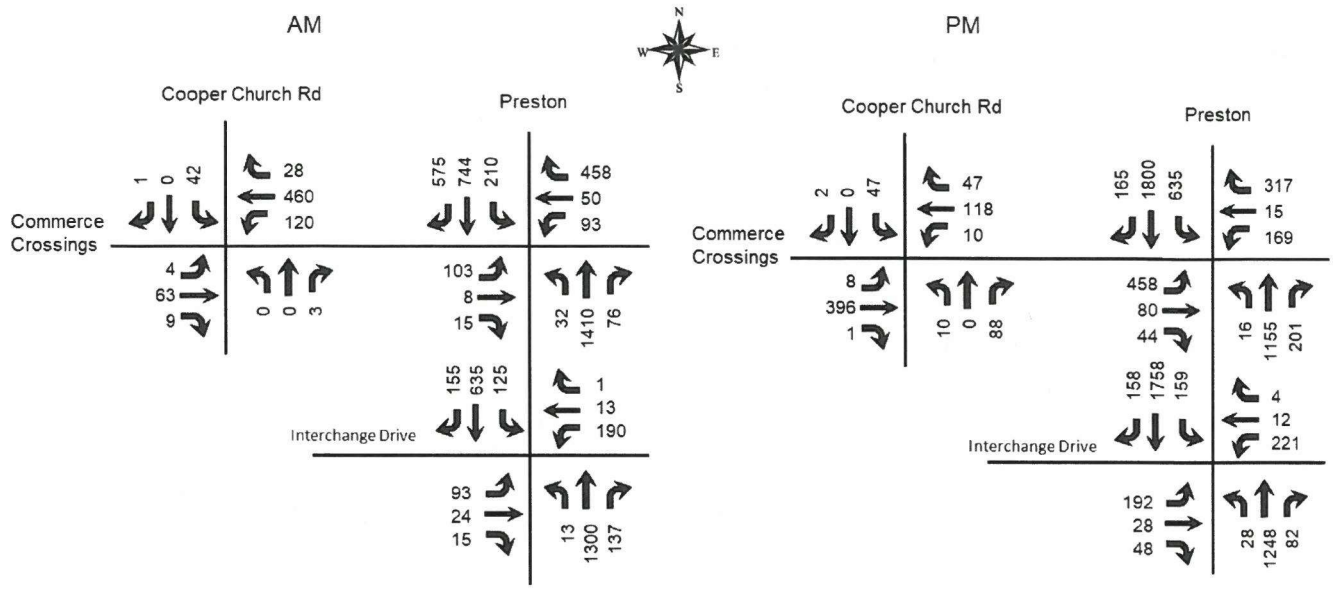



**Figure 3. 2024 No Build Peak Hour Volumes**

## TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land use of "Apartments (220)" "Small Office (712)" and "Warehouse (150)", were reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. **Figure 4** shows the trips distribution percentages. **Figure 5** shows the trips generated by this development and distributed throughout the road network for the year 2024 during the peak hours. **Figure 6** displays the individual turning movements for the year 2024 for the peak hours when the development is completed.

**Table 1. Peak Hour Trips Generated by Site**

| | A.M. Peak Hour | | | P.M. Peak Hour | | |
|---|---|---|---|---|---|---|
| Land Use | Trips | In | Out | Trips | In | Out |
| Apartments (336 units) | 127 | 30 | 97 | 165 | 104 | 61 |
| Office (12,000 sq ft) | 27 | 24 | 3 | 29 | 5 | 24 |
| Warehouse (632,820 sq ft) | 100 | 77 | 23 | 102 | 29 | 73 |
| **TOTAL** | **254** | **131** | **123** | **296** | **138** | **158** |

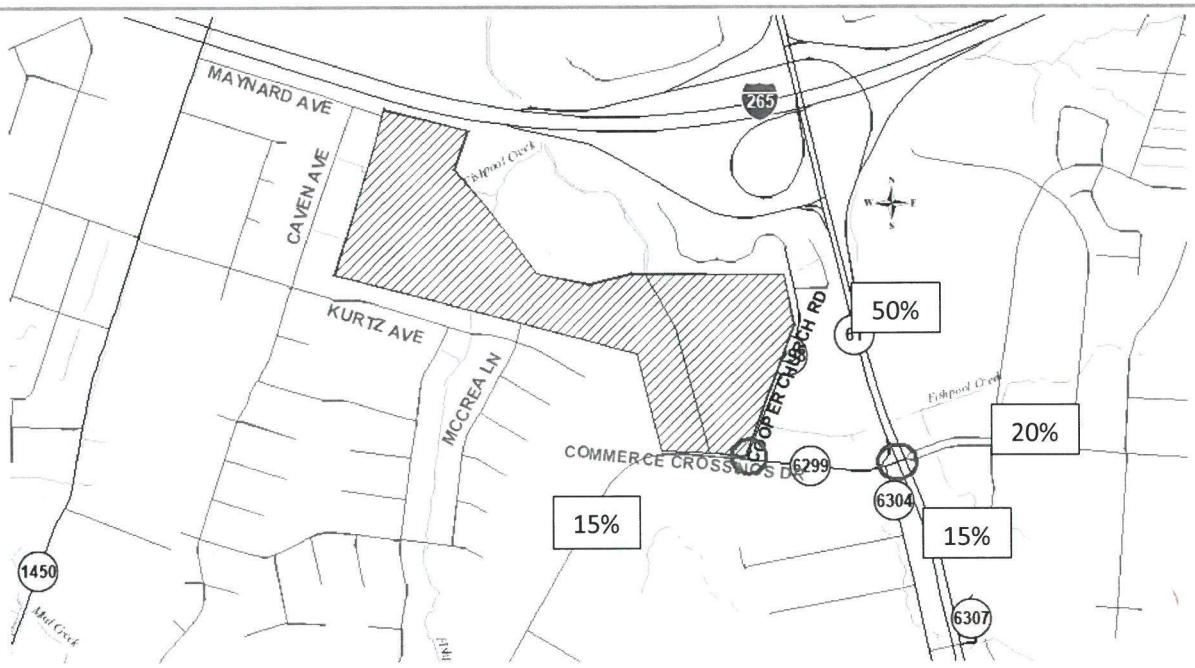



**Figure 4. Trip Distribution Percentages**

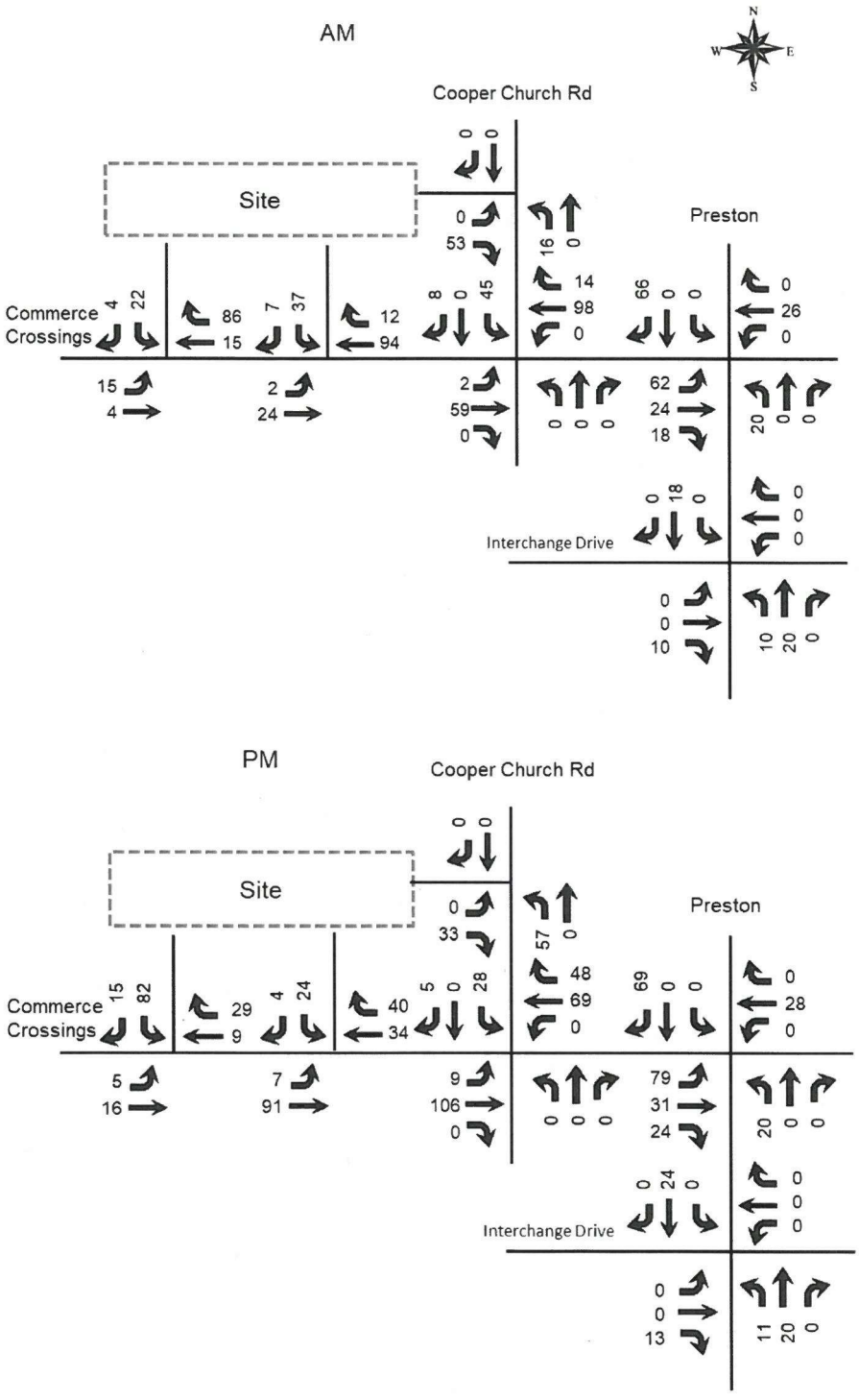



**Figure 5. Peak Hour Trips Generated by Site**

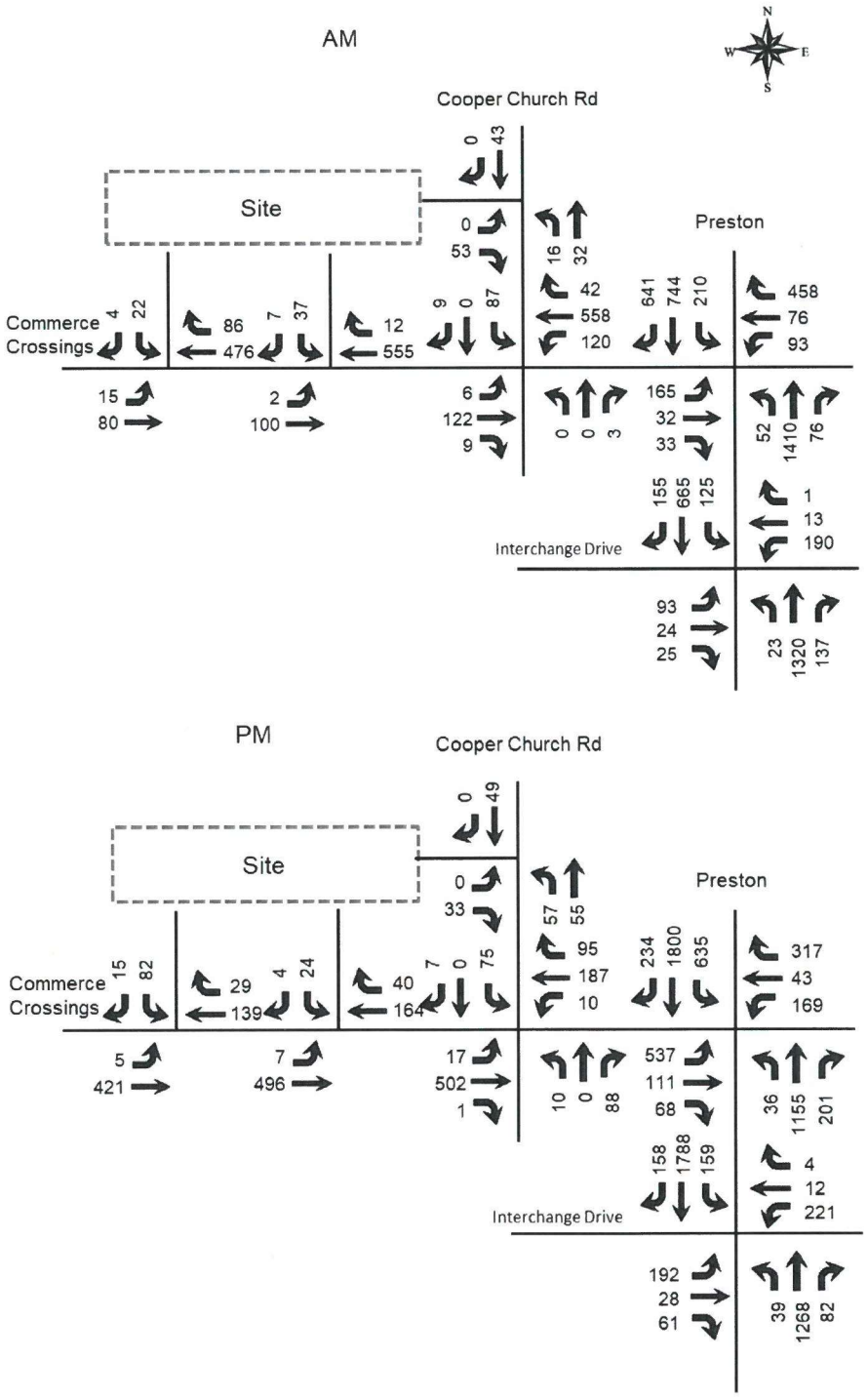



**Figure 6. 2024 Peak Hour Build**

## ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 7th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 2022) software. The delays and Level of Service are summarized in **Table 2**.

**Table 2. Peak Hour Level of Service**

| | A.M. | | | P.M. | | |
|---|---|---|---|---|---|---|
| Approach | 2021 Existing | 2024 No Build | 2024 Build | 2021 Existing | 2024 No Build | 2024 Build |
| **Preston Highway at Cooper Chapel Road** | **C 30.2** | **C 29.9** | **C 32.6** | **D 45.7** | **D 39.5** | **D 42.2** |
| Commerce Crossings Eastbound | E 59.7 | E 56.9 | E 56.1 | E 73.4 | E 73.3 | E 71.5 |
| Cooper Chapel Road Westbound | D 43.7 | D 42.0 | D 44.9 | E 60.9 | E 60.8 | E 61.8 |
| Preston Highway Northbound | C 26.0 | C 25.8 | C 28.4 | D 54.7 | C 29.6 | C 31.7 |
| Preston Highway Southbound | C 25.4 | C 25.4 | C 26.7 | C 31.9 | C 32.5 | D 35.3 |
| **Commerce Crossings Drive at Cooper Church Rd** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | A 8.9 | A 8.9 | A 9.5 | A 7.7 | A 7.7 | A 8.1 |
| Commerce Crossings Drive Westbound (left) | A 7.7 | A 7.7 | A 7.9 | A 8.6 | A 8.7 | A 9.1 |
| Parking Lot Northbound | NA | NA | NA | B 12.3 | B 12.4 | B 14.6 |
| Cooper Church Road Southbound | D 25.2 | D 25.9 | E 49.4 | C 19.0 | C 19.4 | D 28.7 |
| **Commerce Crossings Drive at Entrance** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | | | A 9.4 | | | A 7.7 |
| Entrance Road Southbound | | | B 14.8 | | | B 15.0 |
| **Commerce Crossings Drive at Apartment Entrance** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | | | A 9.3 | | | A 7.8 |
| Entrance Road Southbound | | | C 16.2 | | | B 14.0 |

| Approach | A.M. | | | P.M. | | |
|---|---|---|---|---|---|---|
| | 2021 Existing | 2024 No Build | 2024 Build | 2021 Existing | 2024 No Build | 2024 Build |
| **Copper Church Road at Entrance** | | | | | | |
| Entrance Eastbound | | | A 8.8 | | | A 8.8 |
| Cooper Church Road Northbound | | | A 7.4 | | | A 7.5 |
| **Preston Highway at Interchange Drive** | **A 7.4** | **C 25.9** | **C 26.1** | **B 19.3** | **D 38.8** | **D 39.5** |
| Interchange Drive Eastbound | E 72.6 | E 74.1 | E 73.1 | E 75.0 | F 83.0 | F 82.2 |
| Entrance Westbound | F 87.9 | E 68.0 | E 68.0 | F 84.8 | F 81.2 | F 81.2 |
| Preston Highway Northbound | A 4.1 | B 15.8 | B 16.1 | A 8.8 | C 28.1 | C 28.2 |
| Preston Highway Southbound | A 5.9 | C 23.1 | C 23.0 | B 19.2 | C 34.7 | D 35.8 |

*Key: Level of Service, Delay in seconds per vehicle*

The developer proposed to construct a southbound right turn lane on Cooper Church Road at Commerce Crossings Drive. The turn lane needs to be 100' full width with a 50' taper.

The Kentucky Transportation Cabinet evaluates the need and length of auxiliary turn lanes Highway Design Guidance Manual dated July, 2020. The traffic impact policy requires using volumes for ten years beyond build-out, or 2034. The 2034 volumes were determined applying a one-half percent annual growth rate from 2024. **Figure 7** illustrates the 2034 No Build volumes. Figure 8 illustrates the 2034 Build Volumes. Using the volumes in **Figure 8**.

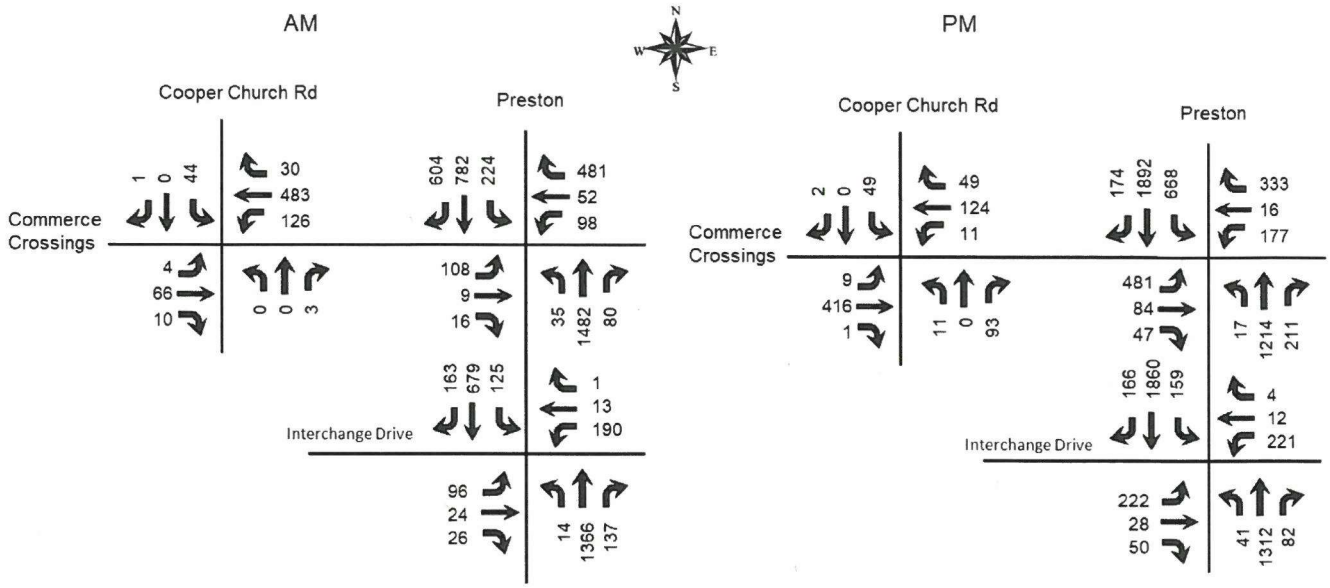
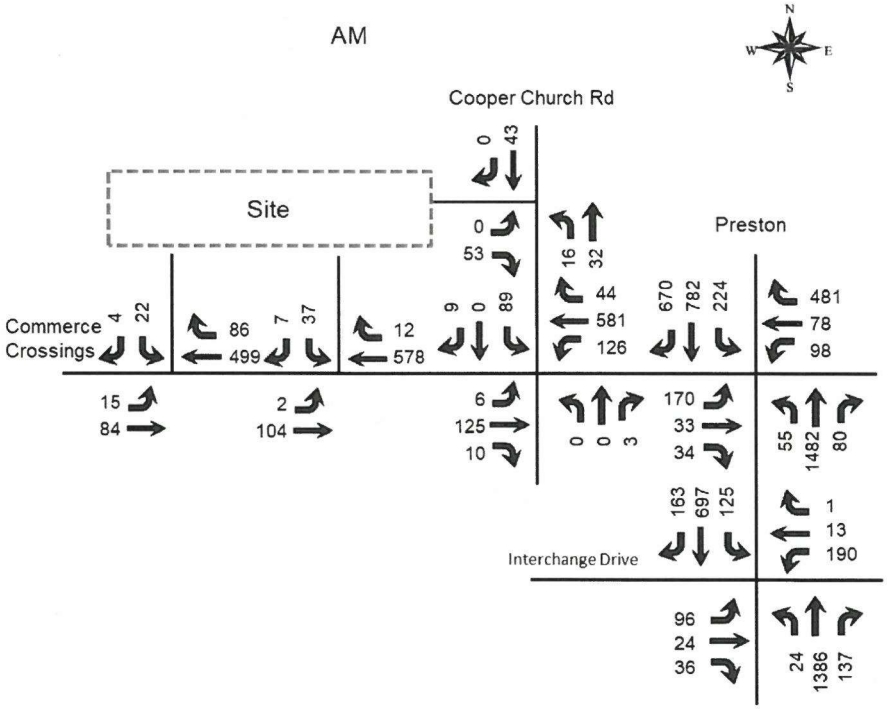



**Figure 7. 2034 Peak Hour No Build**



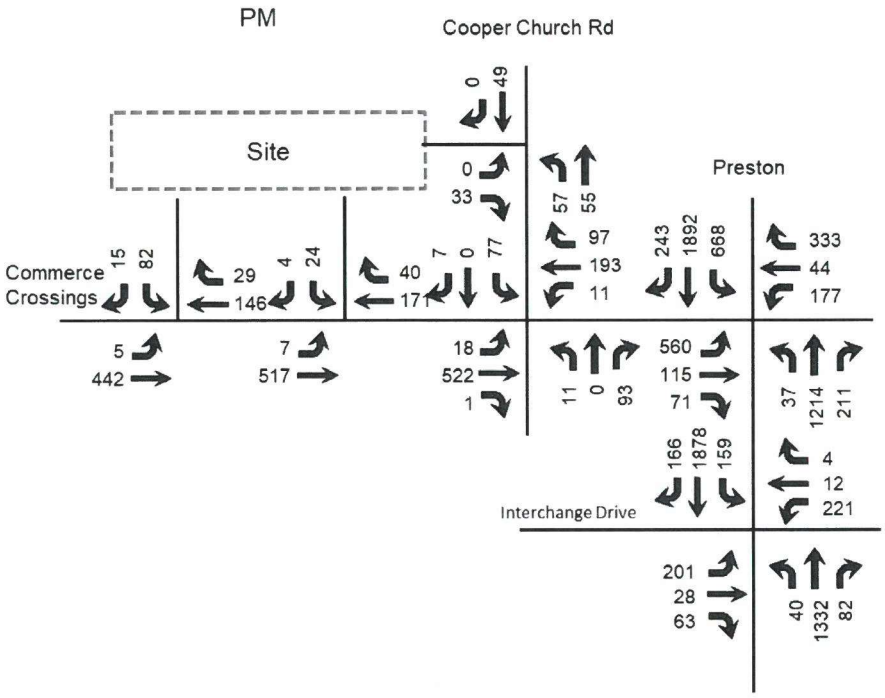



**Figure 8. 2034 Peak Hour Build**

**Table 3. Peak Hour Level of Service for 2034**

| | A.M. | | | P.M. | | |
|---|---|---|---|---|---|---|
| Approach | 2021 Existing | 2034 No Build | 2034 Build | 2021 Existing | 2034 No Build | 2034 Build |
| **Preston Highway at Cooper Chapel Road** | **C 30.2** | **C 31.3** | **C 34.3** | **D 45.7** | **D 41.2** | **D 44.2** |
| Commerce Crossings Eastbound | E 59.7 | E 59.7 | E 59.0 | E 73.4 | E 72.9 | E 71.4 |
| Cooper Chapel Road Westbound | D 43.7 | D 43.9 | D 47.0 | E 60.9 | E 60.0 | E 61.2 |
| Preston Highway Northbound | C 26.0 | C 27.1 | C 30.0 | D 54.7 | C 31.5 | C 33.7 |
| Preston Highway Southbound | C 25.4 | C 26.5 | C 27.9 | C 31.9 | C 34.9 | D 38.3 |
| **Commerce Crossings Drive at Cooper Church Rd** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | A 8.9 | A 9.0 | A 9.6 | A 7.7 | A 7.7 | A 8.1 |
| Commerce Crossings Drive Westbound (left) | A 7.7 | A 7.7 | A 8.0 | A 8.6 | A 8.7 | A 9.2 |
| Parking Lot Northbound | NA | NA | NA | B 12.3 | B 13.0 | C 15.2 |

| Approach | A.M. | | | P.M. | | |
|---|---|---|---|---|---|---|
| | 2021 Existing | 2034 No Build | 2034 Build | 2021 Existing | 2034 No Build | 2034 Build |
| Cooper Church Road Southbound | D 25.2 | D 28.6 | E 49.6 | C 19.0 | C 19.5 | D 32.5 |
| **Commerce Crossings Drive at Entrance** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | | | A 9.6 | | | A 7.7 |
| Entrance Road Southbound | | | C 15.2 | | | C 15.4 |
| **Commerce Crossings Drive at Apartment Entrance** | | | | | | |
| Commerce Crossings Drive Eastbound (left) | | | A 9.4 | | | A 7.8 |
| Entrance Road Southbound | | | C 17.6 | | | B 14.3 |
| **Copper Church Road at Entrance** | | | | | | |
| Entrance Eastbound | | | A 8.8 | | | A 8.8 |
| Cooper Church Road Northbound | | | A 7.4 | | | A 7.5 |
| **Preston Highway at Interchange Drive** | **A 7.4** | **C 26.1** | **C 26.4** | **B 19.3** | **D 40.4** | **D 42.1** |
| Interchange Drive Eastbound | E 72.6 | E 72.9 | E 72.1 | E 75.0 | F 82.5 | F 81.7 |
| Entrance Westbound | F 87.9 | E 68.0 | E 68.0 | F 84.8 | F 81.2 | F 81.2 |
| Preston Highway Northbound | A 4.1 | B 16.1 | B 16.4 | A 8.8 | C 28.6 | C 28.8 |
| Preston Highway Southbound | A 5.9 | C 23.0 | C 23.0 | B 19.2 | D 37.2 | D 40.1 |

## CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2024 and 2034, there will be a minimal impact to the existing highway network. A southbound right turn lane will be provided on Cooper Church Road. The dimensions would be 100 feet of full width with a 50-foot taper.

# APPENDIX

## Traffic Counts

### Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Jefferson County, KY

**Site 1 of 2**
KY-61 Preston Hwy (South)
KY-61 Preston Hwy (North)
Commerce Crossings Dr
Cooper Chapel Rd

**Date**
Tuesday, August 24, 2021

**Lat/Long**
38.103518°, -85.672640°

**Weather**
Fair
87°F

**0700 - 0900 (Weekday 2h Session) (08-24-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KY-61 Preston Hwy (South) | | | | | KY-61 Preston Hwy (North) | | | | | Commerce Crossings Dr | | | | | Cooper Chapel Rd | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| TIME | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 0700 - 0715 | 1 | 341 | 11 | 0 | 353 | 20 | 215 | 84 | 0 | 319 | 28 | 1 | 2 | 0 | 31 | 15 | 8 | 162 | 0 | 185 | 888 |
| 0715 - 0730 | 10 | 369 | 23 | 0 | 402 | 33 | 185 | 111 | 0 | 329 | 22 | 1 | 1 | 0 | 24 | 17 | 8 | 124 | 0 | 149 | 904 |
| 0730 - 0745 | 5 | 363 | 10 | 0 | 378 | 59 | 199 | 128 | 0 | 386 | 25 | 5 | 5 | 0 | 35 | 21 | 13 | 130 | 0 | 164 | 963 |
| 0745 - 0800 | 11 | 305 | 17 | 0 | 333 | 62 | 224 | 192 | 0 | 478 | 29 | 2 | 2 | 0 | 33 | 23 | 20 | 104 | 0 | 147 | 991 |
| Hourly Total | 27 | 1378 | 61 | 0 | **1466** | 174 | 823 | 515 | 0 | **1512** | 104 | 9 | 10 | 0 | **123** | 76 | 49 | 520 | 0 | **645** | **3746** |
| 0800 - 0815 | 6 | 352 | 25 | 0 | 383 | 53 | 165 | 135 | 0 | 353 | 25 | 0 | 7 | 0 | 32 | 31 | 8 | 93 | 0 | 132 | 900 |
| 0815 - 0830 | 3 | 311 | 32 | 0 | 346 | 54 | 165 | 87 | 1 | 307 | 19 | 3 | 2 | 0 | 24 | 22 | 9 | 81 | 0 | 112 | 789 |
| 0830 - 0845 | 3 | 277 | 44 | 0 | 324 | 51 | 165 | 60 | 0 | 276 | 30 | 2 | 6 | 0 | 38 | 24 | 5 | 121 | 0 | 150 | 788 |
| 0845 - 0900 | 5 | 279 | 28 | 0 | 312 | 62 | 188 | 63 | 1 | 314 | 19 | 2 | 3 | 0 | 24 | 24 | 2 | 99 | 0 | 125 | 775 |
| Hourly Total | 17 | 1219 | 129 | 0 | **1365** | 220 | 683 | 345 | 2 | **1250** | 93 | 7 | 18 | 0 | **118** | 101 | 24 | 394 | 0 | **519** | **3252** |
| Grand Total | 44 | 2597 | 190 | 0 | **2831** | 394 | 1506 | 860 | 2 | **2762** | 197 | 16 | 28 | 0 | **241** | 177 | 73 | 914 | 0 | **1164** | **6998** |
| Approach % | 1.55 | 91.73 | 6.71 | 0.00 | - | 14.27 | 54.53 | 31.14 | 0.07 | - | 81.74 | 6.64 | 11.62 | 0.00 | - | 15.21 | 6.27 | 78.52 | 0.00 | - | |
| Intersection % | 0.63 | 37.11 | 2.72 | 0.00 | 40.45 | 5.63 | 21.52 | 12.29 | 0.03 | 39.47 | 2.82 | 0.23 | 0.40 | 0.00 | 3.44 | 2.53 | 1.04 | 13.06 | 0.00 | 16.63 | |
| PHF | 0.73 | 0.94 | 0.75 | 0.00 | **0.93** | 0.83 | 0.86 | 0.74 | 0.00 | **0.81** | 0.87 | 0.40 | 0.54 | 0.00 | **0.89** | 0.74 | 0.61 | 0.87 | 0.00 | **0.90** | **0.95** |

**1600 - 1800 (Weekday 2h Session) (08-24-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KY-61 Preston Hwy (South) | | | | | KY-61 Preston Hwy (North) | | | | | Commerce Crossings Dr | | | | | Cooper Chapel Rd | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| TIME | 1.1 | 1.2 | 1.3 | 1.4 | Total | 1.5 | 1.6 | 1.7 | 1.8 | Total | 1.9 | 1.10 | 1.11 | 1.12 | Total | 1.13 | 1.14 | 1.15 | 1.16 | Total | Total |
| 1600 - 1615 | 3 | 274 | 35 | 0 | 312 | 77 | 330 | 20 | 0 | 427 | 125 | 2 | 5 | 0 | 132 | 38 | 4 | 94 | 0 | 136 | 1007 |
| 1615 - 1630 | 5 | 322 | 42 | 0 | 369 | 135 | 432 | 36 | 0 | 603 | 59 | 12 | 8 | 0 | 79 | 24 | 7 | 73 | 0 | 104 | 1155 |
| 1630 - 1645 | 7 | 289 | 50 | 0 | 346 | 144 | 406 | 41 | 3 | 594 | 138 | 28 | 19 | 0 | 185 | 49 | 3 | 90 | 0 | 142 | 1267 |
| 1645 - 1700 | 2 | 248 | 49 | 0 | 299 | 174 | 472 | 56 | 1 | 703 | 83 | 9 | 9 | 0 | 101 | 46 | 3 | 80 | 0 | 129 | 1232 |
| Hourly Total | 17 | 1133 | 176 | 0 | **1326** | 530 | 1640 | 153 | 4 | **2327** | 405 | 51 | 41 | 0 | **497** | 157 | 17 | 337 | 0 | **511** | **4661** |
| 1700 - 1715 | 2 | 279 | 57 | 0 | 338 | 169 | 463 | 30 | 0 | 662 | 170 | 30 | 8 | 1 | 209 | 47 | 2 | 69 | 0 | 118 | 1327 |
| 1715 - 1730 | 2 | 268 | 54 | 0 | 324 | 158 | 444 | 30 | 2 | 634 | 40 | 5 | 9 | 0 | 54 | 43 | 1 | 90 | 0 | 134 | 1146 |
| 1730 - 1745 | 4 | 241 | 43 | 0 | 288 | 160 | 474 | 30 | 0 | 664 | 69 | 9 | 5 | 0 | 83 | 47 | 4 | 102 | 0 | 153 | 1188 |
| 1745 - 1800 | 2 | 250 | 44 | 0 | 296 | 117 | 380 | 30 | 2 | 529 | 43 | 6 | 9 | 0 | 58 | 46 | 0 | 81 | 0 | 127 | 1010 |
| Hourly Total | 10 | 1038 | 198 | 0 | **1246** | 604 | 1761 | 120 | 4 | **2489** | 322 | 50 | 31 | 1 | **404** | 183 | 7 | 342 | 0 | **532** | **4671** |
| Grand Total | 27 | 2171 | 374 | 0 | **2572** | 1134 | 3401 | 273 | 8 | **4816** | 727 | 101 | 72 | 1 | **901** | 340 | 24 | 679 | 0 | **1043** | **9332** |
| Approach % | 1.05 | 84.41 | 14.54 | 0.00 | - | 23.55 | 70.62 | 5.67 | 0.17 | - | 80.69 | 11.21 | 7.99 | 0.11 | - | 32.60 | 2.30 | 65.10 | 0.00 | - | |
| Intersection % | 0.29 | 23.26 | 4.01 | 0.00 | 27.56 | 12.15 | 36.44 | 2.93 | 0.09 | 51.61 | 7.79 | 1.08 | 0.77 | 0.01 | 9.65 | 3.64 | 0.26 | 7.28 | 0.00 | 11.18 | |
| PHF | 0.57 | 0.88 | 0.87 | 0.00 | **0.92** | 0.89 | 0.94 | 0.73 | 0.33 | **0.91** | 0.66 | 0.66 | 0.58 | 0.25 | **0.69** | 0.85 | 0.54 | 0.87 | 0.00 | **0.87** | **0.94** |

## Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Jefferson County, KY

**Site 2 of 2**
Driveway
Cooper Church Dr
Commerce Crossings Dr (West)
Commerce Crossings Dr (East)

**Date**
Tuesday, August 24, 2021

**Lat/Long**
38.103540°, -85.676436°

**Weather**
Fair
87°F

**0700 - 0900 (Weekday 2h Session) (08-24-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Cooper Church Dr | | | | | Commerce Crossings Dr (West) | | | | | Commerce Crossings Dr (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| TIME | 2.1 | 2.2 | 2.3 | 2.4 | Total | 2.5 | 2.6 | 2.7 | 2.8 | Total | 2.9 | 2.10 | 2.11 | 2.12 | Total | 2.13 | 2.14 | 2.15 | 2.16 | Total | Total |
| 0700 - 0715 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 1 | 0 | 14 | 2 | 16 | 0 | 0 | 18 | 10 | 74 | 3 | 0 | 87 | 119 |
| 0715 - 0730 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 1 | 0 | 9 | 1 | 9 | 3 | 0 | 13 | 31 | 90 | 5 | 0 | 126 | 148 |
| 0730 - 0745 | 0 | 0 | 1 | 0 | 1 | 9 | 0 | 0 | 0 | 9 | 2 | 20 | 2 | 0 | 24 | 24 | 96 | 8 | 0 | 128 | 162 |
| 0745 - 0800 | 0 | 0 | 1 | 0 | 1 | 9 | 0 | 0 | 0 | 9 | 3 | 20 | 4 | 0 | 27 | 40 | 169 | 5 | 0 | 214 | 251 |
| Hourly Total | 0 | 0 | 2 | 0 | **2** | 39 | 0 | 2 | 0 | **41** | 8 | 65 | 9 | 0 | **82** | 105 | 429 | 21 | 0 | **555** | **680** |
| 0800 - 0815 | 0 | 0 | 1 | 0 | 1 | 17 | 0 | 0 | 0 | 17 | 0 | 13 | 0 | 0 | 13 | 23 | 98 | 10 | 0 | 131 | 162 |
| 0815 - 0830 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 1 | 1 | 11 | 0 | 12 | 0 | 0 | 12 | 13 | 75 | 4 | 0 | 92 | 115 |
| 0830 - 0845 | 0 | 0 | 2 | 0 | 2 | 15 | 0 | 2 | 0 | 17 | 0 | 20 | 1 | 0 | 21 | 12 | 46 | 6 | 0 | 64 | 104 |
| 0845 - 0900 | 1 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 4 | 1 | 12 | 0 | 0 | 13 | 8 | 50 | 4 | 0 | 62 | 80 |
| Hourly Total | 1 | 0 | 3 | 0 | **4** | 45 | 0 | 3 | 1 | **49** | 1 | 57 | 1 | 0 | **59** | 56 | 269 | 24 | 0 | **349** | **461** |
| Grand Total | 1 | 0 | 5 | 0 | **6** | 84 | 0 | 5 | 1 | **90** | 9 | 122 | 10 | 0 | **141** | 161 | 698 | 45 | 0 | **904** | **1141** |
| Approach % | 16.67 | 0.00 | 83.33 | 0.00 | - | 93.33 | 0.00 | 5.56 | 1.11 | - | 6.38 | 86.52 | 7.09 | 0.00 | - | 17.81 | 77.21 | 4.98 | 0.00 | - | |
| Intersection % | 0.09 | 0.00 | 0.44 | 0.00 | 0.53 | 7.36 | 0.00 | 0.44 | 0.09 | 7.89 | 0.79 | 10.69 | 0.88 | 0.00 | 12.36 | 14.11 | 61.17 | 3.94 | 0.00 | 79.23 | |
| PHF | 0.00 | 0.00 | 0.75 | 0.00 | **0.75** | 0.63 | 0.00 | 0.25 | 0.00 | **0.65** | 0.50 | 0.78 | 0.56 | 0.00 | **0.71** | 0.74 | 0.67 | 0.70 | 0.00 | **0.70** | **0.72** |

**1600 - 1800 (Weekday 2h Session) (08-24-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Driveway | | | | | Cooper Church Dr | | | | | Commerce Crossings Dr (West) | | | | | Commerce Crossings Dr (East) | | | | | |
| | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Left | Thru | Right | U-Turn | App | Int |
| TIME | 2.1 | 2.2 | 2.3 | 2.4 | Total | 2.5 | 2.6 | 2.7 | 2.8 | Total | 2.9 | 2.10 | 2.11 | 2.12 | Total | 2.13 | 2.14 | 2.15 | 2.16 | Total | Total |
| 1600 - 1615 | 0 | 0 | 17 | 0 | 17 | 9 | 0 | 1 | 0 | 10 | 0 | 125 | 0 | 0 | 125 | 3 | 15 | 7 | 0 | 25 | 177 |
| 1615 - 1630 | 0 | 0 | 9 | 0 | 9 | 9 | 0 | 1 | 0 | 10 | 3 | 54 | 0 | 0 | 57 | 3 | 28 | 10 | 1 | 42 | 118 |
| 1630 - 1645 | 6 | 0 | 53 | 0 | 59 | 15 | 0 | 0 | 0 | 15 | 1 | 92 | 1 | 0 | 94 | 3 | 30 | 11 | 0 | 44 | 212 |
| 1645 - 1700 | 1 | 0 | 14 | 0 | 15 | 11 | 0 | 0 | 0 | 11 | 3 | 66 | 0 | 0 | 69 | 0 | 38 | 13 | 0 | 51 | 146 |
| Hourly Total | 7 | 0 | 93 | 0 | **100** | 44 | 0 | 2 | 0 | **46** | 7 | 337 | 1 | 0 | **345** | 9 | 111 | 41 | 1 | **162** | **653** |
| 1700 - 1715 | 3 | 0 | 11 | 0 | 14 | 11 | 0 | 1 | 0 | 12 | 1 | 178 | 0 | 0 | 179 | 2 | 20 | 12 | 1 | 35 | 240 |
| 1715 - 1730 | 0 | 0 | 6 | 0 | 6 | 4 | 0 | 1 | 0 | 5 | 1 | 40 | 0 | 0 | 41 | 0 | 14 | 12 | 0 | 26 | 78 |
| 1730 - 1745 | 0 | 0 | 12 | 0 | 12 | 10 | 0 | 0 | 0 | 10 | 2 | 40 | 0 | 0 | 42 | 1 | 14 | 13 | 0 | 28 | 92 |
| 1745 - 1800 | 1 | 0 | 12 | 0 | 13 | 8 | 0 | 1 | 0 | 9 | 0 | 27 | 1 | 0 | 28 | 0 | 13 | 15 | 0 | 28 | 78 |
| Hourly Total | 4 | 0 | 41 | 0 | **45** | 33 | 0 | 3 | 0 | **36** | 4 | 285 | 1 | 0 | **290** | 3 | 61 | 52 | 1 | **117** | **488** |
| Grand Total | 11 | 0 | 134 | 0 | **145** | 77 | 0 | 5 | 0 | **82** | 11 | 622 | 2 | 0 | **635** | 12 | 172 | 93 | 2 | **279** | **1141** |
| Approach % | 7.59 | 0.00 | 92.41 | 0.00 | - | 93.90 | 0.00 | 6.10 | 0.00 | - | 1.73 | 97.95 | 0.31 | 0.00 | - | 4.30 | 61.65 | 33.33 | 0.72 | - | |
| Intersection % | 0.96 | 0.00 | 11.74 | 0.00 | 12.71 | 6.75 | 0.00 | 0.44 | 0.00 | 7.19 | 0.96 | 54.51 | 0.18 | 0.00 | 55.65 | 1.05 | 15.07 | 8.15 | 0.18 | 24.45 | |
| PHF | 0.42 | 0.00 | 0.41 | 0.00 | **0.41** | 0.77 | 0.00 | 0.50 | 0.00 | **0.80** | 0.67 | 0.55 | 0.25 | 0.00 | **0.56** | 0.67 | 0.76 | 0.88 | 0.50 | **0.84** | **0.75** |

## Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
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Preston Highway, KY

**Site 2 of 3**
KY-61 Preston Hwy (South)
KY-61 Preston Hwy (North)
Old Preston Hwy
Local Rd

**Date**
Tuesday, April 13, 2021

**Lat/Long**
38.096348°, -85.670213°

**Weather**
Cloudy
61°F

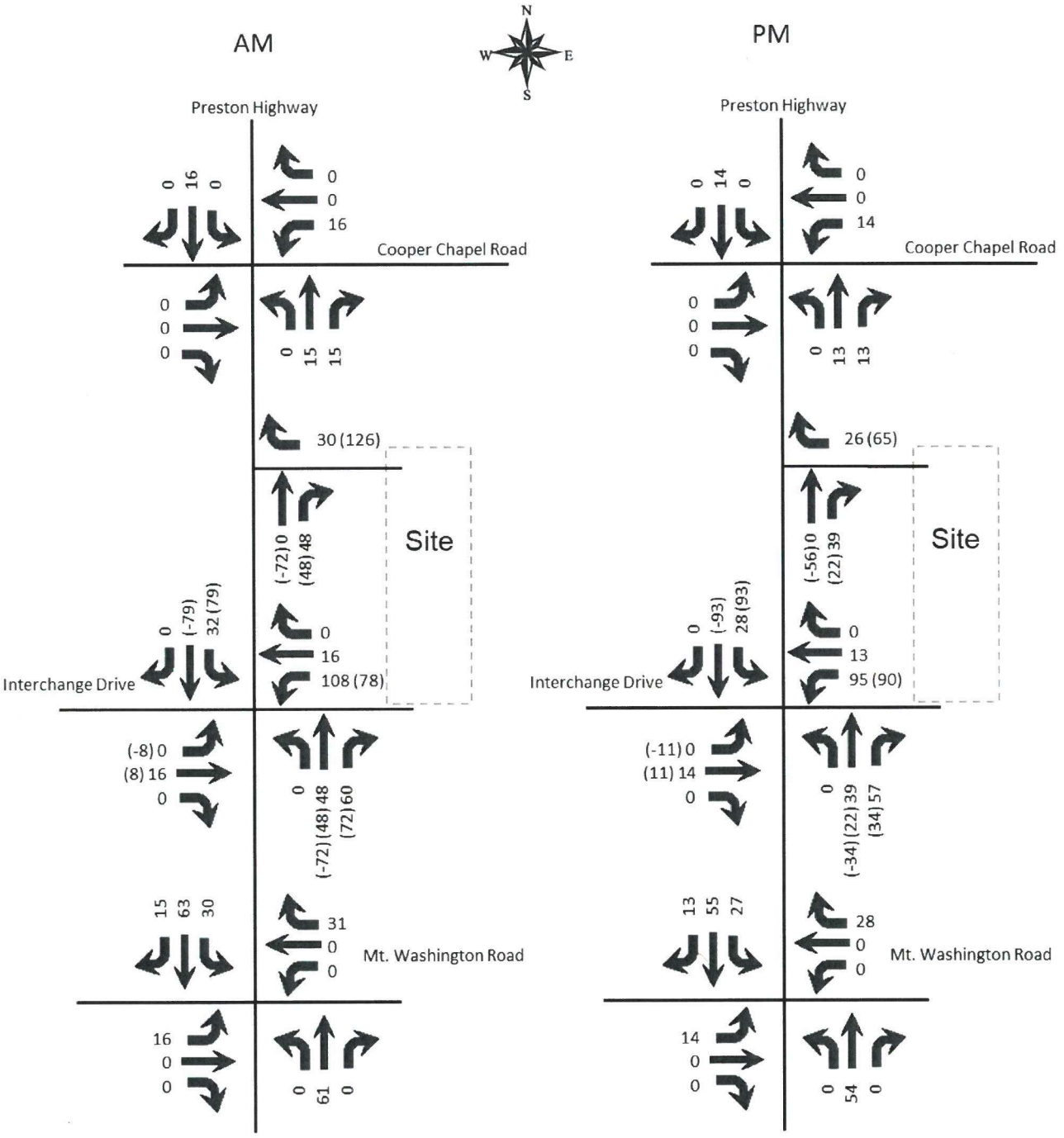
**0700 - 0900 (Weekday 2h Session) (13-04-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KY-61 Preston Hwy (South) | | | | | KY-61 Preston Hwy (North) | | | | | Old Preston Hwy | | | | | Local Rd | | | | | |
| TIME | Left 2.1 | Thru 2.2 | Right 2.3 | U-Turn 2.4 | App Total | Left 2.5 | Thru 2.6 | Right 2.7 | U-Turn 2.8 | App Total | Left 2.9 | Thru 2.10 | Right 2.11 | U-Turn 2.12 | App Total | Left 2.13 | Thru 2.14 | Right 2.15 | U-Turn 2.16 | App Total | Int Total |
| 0700 - 0715 | 5 | 314 | 0 | 0 | 319 | 0 | 100 | 52 | 0 | 152 | 23 | 0 | 2 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 496 |
| 0715 - 0730 | 0 | 331 | 0 | 0 | 331 | 0 | 147 | 65 | 0 | 212 | 22 | 0 | 2 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 567 |
| 0730 - 0745 | 4 | 398 | 1 | 0 | 403 | 0 | 175 | 33 | 0 | 208 | 19 | 0 | 3 | 0 | 22 | 1 | 0 | 0 | 0 | 1 | 634 |
| 0745 - 0800 | 4 | 299 | 1 | 1 | 305 | 0 | 199 | 32 | 0 | 231 | 14 | 0 | 7 | 0 | 21 | 0 | 0 | 1 | 0 | 1 | 558 |
| Hourly Total | 13 | 1342 | 2 | 1 | **1358** | 0 | 621 | 182 | 0 | **803** | 78 | 0 | 14 | 0 | **92** | 1 | 0 | 1 | 0 | **2** | **2255** |
| 0800 - 0815 | 0 | 287 | 1 | 1 | 289 | 0 | 200 | 22 | 1 | 223 | 12 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 527 |
| 0815 - 0830 | 2 | 257 | 0 | 0 | 259 | 1 | 167 | 14 | 0 | 182 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 450 |
| 0830 - 0845 | 0 | 283 | 0 | 0 | 283 | 1 | 198 | 13 | 0 | 212 | 20 | 0 | 3 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 518 |
| 0845 - 0900 | 2 | 279 | 1 | 0 | 282 | 0 | 234 | 16 | 0 | 250 | 11 | 0 | 1 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 545 |
| Hourly Total | 4 | 1106 | 2 | 1 | **1113** | 2 | 799 | 65 | 1 | **867** | 52 | 0 | 7 | 1 | **60** | 0 | 0 | 0 | 0 | **0** | **2040** |
| Grand Total | 17 | 2448 | 4 | 2 | **2471** | 2 | 1420 | 247 | 1 | **1670** | 130 | 0 | 21 | 1 | **152** | 1 | 0 | 1 | 0 | **2** | **4295** |
| Approach % | 0.69 | 99.07 | 0.16 | 0.08 | - | 0.12 | 85.03 | 14.79 | 0.06 | - | 85.53 | 0.00 | 13.82 | 0.66 | - | 50.00 | 0.00 | 50.00 | 0.00 | - | |
| Intersection % | 0.40 | 57.00 | 0.09 | 0.05 | 57.53 | 0.05 | 33.06 | 5.75 | 0.02 | 38.88 | 3.03 | 0.00 | 0.49 | 0.02 | 3.54 | 0.02 | 0.00 | 0.02 | 0.00 | 0.05 | |
| PHF | 0.50 | 0.83 | 0.75 | 0.50 | **0.82** | 0.00 | 0.90 | 0.58 | 0.25 | **0.95** | 0.76 | 0.00 | 0.54 | 0.00 | **0.85** | 0.25 | 0.00 | 0.25 | 0.00 | **0.50** | **0.90** |

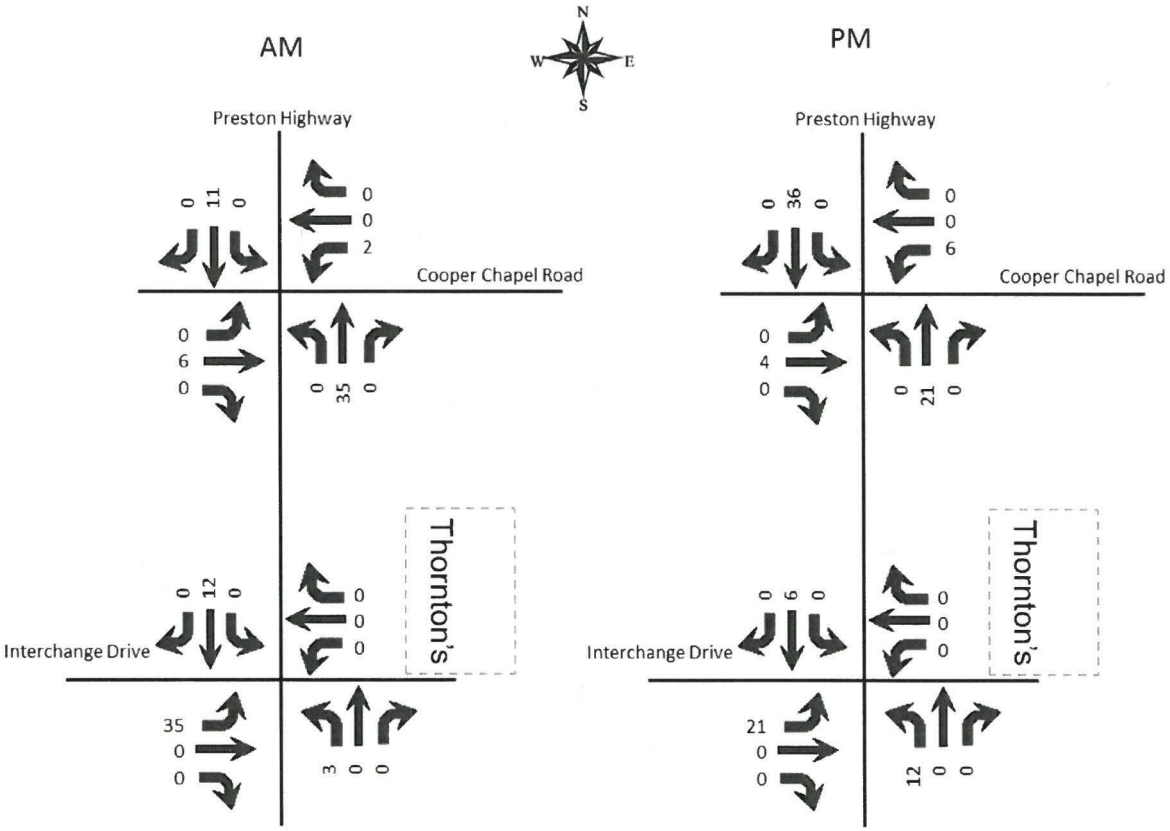
**1600 - 1800 (Weekday 2h Session) (13-04-2021)**
All vehicles

| | Northbound | | | | | Southbound | | | | | Eastbound | | | | | Westbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KY-61 Preston Hwy (South) | | | | | KY-61 Preston Hwy (North) | | | | | Old Preston Hwy | | | | | Local Rd | | | | | |
| TIME | Left 2.1 | Thru 2.2 | Right 2.3 | U-Turn 2.4 | App Total | Left 2.5 | Thru 2.6 | Right 2.7 | U-Turn 2.8 | App Total | Left 2.9 | Thru 2.10 | Right 2.11 | U-Turn 2.12 | App Total | Left 2.13 | Thru 2.14 | Right 2.15 | U-Turn 2.16 | App Total | Int Total |
| 1600 - 1615 | 0 | 295 | 2 | 0 | 297 | 0 | 391 | 32 | 0 | 423 | 67 | 0 | 15 | 0 | 82 | 1 | 1 | 1 | 0 | 3 | 805 |
| 1615 - 1630 | 6 | 289 | 2 | 0 | 297 | 1 | 467 | 29 | 0 | 497 | 36 | 0 | 16 | 0 | 52 | 0 | 0 | 3 | 0 | 3 | 849 |
| 1630 - 1645 | 1 | 310 | 0 | 0 | 311 | 0 | 424 | 33 | 2 | 459 | 62 | 0 | 17 | 0 | 79 | 0 | 0 | 1 | 0 | 1 | 850 |
| 1645 - 1700 | 1 | 325 | 1 | 0 | 327 | 0 | 445 | 45 | 0 | 490 | 44 | 0 | 13 | 0 | 57 | 1 | 0 | 1 | 0 | 2 | 876 |
| Hourly Total | 8 | 1219 | 5 | 0 | **1232** | 1 | 1727 | 139 | 2 | **1869** | 209 | 0 | 61 | 0 | **270** | 2 | 1 | 6 | 0 | **9** | **3380** |
| 1700 - 1715 | 3 | 286 | 0 | 0 | 289 | 0 | 464 | 35 | 0 | 499 | 43 | 0 | 12 | 0 | 55 | 1 | 0 | 2 | 0 | 3 | 846 |
| 1715 - 1730 | 3 | 296 | 1 | 2 | 302 | 0 | 481 | 39 | 0 | 520 | 45 | 0 | 13 | 0 | 58 | 1 | 0 | 1 | 0 | 2 | 882 |
| 1730 - 1745 | 7 | 315 | 0 | 0 | 322 | 0 | 477 | 36 | 0 | 513 | 52 | 0 | 10 | 0 | 62 | 0 | 0 | 0 | 0 | 0 | 897 |
| 1745 - 1800 | 7 | 297 | 0 | 1 | 305 | 0 | 397 | 41 | 0 | 438 | 35 | 0 | 3 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 781 |
| Hourly Total | 20 | 1194 | 1 | 3 | **1218** | 0 | 1819 | 151 | 0 | **1970** | 175 | 0 | 38 | 0 | **213** | 2 | 0 | 3 | 0 | **5** | **3406** |
| Grand Total | 28 | 2413 | 6 | 3 | **2450** | 1 | 3546 | 290 | 2 | **3839** | 384 | 0 | 99 | 0 | **483** | 4 | 1 | 9 | 0 | **14** | **6786** |
| Approach % | 1.14 | 98.49 | 0.24 | 0.12 | - | 0.03 | 92.37 | 7.55 | 0.05 | - | 79.50 | 0.00 | 20.50 | 0.00 | - | 28.57 | 7.14 | 64.29 | 0.00 | - | |
| Intersection % | 0.41 | 35.56 | 0.09 | 0.04 | 36.10 | 0.01 | 52.25 | 4.27 | 0.03 | 56.57 | 5.66 | 0.00 | 1.46 | 0.00 | 7.12 | 0.06 | 0.01 | 0.13 | 0.00 | 0.21 | |
| PHF | 0.50 | 0.94 | 0.50 | 0.25 | **0.95** | 0.00 | 0.97 | 0.86 | 0.00 | **0.97** | 0.88 | 0.00 | 0.92 | 0.00 | **0.94** | 0.75 | 0.00 | 0.50 | 0.00 | **0.58** | **0.98** |

TRIP DISTRIBUTION "Preston Highway TIS"



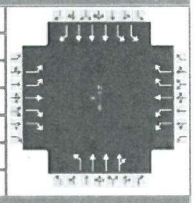
TRIP DISTRIBUTION "Apartments Old Preston Highway TIS"



## HCS Reports

### HCS7 Signalized Intersection Results Summary

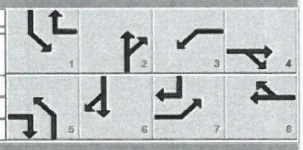
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Nov 10, 2021 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.95 |
| Urban Street | Preston Highway | Analysis Year | 2021 | Analysis Period | 1> 7:15 |
| Intersection | Cooper Chapel Road | File Name | AM 21 Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( v ), veh/h | 101 | 8 | 15 | 92 | 49 | 451 | 32 | 1389 | 75 | 207 | 733 | 566 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 126.8 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | Yes | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | 4.7 | | 58.5 | 7.0 | 0.2 | 25.2 | | | | | |
| Yellow | 3.5 | 0.0 | | 4.3 | 3.5 | 0.0 | 3.6 | | | | | |
| Red | 3.0 | 0.0 | | 1.9 | 3.0 | 0.0 | 2.4 | | | | | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 13.7 | 31.4 | 13.5 | 31.2 | 12.5 | 64.7 | 17.2 | 69.4 |
| Change Period, ( Y+R c ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( MAH ), s | 5.6 | 5.8 | 5.1 | 5.8 | 3.0 | 4.9 | 4.0 | 4.9 |
| Queue Clearance Time ( g s ), s | 6.4 | 2.6 | 5.5 | 20.4 | 4.1 | 25.7 | 9.9 | 14.5 |
| Green Extension Time ( g e ), s | 0.8 | 4.4 | 0.4 | 4.8 | 0.0 | 32.7 | 0.8 | 34.3 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Max Out Probability | 0.00 | 0.03 | 0.00 | 0.01 | 0.00 | 0.22 | 0.00 | 0.17 |

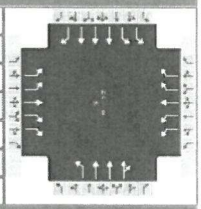
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( v ), veh/h | 106 | 8 | 16 | 97 | 52 | 475 | 31 | 963 | 468 | 218 | 772 | 280 |
| Adjusted Saturation Flow Rate ( s ), veh/h/ln | 1510 | 1900 | 1203 | 1702 | 1900 | 1414 | 1810 | 1870 | 1819 | 1716 | 1658 | 1547 |
| Queue Service Time ( g s ), s | 4.4 | 0.5 | 0.6 | 3.5 | 2.8 | 18.4 | 2.1 | 23.7 | 23.7 | 7.9 | 11.7 | 12.5 |
| Cycle Queue Clearance Time ( g c ), s | 4.4 | 0.5 | 0.6 | 3.5 | 2.8 | 18.4 | 2.1 | 23.7 | 23.7 | 7.9 | 11.7 | 12.5 |
| Green Ratio ( g/C ) | 0.06 | 0.20 | 0.25 | 0.06 | 0.20 | 0.28 | 0.05 | 0.46 | 0.46 | 0.08 | 0.50 | 0.56 |
| Capacity ( c ), veh/h | 171 | 381 | 596 | 188 | 378 | 801 | 86 | 1727 | 840 | 290 | 2480 | 859 |
| Volume-to-Capacity Ratio ( X ) | 0.622 | 0.022 | 0.027 | 0.516 | 0.137 | 0.593 | 0.366 | 0.558 | 0.558 | 0.752 | 0.311 | 0.326 |
| Back of Queue ( Q ), ft/ln ( 95 th percentile) | 93.1 | 9.7 | 9.8 | 73.5 | 61.2 | 265.2 | 43.5 | 372.2 | 360.4 | 160 | 198.2 | 193.6 |
| Back of Queue ( Q ), veh/ln ( 95 th percentile) | 3.3 | 0.4 | 0.3 | 2.8 | 2.4 | 10.5 | 1.7 | 14.7 | 14.4 | 6.2 | 7.6 | 7.4 |
| Queue Storage Ratio ( RQ ) ( 95 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.29 | 0.20 | 0.97 |
| Uniform Delay ( d 1 ), s/veh | 58.5 | 40.8 | 36.2 | 58.3 | 41.9 | 39.2 | 58.6 | 24.8 | 24.8 | 56.8 | 18.9 | 15.3 |
| Incremental Delay ( d 2 ), s/veh | 6.2 | 0.0 | 0.0 | 3.0 | 0.3 | 1.2 | 0.8 | 0.3 | 0.7 | 3.9 | 0.1 | 0.3 |
| Initial Queue Delay ( d 3 ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( d ), s/veh | 64.7 | 40.8 | 36.2 | 61.3 | 42.1 | 40.3 | 59.4 | 25.1 | 25.5 | 60.7 | 19.0 | 15.6 |
| Level of Service (LOS) | E | D | D | E | D | D | E | C | C | E | B | B |
| Approach Delay, s/veh / LOS | 59.7 | E | | 43.7 | D | | 26.0 | C | | 25.4 | C | |
| Intersection Delay, s/veh / LOS | 30.2 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.60 | C | 3.28 | C | 2.57 | C | 2.42 | B |
| Bicycle LOS Score / LOS | 0.70 | A | 1.52 | B | 1.35 | A | 1.19 | A |

 HCS™ Streets Version 7.9.5 Generated: 11/10/2021 11:03:46 PM

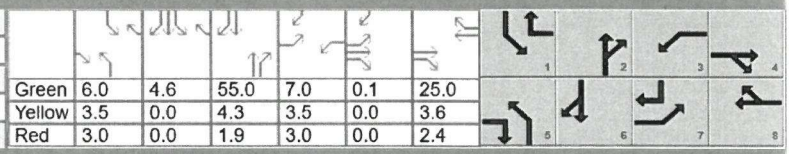
## HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.95 |
| Urban Street | Preston Highway | Analysis Year | 2024 No Build | Analysis Period | 1> 7:15 |
| Intersection | Cooper Chapel Road | File Name | AM 24 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 103 | 14 | 15 | 95 | 50 | 458 | 32 | 1445 | 76 | 210 | 755 | 575 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 122.9 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | Yes | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |



| | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | | 4.6 | 55.0 | | 7.0 | 0.1 | | 25.0 | | | |
| Yellow | 3.5 | | 0.0 | 4.3 | | 3.5 | 0.0 | | 3.6 | | | |
| Red | 3.0 | | 0.0 | 1.9 | | 3.0 | 0.0 | | 2.4 | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 13.6 | 31.1 | 13.5 | 31.0 | 12.5 | 61.2 | 17.1 | 65.8 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.8 | 5.1 | 5.8 | 3.0 | 4.9 | 4.0 | 4.9 |
| Queue Clearance Time ( *g s* ), s | 6.3 | 2.8 | 5.5 | 20.0 | 3.8 | 23.5 | 9.7 | 14.9 |
| Green Extension Time ( *g e* ), s | 0.8 | 4.6 | 0.4 | 5.0 | 0.0 | 31.4 | 0.8 | 32.4 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Max Out Probability | 0.00 | 0.04 | 0.00 | 0.01 | 0.00 | 0.19 | 0.00 | 0.15 |

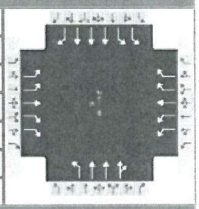
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 108 | 15 | 16 | 100 | 53 | 482 | 28 | 900 | 438 | 221 | 795 | 289 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1510 | 1900 | 1203 | 1702 | 1900 | 1414 | 1810 | 1870 | 1820 | 1716 | 1658 | 1547 |
| Queue Service Time ( *g s* ), s | 4.3 | 0.8 | 0.6 | 3.5 | 2.8 | 18.0 | 1.8 | 21.5 | 21.5 | 7.7 | 12.1 | 12.9 |
| Cycle Queue Clearance Time ( *g c* ), s | 4.3 | 0.8 | 0.6 | 3.5 | 2.8 | 18.0 | 1.8 | 21.5 | 21.5 | 7.7 | 12.1 | 12.9 |
| Green Ratio ( *g/C* ) | 0.06 | 0.20 | 0.25 | 0.06 | 0.20 | 0.29 | 0.05 | 0.45 | 0.45 | 0.09 | 0.48 | 0.54 |
| Capacity ( *c* ), veh/h | 176 | 389 | 609 | 194 | 386 | 818 | 88 | 1675 | 815 | 295 | 2412 | 840 |
| Volume-to-Capacity Ratio ( *X* ) | 0.617 | 0.038 | 0.026 | 0.516 | 0.136 | 0.589 | 0.319 | 0.537 | 0.537 | 0.748 | 0.329 | 0.344 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 3.2 | 0.7 | 0.3 | 2.8 | 2.4 | 10.3 | 1.5 | 13.5 | 13.3 | 6.1 | 7.8 | 7.7 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 0.20 | 1.00 |
| Uniform Delay ( *d 1* ), s/veh | 56.6 | 39.2 | 34.5 | 56.4 | 40.2 | 37.4 | 56.5 | 24.7 | 24.7 | 54.9 | 19.4 | 15.8 |
| Incremental Delay ( *d 2* ), s/veh | 5.9 | 0.1 | 0.0 | 2.9 | 0.3 | 1.1 | 0.6 | 0.3 | 0.7 | 3.8 | 0.1 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 62.5 | 39.3 | 34.6 | 59.3 | 40.4 | 38.6 | 57.2 | 25.0 | 25.4 | 58.7 | 19.5 | 16.1 |
| Level of Service (LOS) | E | D | C | E | D | D | E | C | C | E | B | B |
| Approach Delay, s/veh / LOS | 56.9 | E | | 42.0 | D | | 25.8 | C | | 25.4 | C | |
| Intersection Delay, s/veh / LOS | 29.9 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.60 | C | 3.28 | C | 2.57 | C | 2.42 | B |
| Bicycle LOS Score / LOS | 0.72 | A | 1.53 | B | 1.39 | A | 1.21 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:22:02 AM

## HCS Signalized Intersection Results Summary

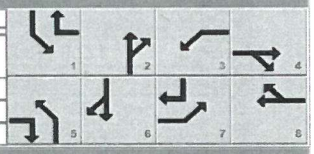
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.95 |
| Urban Street | Preston Highway | Analysis Year | 2024 Build | Analysis Period | 1> 7:15 |
| Intersection | Cooper Chapel Road | File Name | AM 24 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 165 | 38 | 33 | 95 | 76 | 458 | 52 | 1445 | 76 | 210 | 755 | 641 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 130.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | Yes | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 5.0 | 57.1 | 7.0 | 3.7 | 26.0 | |
| Yellow | 3.5 | 0.0 | 4.3 | 3.5 | 0.0 | 3.6 | |
| Red | 3.0 | 0.0 | 1.9 | 3.0 | 0.0 | 2.4 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 17.2 | 35.7 | 13.5 | 32.0 | 12.5 | 63.3 | 17.5 | 68.3 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.7 | 5.1 | 5.7 | 3.0 | 4.9 | 4.0 | 4.9 |
| Queue Clearance Time ( $g_s$ ), s | 9.3 | 4.2 | 5.7 | 21.1 | 5.2 | 24.6 | 10.2 | 19.3 |
| Green Extension Time ( $g_e$ ), s | 1.4 | 4.9 | 0.4 | 4.8 | 0.1 | 32.4 | 0.8 | 33.2 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Max Out Probability | 0.00 | 0.07 | 0.00 | 0.02 | 0.00 | 0.21 | 0.00 | 0.19 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 174 | 40 | 35 | 100 | 80 | 482 | 45 | 884 | 430 | 221 | 795 | 359 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1510 | 1900 | 1203 | 1702 | 1900 | 1414 | 1810 | 1870 | 1820 | 1716 | 1658 | 1547 |
| Queue Service Time ( $g_s$ ), s | 7.3 | 2.2 | 1.4 | 3.7 | 4.6 | 19.1 | 3.2 | 22.6 | 22.6 | 8.2 | 12.9 | 17.3 |
| Cycle Queue Clearance Time ( $g_c$ ), s | 7.3 | 2.2 | 1.4 | 3.7 | 4.6 | 19.1 | 3.2 | 22.6 | 22.6 | 8.2 | 12.9 | 17.3 |
| Green Ratio ( *g/C* ) | 0.08 | 0.23 | 0.27 | 0.05 | 0.20 | 0.29 | 0.05 | 0.44 | 0.44 | 0.08 | 0.48 | 0.56 |
| Capacity ( *c* ), veh/h | 248 | 434 | 660 | 183 | 380 | 806 | 83 | 1643 | 800 | 291 | 2378 | 867 |
| Volume-to-Capacity Ratio ( *X* ) | 0.700 | 0.092 | 0.053 | 0.546 | 0.210 | 0.598 | 0.539 | 0.538 | 0.538 | 0.759 | 0.334 | 0.414 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 5.4 | 1.9 | 0.7 | 3.0 | 4.0 | 10.9 | 2.6 | 14.2 | 14.0 | 6.5 | 8.4 | 9.7 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 0.22 | 1.26 |
| Uniform Delay ( $d_1$ ), s/veh | 58.2 | 39.6 | 34.7 | 60.0 | 43.5 | 40.1 | 60.7 | 26.8 | 26.8 | 58.2 | 21.1 | 16.4 |
| Incremental Delay ( $d_2$ ), s/veh | 6.0 | 0.1 | 0.0 | 3.4 | 0.4 | 1.2 | 1.7 | 0.3 | 0.7 | 4.0 | 0.1 | 0.5 |
| Initial Queue Delay ( $d_3$ ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 64.2 | 39.7 | 34.8 | 63.5 | 43.9 | 41.3 | 62.4 | 27.1 | 27.5 | 62.3 | 21.2 | 16.8 |
| Level of Service (LOS) | E | D | C | E | D | D | E | C | C | E | C | B |
| Approach Delay, s/veh / LOS | 56.1 | E | | 44.9 | D | | 28.4 | C | | 26.7 | C | |
| Intersection Delay, s/veh / LOS | 32.6 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.60 | C | 3.28 | C | 2.57 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 0.90 | A | 1.58 | B | 1.40 | A | 1.24 | A |

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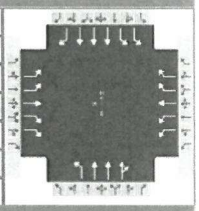
## HCS Signalized Intersection Results Summary

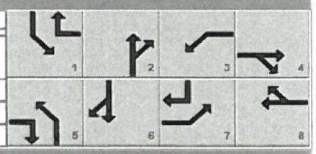
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.95 |
| Urban Street | Preston Highway | Analysis Year | 2034 No Build | Analysis Period | 1> 7:15 |
| Intersection | Cooper Chapel Road | File Name | AM 34 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 108 | 15 | 16 | 100 | 52 | 481 | 35 | 1517 | 80 | 224 | 793 | 604 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 129.3 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | Yes | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | 5.6 | | 58.0 | 7.0 | 0.6 | 26.9 | | | | | | |
| Yellow | 3.5 | 0.0 | | 4.3 | 3.5 | 0.0 | 3.6 | | | | | | |
| Red | 3.0 | 0.0 | | 1.9 | 3.0 | 0.0 | 2.4 | | | | | | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 14.1 | 33.5 | 13.5 | 32.9 | 12.5 | 64.2 | 18.1 | 69.8 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.8 | 5.1 | 5.8 | 3.0 | 4.9 | 4.0 | 4.9 |
| Queue Clearance Time ( *g s* ), s | 6.8 | 2.9 | 5.9 | 21.8 | 4.0 | 24.8 | 10.7 | 17.2 |
| Green Extension Time ( *g e* ), s | 0.9 | 4.8 | 0.5 | 5.0 | 0.0 | 33.2 | 0.9 | 34.3 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Max Out Probability | 0.00 | 0.05 | 0.00 | 0.01 | 0.00 | 0.22 | 0.00 | 0.19 |

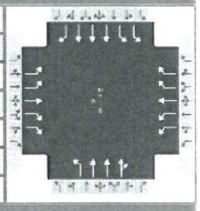
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 114 | 16 | 17 | 105 | 55 | 506 | 29 | 904 | 440 | 236 | 835 | 320 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1510 | 1900 | 1203 | 1702 | 1900 | 1414 | 1810 | 1870 | 1820 | 1716 | 1658 | 1547 |
| Queue Service Time ( *g s* ), s | 4.8 | 0.9 | 0.7 | 3.9 | 3.0 | 19.8 | 2.0 | 22.8 | 22.8 | 8.7 | 13.3 | 15.2 |
| Cycle Queue Clearance Time ( *g c* ), s | 4.8 | 0.9 | 0.7 | 3.9 | 3.0 | 19.8 | 2.0 | 22.8 | 22.8 | 8.7 | 13.3 | 15.2 |
| Green Ratio ( *g/C* ) | 0.06 | 0.21 | 0.26 | 0.05 | 0.21 | 0.30 | 0.05 | 0.45 | 0.45 | 0.09 | 0.49 | 0.55 |
| Capacity ( *c* ), veh/h | 178 | 405 | 624 | 184 | 395 | 842 | 84 | 1678 | 816 | 308 | 2446 | 852 |
| Volume-to-Capacity Ratio ( *X* ) | 0.637 | 0.039 | 0.027 | 0.572 | 0.138 | 0.601 | 0.351 | 0.539 | 0.539 | 0.767 | 0.341 | 0.375 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 3.6 | 0.7 | 0.4 | 3.2 | 2.6 | 11.2 | 1.7 | 14.3 | 14.0 | 6.9 | 8.5 | 8.8 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.22 | 1.14 |
| Uniform Delay ( *d 1* ), s/veh | 59.5 | 40.4 | 35.7 | 59.8 | 41.8 | 38.9 | 59.8 | 26.0 | 26.0 | 57.6 | 20.1 | 16.5 |
| Incremental Delay ( *d 2* ), s/veh | 6.3 | 0.1 | 0.0 | 3.8 | 0.3 | 1.1 | 0.8 | 0.3 | 0.7 | 4.0 | 0.1 | 0.4 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 65.9 | 40.5 | 35.8 | 63.5 | 42.1 | 40.0 | 60.6 | 26.3 | 26.6 | 61.6 | 20.2 | 16.9 |
| Level of Service (LOS) | E | D | D | E | D | D | E | C | C | E | C | B |
| Approach Delay, s/veh / LOS | 59.7 | E | | 43.9 | D | | 27.1 | C | | 26.5 | C | |
| Intersection Delay, s/veh / LOS | 31.3 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.60 | C | 3.28 | C | 2.57 | C | 2.42 | B |
| Bicycle LOS Score / LOS | 0.73 | A | 1.59 | B | 1.43 | A | 1.25 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:26:38 AM

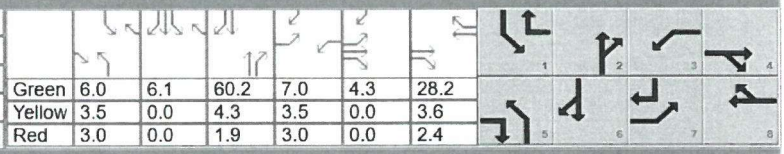
## HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.95 |
| Urban Street | Preston Highway | Analysis Year | 2034 Build | Analysis Period | 1> 7:15 |
| Intersection | Cooper Chapel Road | File Name | AM 34 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 170 | 39 | 34 | 100 | 78 | 481 | 55 | 1517 | 80 | 224 | 793 | 670 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 137.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | Yes | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |



| | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | 6.1 | | 60.2 | 7.0 | 4.3 | 28.2 | | | | | |
| Yellow | 3.5 | 0.0 | | 4.3 | 3.5 | 0.0 | 3.6 | | | | | |
| Red | 3.0 | 0.0 | | 1.9 | 3.0 | 0.0 | 2.4 | | | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 17.8 | 38.5 | 13.5 | 34.2 | 12.5 | 66.4 | 18.6 | 72.5 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.7 | 5.1 | 5.7 | 3.0 | 4.9 | 4.0 | 4.9 |
| Queue Clearance Time ( *g s* ), s | 9.9 | 4.3 | 6.2 | 23.1 | 5.4 | 26.0 | 11.2 | 22.0 |
| Green Extension Time ( *g e* ), s | 1.4 | 5.1 | 0.5 | 5.0 | 0.1 | 34.2 | 0.9 | 34.8 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Max Out Probability | 0.00 | 0.08 | 0.00 | 0.03 | 0.00 | 0.25 | 0.00 | 0.23 |

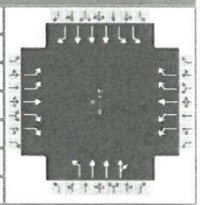
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 179 | 41 | 36 | 105 | 82 | 506 | 46 | 890 | 433 | 236 | 835 | 389 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1510 | 1900 | 1203 | 1702 | 1900 | 1414 | 1810 | 1870 | 1820 | 1716 | 1658 | 1547 |
| Queue Service Time ( *g s* ), s | 7.9 | 2.3 | 1.5 | 4.2 | 4.9 | 21.1 | 3.4 | 24.0 | 24.0 | 9.2 | 14.3 | 20.0 |
| Cycle Queue Clearance Time ( *g c* ), s | 7.9 | 2.3 | 1.5 | 4.2 | 4.9 | 21.1 | 3.4 | 24.0 | 24.0 | 9.2 | 14.3 | 20.0 |
| Green Ratio ( *g/C* ) | 0.08 | 0.24 | 0.28 | 0.05 | 0.21 | 0.29 | 0.04 | 0.44 | 0.44 | 0.09 | 0.48 | 0.57 |
| Capacity ( *c* ), veh/h | 250 | 451 | 676 | 174 | 391 | 831 | 79 | 1644 | 800 | 303 | 2408 | 877 |
| Volume-to-Capacity Ratio ( *X* ) | 0.715 | 0.091 | 0.053 | 0.606 | 0.210 | 0.609 | 0.575 | 0.541 | 0.541 | 0.777 | 0.347 | 0.444 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 5.9 | 2.0 | 0.8 | 3.4 | 4.3 | 11.9 | 2.8 | 15.1 | 14.9 | 7.4 | 9.1 | 11.0 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 0.24 | 1.43 |
| Uniform Delay ( *d 1* ), s/veh | 61.3 | 40.8 | 36.0 | 63.7 | 45.2 | 41.6 | 64.3 | 28.3 | 28.3 | 61.2 | 21.9 | 17.2 |
| Incremental Delay ( *d 2* ), s/veh | 6.4 | 0.1 | 0.0 | 4.6 | 0.4 | 1.2 | 2.0 | 0.3 | 0.7 | 4.3 | 0.1 | 0.5 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 67.7 | 40.9 | 36.0 | 68.3 | 45.7 | 42.8 | 66.4 | 28.6 | 29.0 | 65.5 | 22.1 | 17.7 |
| Level of Service (LOS) | E | D | D | E | D | D | E | C | C | E | C | B |
| Approach Delay, s/veh / LOS | 59.0 | E | | 47.0 | D | | 30.0 | C | | 27.9 | C | |
| Intersection Delay, s/veh / LOS | 34.3 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.60 | C | 3.28 | C | 2.57 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 0.91 | A | 1.63 | B | 1.44 | A | 1.29 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:28:52 AM

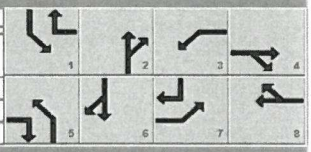
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Nov 10, 2021 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.94 |
| Urban Street | Preston Highway | Analysis Year | 2021 | Analysis Period | 1> 4:45 |
| Intersection | Cooper Chapel Rd | File Name | PM 21 Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 451 | 79 | 44 | 166 | 15 | 312 | 16 | 1138 | 198 | 626 | 1773 | 163 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 25.0 | 66.3 | 12.1 | 11.1 | 21.2 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.5 | 3.5 | 3.6 | |
| Red | 3.0 | 3.0 | 1.9 | 3.0 | 3.0 | 2.4 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 36.3 | 44.9 | 18.6 | 27.2 | 12.5 | 72.5 | 44.0 | 104.0 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.7 | 5.1 | 5.7 | 3.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | 26.5 | 8.6 | 11.1 | 18.3 | 3.8 | | 35.4 | |
| Green Extension Time ( *g e* ), s | 3.3 | 4.0 | 1.1 | 3.0 | 0.0 | 0.0 | 2.0 | 0.0 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Max Out Probability | 0.06 | 0.00 | 0.00 | 0.12 | 0.00 | | 0.14 | |

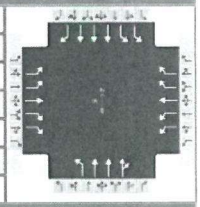
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 480 | 84 | 47 | 177 | 16 | 332 | 16 | 943 | 435 | 666 | 1886 | 173 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1702 | 1870 | 1403 | 1716 | 1796 | 1403 | 1640 | 1870 | 1725 | 1743 | 1698 | 1522 |
| Queue Service Time ( *g s* ), s | 24.5 | 6.6 | 2.3 | 9.1 | 1.4 | 16.3 | 1.8 | 39.3 | 39.0 | 33.4 | 36.3 | 4.3 |
| Cycle Queue Clearance Time ( *g c* ), s | 24.5 | 6.6 | 2.3 | 9.1 | 1.4 | 16.3 | 1.8 | 39.3 | 39.0 | 33.4 | 36.3 | 4.3 |
| Green Ratio ( *g/C* ) | 0.17 | 0.22 | 0.25 | 0.07 | 0.12 | 0.33 | 0.04 | 0.37 | 0.37 | 0.21 | 0.54 | 0.71 |
| Capacity ( *c* ), veh/h | 582 | 404 | 700 | 251 | 212 | 915 | 64 | 1378 | 635 | 745 | 2767 | 1079 |
| Volume-to-Capacity Ratio ( *X* ) | 0.824 | 0.208 | 0.067 | 0.705 | 0.075 | 0.363 | 0.259 | 0.684 | 0.684 | 0.894 | 0.682 | 0.161 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | 430.8 | 147.1 | 37.7 | 192.1 | 32.1 | 246.3 | 38.4 | 649.2 | 603.2 | 558.9 | 424.2 | 62 |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 16.7 | 5.8 | 1.5 | 7.5 | 1.2 | 9.7 | 1.4 | 25.6 | 24.1 | 22.2 | 16.7 | 2.3 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.96 | 0.33 | 0.30 | 0.48 | 0.06 | 0.70 | 0.09 | 0.54 | 0.51 | 1.02 | 0.42 | 0.31 |
| Uniform Delay ( *d 1* ), s/veh | 72.0 | 57.9 | 51.6 | 81.5 | 70.6 | 46.4 | 87.3 | 51.3 | 50.2 | 68.8 | 16.3 | 5.0 |
| Incremental Delay ( *d 2* ), s/veh | 6.2 | 0.4 | 0.1 | 4.9 | 0.2 | 0.4 | 0.7 | 2.5 | 5.3 | 10.2 | 1.4 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 78.1 | 58.3 | 51.6 | 86.5 | 70.9 | 46.8 | 88.0 | 53.8 | 55.5 | 79.0 | 17.7 | 5.3 |
| Level of Service (LOS) | E | E | D | F | E | D | F | D | E | E | B | A |
| Approach Delay, s/veh / LOS | 73.4 | E | | 60.9 | E | | 54.7 | D | | 31.9 | C | |
| Intersection Delay, s/veh / LOS | 45.7 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.61 | C | 2.88 | C | 2.59 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 1.50 | A | 1.35 | A | 1.28 | A | 1.99 | B |

 HCS™ Streets Version 7.9.5 Generated: 11/12/2021 3:42:16 PM

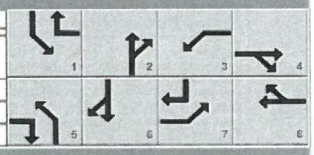
## HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.94 |
| Urban Street | Preston Highway | Analysis Year | 2024 No Build | Analysis Period | 1> 4:45 |
| Intersection | Cooper Chapel Rd | File Name | PM 24 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 458 | 84 | 44 | 175 | 15 | 317 | 16 | 1176 | 201 | 635 | 1836 | 165 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 25.4 | 65.3 | 12.7 | 11.0 | 21.5 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.5 | 3.5 | 3.6 | |
| Red | 3.0 | 3.0 | 1.9 | 3.0 | 3.0 | 2.4 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 36.7 | 44.9 | 19.2 | 27.5 | 12.5 | 71.5 | 44.4 | 103.4 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.7 | 5.1 | 5.7 | 3.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | 26.9 | 9.1 | 11.5 | 18.5 | 3.7 | | 35.9 | |
| Green Extension Time ( *g e* ), s | 3.3 | 4.1 | 1.2 | 3.0 | 0.0 | 0.0 | 1.9 | 0.0 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Max Out Probability | 0.07 | 0.00 | 0.00 | 0.14 | 0.00 | | 0.22 | |

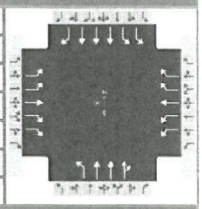
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 487 | 89 | 47 | 186 | 16 | 337 | 15 | 896 | 414 | 676 | 1953 | 176 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1702 | 1870 | 1403 | 1716 | 1796 | 1403 | 1640 | 1870 | 1727 | 1743 | 1698 | 1522 |
| Queue Service Time ( *g s* ), s | 24.9 | 7.1 | 2.3 | 9.5 | 1.4 | 16.5 | 1.7 | 27.9 | 26.3 | 33.9 | 39.6 | 4.4 |
| Cycle Queue Clearance Time ( *g c* ), s | 24.9 | 7.1 | 2.3 | 9.5 | 1.4 | 16.5 | 1.7 | 27.9 | 26.3 | 33.9 | 39.6 | 4.4 |
| Green Ratio ( *g/C* ) | 0.17 | 0.22 | 0.25 | 0.08 | 0.12 | 0.33 | 0.04 | 0.36 | 0.36 | 0.22 | 0.54 | 0.71 |
| Capacity ( *c* ), veh/h | 590 | 405 | 701 | 261 | 214 | 924 | 64 | 1357 | 626 | 753 | 2750 | 1077 |
| Volume-to-Capacity Ratio ( *X* ) | 0.826 | 0.221 | 0.067 | 0.713 | 0.075 | 0.365 | 0.238 | 0.660 | 0.661 | 0.898 | 0.710 | 0.163 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 16.9 | 6.2 | 1.5 | 7.8 | 1.2 | 9.8 | 1.3 | 14.3 | 12.2 | 22.5 | 18.1 | 2.4 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.97 | 0.35 | 0.30 | 0.50 | 0.06 | 0.71 | 0.08 | 0.30 | 0.26 | 1.03 | 0.46 | 0.32 |
| Uniform Delay ( *d 1* ), s/veh | 71.8 | 58.0 | 51.5 | 81.2 | 70.5 | 46.0 | 87.2 | 27.5 | 24.5 | 68.6 | 17.2 | 5.1 |
| Incremental Delay ( *d 2* ), s/veh | 6.3 | 0.4 | 0.1 | 4.9 | 0.2 | 0.4 | 0.5 | 1.7 | 3.7 | 10.8 | 1.6 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 78.1 | 58.4 | 51.6 | 86.2 | 70.7 | 46.4 | 87.6 | 29.2 | 28.2 | 79.5 | 18.7 | 5.4 |
| Level of Service (LOS) | E | E | D | F | E | D | F | C | C | E | B | A |
| Approach Delay, s/veh / LOS | 73.3 | E | | 60.8 | E | | 29.6 | C | | 32.5 | C | |
| Intersection Delay, s/veh / LOS | 39.5 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.61 | C | 2.88 | C | 2.60 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 1.52 | B | 1.38 | A | 1.30 | A | 2.03 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:30:28 AM

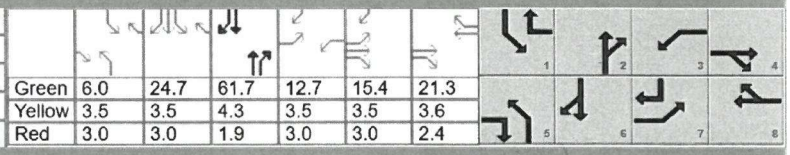
## HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.94 |
| Urban Street | Preston Highway | Analysis Year | 2024 Build | Analysis Period | 1> 4:45 |
| Intersection | Cooper Chapel Rd | File Name | PM 24 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 537 | 115 | 68 | 175 | 43 | 317 | 36 | 1176 | 201 | 635 | 1836 | 234 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | 24.7 | | 61.7 | 12.7 | 15.4 | 21.3 | | | | | |
| Yellow | 3.5 | 3.5 | | 4.3 | 3.5 | 3.5 | 3.6 | | | | | |
| Red | 3.0 | 3.0 | | 1.9 | 3.0 | 3.0 | 2.4 | | | | | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 41.1 | 49.2 | 19.2 | 27.3 | 12.5 | 67.9 | 43.7 | 99.1 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.6 | 5.1 | 5.6 | 3.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | 31.1 | 11.6 | 11.5 | 18.6 | 5.7 | | 36.1 | |
| Green Extension Time ( *g e* ), s | 3.4 | 4.7 | 1.2 | 2.7 | 0.0 | 0.0 | 1.2 | 0.0 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Max Out Probability | 0.25 | 0.00 | 0.00 | 0.46 | 0.00 | | 0.98 | |

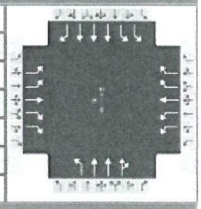
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 571 | 122 | 72 | 186 | 46 | 337 | 34 | 878 | 406 | 676 | 1953 | 249 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1702 | 1870 | 1403 | 1716 | 1796 | 1403 | 1640 | 1870 | 1727 | 1743 | 1698 | 1522 |
| Queue Service Time ( *g s* ), s | 29.1 | 9.6 | 3.5 | 9.5 | 4.1 | 16.6 | 3.7 | 28.2 | 26.7 | 34.1 | 44.0 | 7.1 |
| Cycle Queue Clearance Time ( *g c* ), s | 29.1 | 9.6 | 3.5 | 9.5 | 4.1 | 16.6 | 3.7 | 28.2 | 26.7 | 34.1 | 44.0 | 7.1 |
| Green Ratio ( *g/C* ) | 0.20 | 0.24 | 0.27 | 0.08 | 0.12 | 0.33 | 0.04 | 0.34 | 0.34 | 0.21 | 0.52 | 0.71 |
| Capacity ( *c* ), veh/h | 673 | 449 | 767 | 261 | 213 | 913 | 64 | 1282 | 592 | 741 | 2630 | 1078 |
| Volume-to-Capacity Ratio ( *X* ) | 0.849 | 0.273 | 0.094 | 0.713 | 0.215 | 0.369 | 0.526 | 0.685 | 0.686 | 0.912 | 0.743 | 0.231 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 19.5 | 8.2 | 2.2 | 7.8 | 3.5 | 9.8 | 2.9 | 14.1 | 12.1 | 23.0 | 20.7 | 3.8 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 1.12 | 0.46 | 0.45 | 0.50 | 0.17 | 0.71 | 0.19 | 0.30 | 0.26 | 1.05 | 0.53 | 0.50 |
| Uniform Delay ( *d 1* ), s/veh | 69.6 | 55.6 | 48.8 | 81.2 | 71.8 | 46.6 | 88.2 | 28.3 | 25.3 | 69.2 | 20.4 | 5.6 |
| Incremental Delay ( *d 2* ), s/veh | 8.0 | 0.5 | 0.1 | 4.9 | 0.8 | 0.4 | 1.7 | 2.1 | 4.4 | 14.1 | 1.9 | 0.5 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 77.7 | 56.1 | 48.9 | 86.2 | 72.6 | 47.0 | 89.9 | 30.4 | 29.7 | 83.4 | 22.4 | 6.1 |
| Level of Service (LOS) | E | E | D | F | E | D | F | C | C | F | C | A |
| Approach Delay, s/veh / LOS | 71.5 | E | | 61.8 | E | | 31.7 | C | | 35.3 | D | |
| Intersection Delay, s/veh / LOS | 42.2 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.61 | C | 2.88 | C | 2.60 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 1.75 | B | 1.43 | A | 1.31 | A | 2.07 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:32:24 AM

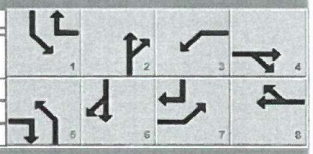
## HCS Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.94 |
| Urban Street | Preston Highway | Analysis Year | 2034 No Build | Analysis Period | 1> 4:45 |
| Intersection | Cooper Chapel Rd | File Name | PM 34 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 481 | 88 | 47 | 183 | 16 | 333 | 17 | 1235 | 211 | 668 | 1928 | 174 |

| Signal Information | | | | | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 | | | | | | | | | | | | | |
| Offset, s | 0 | Reference Point | End | Green | 6.0 | 26.7 | | 62.1 | 13.2 | 11.8 | 22.0 | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Yellow | 3.5 | 3.5 | | 4.3 | 3.5 | 3.5 | 3.6 | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | Red | 3.0 | 3.0 | | 1.9 | 3.0 | 3.0 | 2.4 | | | | | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 38.0 | 46.4 | 19.7 | 28.0 | 12.5 | 68.3 | 45.7 | 101.5 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.7 | 5.1 | 5.7 | 3.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | 28.1 | 9.4 | 12.0 | 19.2 | 3.7 | | 37.8 | |
| Green Extension Time ( *g e* ), s | 3.4 | 4.3 | 1.2 | 2.9 | 0.0 | 0.0 | 1.4 | 0.0 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Max Out Probability | 0.10 | 0.00 | 0.00 | 0.24 | 0.00 | | 0.80 | |

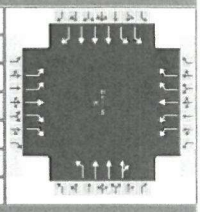
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 512 | 94 | 50 | 195 | 17 | 354 | 16 | 904 | 417 | 711 | 2051 | 185 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1702 | 1870 | 1403 | 1716 | 1796 | 1403 | 1640 | 1870 | 1727 | 1743 | 1698 | 1522 |
| Queue Service Time ( *g s* ), s | 26.1 | 7.4 | 2.4 | 10.0 | 1.5 | 17.2 | 1.7 | 29.7 | 28.1 | 35.8 | 46.1 | 4.8 |
| Cycle Queue Clearance Time ( *g c* ), s | 26.1 | 7.4 | 2.4 | 10.0 | 1.5 | 17.2 | 1.7 | 29.7 | 28.1 | 35.8 | 46.1 | 4.8 |
| Green Ratio ( *g/C* ) | 0.18 | 0.22 | 0.26 | 0.08 | 0.12 | 0.34 | 0.04 | 0.34 | 0.34 | 0.22 | 0.53 | 0.70 |
| Capacity ( *c* ), veh/h | 615 | 419 | 723 | 270 | 220 | 954 | 64 | 1290 | 596 | 778 | 2696 | 1072 |
| Volume-to-Capacity Ratio ( *X* ) | 0.832 | 0.223 | 0.069 | 0.720 | 0.077 | 0.371 | 0.243 | 0.700 | 0.701 | 0.913 | 0.761 | 0.173 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 17.7 | 6.4 | 1.6 | 8.1 | 1.3 | 10.1 | 1.3 | 14.9 | 12.8 | 23.9 | 21.1 | 2.7 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 1.01 | 0.36 | 0.32 | 0.52 | 0.06 | 0.73 | 0.08 | 0.32 | 0.27 | 1.10 | 0.54 | 0.35 |
| Uniform Delay ( *d 1* ), s/veh | 71.1 | 57.0 | 50.5 | 81.0 | 70.0 | 44.9 | 87.2 | 28.9 | 25.8 | 68.2 | 19.3 | 5.4 |
| Incremental Delay ( *d 2* ), s/veh | 6.8 | 0.4 | 0.1 | 4.9 | 0.2 | 0.4 | 0.5 | 2.1 | 4.5 | 13.6 | 2.1 | 0.4 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 77.9 | 57.4 | 50.6 | 85.9 | 70.2 | 45.3 | 87.7 | 31.0 | 30.4 | 81.8 | 21.3 | 5.7 |
| Level of Service (LOS) | E | E | D | F | E | D | F | C | C | F | C | A |
| Approach Delay, s/veh / LOS | 72.9 | E | | 60.0 | E | | 31.5 | C | | 34.9 | C | |
| Intersection Delay, s/veh / LOS | 41.2 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.61 | C | 2.88 | C | 2.60 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 1.57 | B | 1.42 | A | 1.34 | A | 2.11 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:33:57 AM

## HCS Signalized Intersection Results Summary

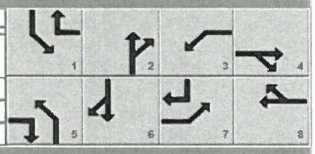
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.94 |
| Urban Street | Preston Highway | Analysis Year | 2034 Build | Analysis Period | 1> 4:45 |
| Intersection | Cooper Chapel Rd | File Name | PM 34 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 560 | 119 | 71 | 183 | 44 | 333 | 37 | 1235 | 211 | 668 | 1928 | 243 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 25.7 | 59.0 | 13.2 | 16.1 | 21.8 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.5 | 3.5 | 3.6 | |
| Red | 3.0 | 3.0 | 1.9 | 3.0 | 3.0 | 2.4 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | 7 | 4 | 3 | 8 | 5 | 2 | 1 | 6 |
| Case Number | 2.0 | 3.0 | 2.0 | 3.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | 42.3 | 50.4 | 19.7 | 27.8 | 12.5 | 65.2 | 44.7 | 97.4 |
| Change Period, ( *Y+R c* ), s | 6.5 | 6.0 | 6.5 | 6.0 | 6.5 | 6.2 | 6.5 | 6.2 |
| Max Allow Headway ( *MAH* ), s | 5.6 | 5.6 | 5.1 | 5.6 | 3.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | 32.4 | 11.8 | 12.0 | 19.3 | 5.6 | | 38.0 | |
| Green Extension Time ( *g e* ), s | 3.4 | 4.9 | 1.2 | 2.5 | 0.0 | 0.0 | 0.2 | 0.0 |
| Phase Call Probability | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | |
| Max Out Probability | 0.34 | 0.00 | 0.00 | 0.70 | 0.00 | | 1.00 | |

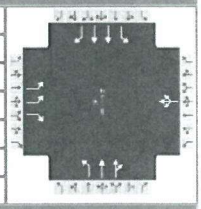
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 596 | 127 | 76 | 195 | 47 | 354 | 33 | 887 | 410 | 711 | 2051 | 259 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1702 | 1870 | 1403 | 1716 | 1796 | 1403 | 1640 | 1870 | 1727 | 1743 | 1698 | 1522 |
| Queue Service Time ( *g s* ), s | 30.4 | 9.8 | 3.6 | 10.0 | 4.2 | 17.3 | 3.6 | 30.0 | 28.5 | 36.0 | 50.7 | 7.6 |
| Cycle Queue Clearance Time ( *g c* ), s | 30.4 | 9.8 | 3.6 | 10.0 | 4.2 | 17.3 | 3.6 | 30.0 | 28.5 | 36.0 | 50.7 | 7.6 |
| Green Ratio ( *g/C* ) | 0.20 | 0.25 | 0.28 | 0.08 | 0.12 | 0.33 | 0.04 | 0.33 | 0.33 | 0.22 | 0.51 | 0.71 |
| Capacity ( *c* ), veh/h | 695 | 461 | 785 | 270 | 218 | 935 | 64 | 1227 | 567 | 759 | 2583 | 1074 |
| Volume-to-Capacity Ratio ( *X* ) | 0.857 | 0.275 | 0.096 | 0.720 | 0.215 | 0.379 | 0.520 | 0.723 | 0.723 | 0.936 | 0.794 | 0.241 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 20.2 | 8.3 | 2.3 | 8.1 | 3.6 | 10.2 | 2.9 | 14.9 | 12.8 | 24.7 | 23.9 | 4.0 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 1.16 | 0.47 | 0.47 | 0.52 | 0.17 | 0.74 | 0.18 | 0.31 | 0.27 | 1.13 | 0.61 | 0.53 |
| Uniform Delay ( *d 1* ), s/veh | 69.1 | 54.8 | 48.0 | 81.0 | 71.4 | 45.8 | 88.2 | 29.9 | 26.7 | 69.2 | 22.6 | 5.9 |
| Incremental Delay ( *d 2* ), s/veh | 8.6 | 0.5 | 0.1 | 4.9 | 0.8 | 0.4 | 1.6 | 2.5 | 5.3 | 18.7 | 2.6 | 0.5 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 77.7 | 55.3 | 48.0 | 85.9 | 72.2 | 46.2 | 89.8 | 32.4 | 32.0 | 87.9 | 25.2 | 6.4 |
| Level of Service (LOS) | E | E | D | F | E | D | F | C | C | F | C | A |
| Approach Delay, s/veh / LOS | 71.4 | E | | 61.2 | E | | 33.7 | C | | 38.3 | D | |
| Intersection Delay, s/veh / LOS | 44.2 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.61 | C | 2.88 | C | 2.60 | C | 2.43 | B |
| Bicycle LOS Score / LOS | 1.80 | B | 1.47 | A | 1.36 | A | 2.15 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:35:41 AM

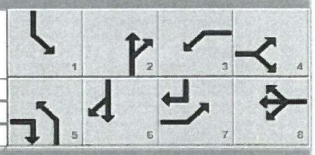
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Jun 2, 2021 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.90 |
| Urban Street | Preston Highway | Analysis Year | 2021 | Analysis Period | 1> 7:15 |
| Intersection | Interchange Drive | File Name | AM 21 Preston.xus | | |
| Project Description | Stern | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 67 | | 15 | 1 | 0 | 1 | 10 | 1315 | 3 | 1 | 721 | 152 |

| Signal Information | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cycle, s | 150.0 | Reference Phase | 2 | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | Off | | | | | | |
| Force Mode | Fixed | Simult. Gap N/S | On | | | | | | |
| | | | | Green | 0.3 | 5.7 | 113.1 | 6.0 | 0.5 | 0.0 |
| | | | | Yellow | 3.5 | 0.0 | 4.3 | 3.6 | 3.6 | 0.0 |
| | | | | Red | 3.0 | 0.0 | 1.6 | 2.4 | 2.4 | 0.0 |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 12.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | | 12.0 | | 6.5 | 12.5 | 124.7 | 6.8 | 119.0 |
| Change Period, ( *Y+Rc* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.1 | 4.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *gs* ), s | | | | 2.2 | 3.0 | | 2.1 | |
| Green Extension Time ( *ge* ), s | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Phase Call Probability | | | | 0.09 | 1.00 | | 0.04 | |
| Max Out Probability | | | | 0.00 | 0.00 | | 0.00 | |

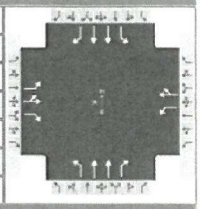
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 74 | | 17 | | 2 | | 11 | 700 | 700 | 1 | 782 | 165 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1661 | | 1359 | | 1704 | | 1527 | 1856 | 1854 | 1810 | 1724 | 1585 |
| Queue Service Time ( *gs* ), s | 3.3 | | 1.7 | | 0.2 | | 1.0 | 12.5 | 12.5 | 0.1 | 10.8 | 3.6 |
| Cycle Queue Clearance Time ( *gc* ), s | 3.3 | | 1.7 | | 0.2 | | 1.0 | 12.5 | 12.5 | 0.1 | 10.8 | 3.6 |
| Green Ratio ( *g/C* ) | 0.04 | | 0.08 | | 0.00 | | 0.60 | 0.79 | 0.79 | 0.00 | 0.75 | 0.79 |
| Capacity ( *c* ), veh/h | 133 | | 109 | | 6 | | 61 | 1470 | 1468 | 3 | 2599 | 1258 |
| Volume-to-Capacity Ratio ( *X* ) | 0.560 | | 0.153 | | 0.368 | | 0.174 | 0.477 | 0.477 | 0.338 | 0.301 | 0.131 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | 68.7 | | 31.4 | | 4.8 | | 21.6 | 138.8 | 135.5 | 3.8 | 158.9 | 43.6 |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 2.6 | | 1.1 | | 0.2 | | 0.7 | 5.4 | 5.4 | 0.2 | 6.1 | 1.7 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.17 | | 0.52 | | 0.00 | | 0.09 | 0.00 | 0.00 | 0.04 | 0.00 | 0.15 |
| Uniform Delay ( *d1* ), s/veh | 70.7 | | 64.3 | | 74.6 | | 71.7 | 2.8 | 2.8 | 74.8 | 5.9 | 3.6 |
| Incremental Delay ( *d2* ), s/veh | 3.7 | | 0.6 | | 13.3 | | 0.9 | 0.8 | 0.8 | 49.9 | 0.3 | 0.2 |
| Initial Queue Delay ( *d3* ), s/veh | 0.0 | | 0.0 | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 74.4 | | 64.9 | | 87.9 | | 72.6 | 3.6 | 3.6 | 124.7 | 6.2 | 3.8 |
| Level of Service (LOS) | E | | E | | F | | E | A | A | F | A | A |
| Approach Delay, s/veh / LOS | 72.6 | | E | 87.9 | | F | 4.1 | | A | 5.9 | | A |
| Intersection Delay, s/veh / LOS | 7.4 | | | | | | A | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.33 | B | 2.49 | B | 1.62 | B | 2.05 | B |
| Bicycle LOS Score / LOS | | F | 0.49 | A | 1.70 | B | 1.29 | A |

 HCS™ Streets Version 7.9.5 Generated: 6/4/2021 12:24:26 PM

## HCS Signalized Intersection Results Summary

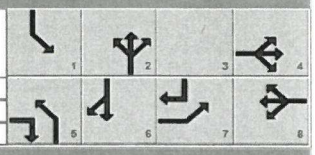
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.90 |
| Urban Street | Preston Highway | Analysis Year | 2024 No Build | Analysis Period | 1> 7:15 |
| Intersection | Interchange Drive | File Name | AM 24 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 93 | 24 | 15 | 190 | 13 | 1 | 13 | 1300 | 137 | 125 | 647 | 155 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 150.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | Off |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 6.2 | 82.4 | 11.4 | 19.6 | 0.0 | |
| Yellow | 3.5 | 0.0 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 0.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 17.4 | | 25.6 | 12.5 | 88.3 | 18.7 | 94.5 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 10.9 | | 19.2 | 2.5 | | 11.9 | |
| Green Extension Time ( *g e* ), s | | 0.5 | | 0.4 | 0.0 | 0.0 | 0.4 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 1.00 | | 0.99 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

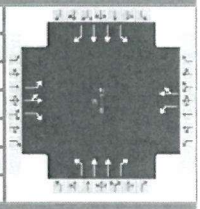
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 103 | 27 | 17 | 211 | 16 | | 13 | 1265 | 133 | 121 | 627 | 150 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1711 | 1900 | 1359 | 1810 | 1876 | | 1527 | 1766 | 1610 | 1810 | 1724 | 1585 |
| Queue Service Time ( *g s* ), s | 8.9 | 2.0 | 1.6 | 17.2 | 1.1 | | 0.5 | 30.6 | 3.3 | 9.9 | 13.6 | 5.2 |
| Cycle Queue Clearance Time ( *g c* ), s | 8.9 | 2.0 | 1.6 | 17.2 | 1.1 | | 0.5 | 30.6 | 3.3 | 9.9 | 13.6 | 5.2 |
| Green Ratio ( *g/C* ) | 0.08 | 0.08 | 0.12 | 0.13 | 0.13 | | 0.59 | 0.55 | 0.55 | 0.08 | 0.59 | 0.67 |
| Capacity ( *c* ), veh/h | 130 | 144 | 157 | 236 | 245 | | 442 | 1942 | 885 | 147 | 2038 | 1057 |
| Volume-to-Capacity Ratio ( *X* ) | 0.796 | 0.185 | 0.106 | 0.893 | 0.063 | | 0.029 | 0.652 | 0.151 | 0.823 | 0.308 | 0.142 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 7.6 | 1.7 | 1.0 | 12.7 | 0.9 | | 0.3 | 14.2 | 2.0 | 8.4 | 8.8 | 3.2 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.50 | 0.00 | 0.50 | 0.00 | 0.00 | | 0.04 | 0.00 | 0.00 | 2.11 | 0.00 | 0.27 |
| Uniform Delay ( *d 1* ), s/veh | 68.2 | 65.0 | 59.4 | 64.2 | 57.2 | | 13.6 | 15.5 | 8.2 | 67.8 | 15.3 | 9.2 |
| Incremental Delay ( *d 2* ), s/veh | 10.5 | 0.6 | 0.3 | 4.7 | 0.0 | | 0.0 | 1.2 | 0.2 | 10.3 | 0.4 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 78.7 | 65.6 | 59.6 | 68.8 | 57.2 | | 13.6 | 16.6 | 8.5 | 78.2 | 15.7 | 9.5 |
| Level of Service (LOS) | E | E | E | E | E | | B | B | A | E | B | A |
| Approach Delay, s/veh / LOS | 74.1 | E | | 68.0 | E | | 15.8 | B | | 23.1 | C | |
| Intersection Delay, s/veh / LOS | 25.9 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.47 | B | 2.48 | B | 1.91 | B | 2.09 | B |
| Bicycle LOS Score / LOS | 0.73 | A | 0.86 | A | 1.82 | B | 1.34 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:22:02 AM

## HCS Signalized Intersection Results Summary

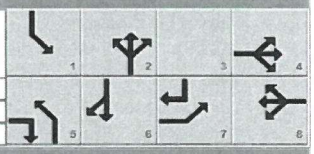
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.90 |
| Urban Street | Preston Highway | Analysis Year | 2024 Build | Analysis Period | 1> 7:15 |
| Intersection | Interchange Drive | File Name | AM 24 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( v ), veh/h | 93 | 24 | 25 | 190 | 13 | 1 | 23 | 1320 | 137 | 125 | 665 | 155 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 150.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | Off |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 6.2 | 82.4 | 11.4 | 19.6 | 0.0 | |
| Yellow | 3.5 | 0.0 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 0.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 17.4 | | 25.6 | 12.5 | 88.3 | 18.7 | 94.5 |
| Change Period, ( Y+R c ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( MAH ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( g s ), s | | 10.9 | | 19.2 | 2.9 | | 11.9 | |
| Green Extension Time ( g e ), s | | 0.5 | | 0.4 | 0.1 | 0.0 | 0.4 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 1.00 | | 0.99 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

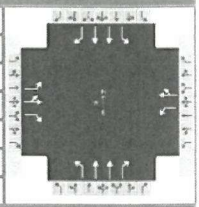
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( v ), veh/h | 103 | 27 | 28 | 211 | 16 | | 22 | 1259 | 131 | 121 | 645 | 150 |
| Adjusted Saturation Flow Rate ( s ), veh/h/ln | 1711 | 1900 | 1359 | 1810 | 1876 | | 1527 | 1766 | 1610 | 1810 | 1724 | 1585 |
| Queue Service Time ( g s ), s | 8.9 | 2.0 | 2.8 | 17.2 | 1.1 | | 0.9 | 30.7 | 3.3 | 9.9 | 14.1 | 5.2 |
| Cycle Queue Clearance Time ( g c ), s | 8.9 | 2.0 | 2.8 | 17.2 | 1.1 | | 0.9 | 30.7 | 3.3 | 9.9 | 14.1 | 5.2 |
| Green Ratio ( g/C ) | 0.08 | 0.08 | 0.12 | 0.13 | 0.13 | | 0.59 | 0.55 | 0.55 | 0.08 | 0.59 | 0.67 |
| Capacity ( c ), veh/h | 130 | 145 | 158 | 236 | 245 | | 434 | 1941 | 884 | 147 | 2037 | 1057 |
| Volume-to-Capacity Ratio ( X ) | 0.794 | 0.184 | 0.176 | 0.893 | 0.063 | | 0.050 | 0.649 | 0.148 | 0.824 | 0.317 | 0.142 |
| Back of Queue ( Q ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( Q ), veh/ln ( 95 th percentile) | 7.5 | 1.7 | 1.7 | 12.7 | 0.9 | | 0.6 | 14.3 | 2.1 | 8.4 | 9.1 | 3.2 |
| Queue Storage Ratio ( RQ ) ( 95 th percentile) | 0.50 | 0.00 | 0.83 | 0.00 | 0.00 | | 0.07 | 0.00 | 0.00 | 2.11 | 0.00 | 0.27 |
| Uniform Delay ( d 1 ), s/veh | 68.1 | 64.9 | 59.8 | 64.2 | 57.2 | | 13.7 | 15.8 | 8.5 | 67.8 | 15.5 | 9.2 |
| Incremental Delay ( d 2 ), s/veh | 10.3 | 0.6 | 0.5 | 4.7 | 0.0 | | 0.0 | 1.1 | 0.2 | 10.3 | 0.4 | 0.3 |
| Initial Queue Delay ( d 3 ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( d ), s/veh | 78.5 | 65.5 | 60.3 | 68.8 | 57.2 | | 13.7 | 16.9 | 8.7 | 78.2 | 15.8 | 9.5 |
| Level of Service (LOS) | E | E | E | E | E | | B | B | A | E | B | A |
| Approach Delay, s/veh / LOS | 73.1 | E | | 68.0 | E | | 16.1 | B | | 23.0 | C | |
| Intersection Delay, s/veh / LOS | 26.1 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.47 | B | 2.48 | B | 1.91 | B | 2.09 | B |
| Bicycle LOS Score / LOS | 0.75 | A | 0.86 | A | 1.84 | B | 1.35 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:24:20 AM

## HCS Signalized Intersection Results Summary

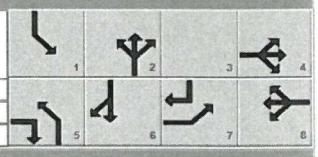
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.90 |
| Urban Street | Preston Highway | Analysis Year | 2034 No Build | Analysis Period | 1> 7:15 |
| Intersection | Interchange Drive | File Name | AM 34 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 96 | 24 | 26 | 190 | 13 | 1 | 14 | 1366 | 137 | 125 | 679 | 166 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 150.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | Off |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | EB | | | WB | | | | |
|---|---|---|---|---|---|---|---|---|
| Green | 6.0 | 6.2 | | 82.1 | 11.7 | 19.6 | 0.0 | |
| Yellow | 3.5 | 0.0 | | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 0.0 | | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 17.7 | | 25.6 | 12.5 | 88.0 | 18.7 | 94.2 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 11.2 | | 19.2 | 2.5 | | 11.9 | |
| Green Extension Time ( *g e* ), s | | 0.5 | | 0.4 | 0.0 | 0.0 | 0.4 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 1.00 | | 0.99 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

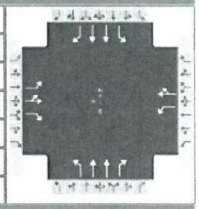
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 107 | 27 | 29 | 211 | 16 | | 13 | 1271 | 127 | 122 | 660 | 161 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1711 | 1900 | 1359 | 1810 | 1876 | | 1527 | 1766 | 1610 | 1810 | 1724 | 1585 |
| Queue Service Time ( *g s* ), s | 9.2 | 2.0 | 2.9 | 17.2 | 1.1 | | 0.5 | 31.0 | 3.1 | 9.9 | 14.6 | 5.7 |
| Cycle Queue Clearance Time ( *g c* ), s | 9.2 | 2.0 | 2.9 | 17.2 | 1.1 | | 0.5 | 31.0 | 3.1 | 9.9 | 14.6 | 5.7 |
| Green Ratio ( *g/C* ) | 0.08 | 0.08 | 0.12 | 0.13 | 0.13 | | 0.59 | 0.55 | 0.55 | 0.08 | 0.59 | 0.67 |
| Capacity ( *c* ), veh/h | 134 | 148 | 161 | 236 | 245 | | 426 | 1933 | 881 | 147 | 2030 | 1057 |
| Volume-to-Capacity Ratio ( *X* ) | 0.798 | 0.180 | 0.180 | 0.893 | 0.063 | | 0.031 | 0.657 | 0.145 | 0.824 | 0.325 | 0.153 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 7.7 | 1.7 | 1.8 | 12.7 | 0.9 | | 0.3 | 14.4 | 2.0 | 8.4 | 9.3 | 3.4 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.51 | 0.00 | 0.87 | 0.00 | 0.00 | | 0.04 | 0.00 | 0.00 | 2.11 | 0.00 | 0.29 |
| Uniform Delay ( *d 1* ), s/veh | 68.0 | 64.6 | 59.6 | 64.2 | 57.2 | | 13.8 | 15.7 | 8.4 | 67.8 | 15.7 | 9.3 |
| Incremental Delay ( *d 2* ), s/veh | 10.3 | 0.6 | 0.5 | 4.7 | 0.0 | | 0.0 | 1.2 | 0.2 | 10.3 | 0.4 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 78.3 | 65.2 | 60.1 | 68.8 | 57.2 | | 13.8 | 16.9 | 8.6 | 78.1 | 16.1 | 9.6 |
| Level of Service (LOS) | E | E | E | E | E | | B | B | A | E | B | A |
| Approach Delay, s/veh / LOS | 72.9 | E | | 68.0 | E | | 16.1 | B | | 23.0 | C | |
| Intersection Delay, s/veh / LOS | 26.1 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.47 | B | 2.48 | B | 1.91 | B | 2.09 | B |
| Bicycle LOS Score / LOS | 0.76 | A | 0.86 | A | 1.88 | B | 1.38 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:26:38 AM

## HCS Signalized Intersection Results Summary

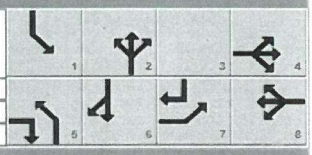
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | AM Peak | PHF | 0.90 |
| Urban Street | Preston Highway | Analysis Year | 2034 Build | Analysis Period | 1> 7:15 |
| Intersection | Interchange Drive | File Name | AM 34 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 96 | 24 | 36 | 190 | 13 | 1 | 24 | 1386 | 137 | 125 | 697 | 163 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 150.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | Off |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 6.0 | 6.3 | 82.0 | 11.8 | 19.6 | 0.0 | |
| Yellow | 3.5 | 0.0 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 0.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 17.8 | | 25.6 | 12.5 | 87.9 | 18.8 | 94.2 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 4.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 11.2 | | 19.2 | 2.9 | | 12.0 | |
| Green Extension Time ( *g e* ), s | | 0.6 | | 0.4 | 0.1 | 0.0 | 0.4 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 1.00 | | 0.99 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

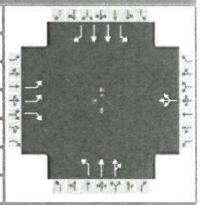
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 107 | 27 | 40 | 211 | 16 | | 22 | 1264 | 125 | 122 | 680 | 159 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1711 | 1900 | 1359 | 1810 | 1876 | | 1527 | 1766 | 1610 | 1810 | 1724 | 1585 |
| Queue Service Time ( *g s* ), s | 9.2 | 2.0 | 4.0 | 17.2 | 1.1 | | 0.9 | 31.2 | 3.2 | 10.0 | 15.2 | 5.6 |
| Cycle Queue Clearance Time ( *g c* ), s | 9.2 | 2.0 | 4.0 | 17.2 | 1.1 | | 0.9 | 31.2 | 3.2 | 10.0 | 15.2 | 5.6 |
| Green Ratio ( *g/C* ) | 0.08 | 0.08 | 0.12 | 0.13 | 0.13 | | 0.59 | 0.55 | 0.55 | 0.08 | 0.59 | 0.67 |
| Capacity ( *c* ), veh/h | 134 | 149 | 161 | 236 | 245 | | 418 | 1931 | 880 | 148 | 2029 | 1057 |
| Volume-to-Capacity Ratio ( *X* ) | 0.796 | 0.179 | 0.249 | 0.893 | 0.063 | | 0.052 | 0.655 | 0.142 | 0.824 | 0.335 | 0.151 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 7.7 | 1.7 | 2.5 | 12.7 | 0.9 | | 0.6 | 14.6 | 2.0 | 8.5 | 9.6 | 3.4 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.51 | 0.00 | 1.21 | 0.00 | 0.00 | | 0.07 | 0.00 | 0.00 | 2.12 | 0.00 | 0.28 |
| Uniform Delay ( *d 1* ), s/veh | 67.9 | 64.6 | 60.1 | 64.2 | 57.2 | | 14.0 | 16.0 | 8.6 | 67.8 | 15.8 | 9.3 |
| Incremental Delay ( *d 2* ), s/veh | 10.2 | 0.6 | 0.8 | 4.7 | 0.0 | | 0.0 | 1.2 | 0.2 | 10.3 | 0.4 | 0.3 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 78.1 | 65.2 | 60.9 | 68.8 | 57.2 | | 14.0 | 17.2 | 8.8 | 78.1 | 16.3 | 9.5 |
| Level of Service (LOS) | E | E | E | E | E | | B | B | A | E | B | A |
| Approach Delay, s/veh / LOS | 72.1 | E | | 68.0 | E | | 16.4 | B | | 23.0 | C | |
| Intersection Delay, s/veh / LOS | 26.4 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.47 | B | 2.48 | B | 1.91 | B | 2.09 | B |
| Bicycle LOS Score / LOS | 0.77 | A | 0.86 | A | 1.91 | B | 1.39 | A |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:28:52 AM

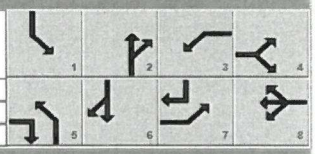
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Jun 2, 2021 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.98 |
| Urban Street | Preston Highway | Analysis Year | 2021 | Analysis Period | 1> 4:45 |
| Intersection | Interchange Dr | File Name | PM 21 Preston.xus | | |
| Project Description | Stern | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 184 | | 48 | 3 | 0 | 4 | 16 | 1222 | 2 | 0 | 1867 | 155 |

| Signal Information | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 | | | | | | | | |
| Offset, s | 0 | Reference Point | End | | | | | | | | |
| Uncoordinated | No | Simult. Gap E/W | On | Green | 3.4 | 126.2 | 20.0 | 6.0 | 0.0 | 0.0 | |
| Force Mode | Fixed | Simult. Gap N/S | On | Yellow | 3.5 | 4.3 | 3.6 | 3.6 | 0.0 | 0.0 | |
| | | | | Red | 3.0 | 1.6 | 2.4 | 2.4 | 0.0 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 12.0 | 2.0 | 4.0 | 2.0 | 3.0 |
| Phase Duration, s | | 26.0 | | 12.0 | 9.9 | 142.0 | 0.0 | 132.1 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.1 | 4.0 | 0.0 | 0.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | | | 2.7 | 3.6 | | | |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Phase Call Probability | | | | 1.00 | 0.56 | | | |
| Max Out Probability | | | | 0.00 | 0.00 | | | |

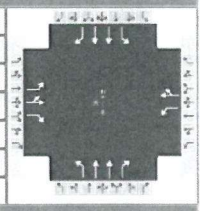
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 188 | | 49 | | 7 | | 16 | 630 | 629 | 0 | 1846 | 153 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1757 | | 1610 | | 1690 | | 1810 | 1885 | 1884 | 1810 | 1781 | 1598 |
| Queue Service Time ( *g s* ), s | 9.0 | | 4.9 | | 0.7 | | 1.6 | 19.9 | 19.9 | 0.0 | 61.1 | 3.8 |
| Cycle Queue Clearance Time ( *g c* ), s | 9.0 | | 4.9 | | 0.7 | | 1.6 | 19.9 | 19.9 | 0.0 | 61.1 | 3.8 |
| Green Ratio ( *g/C* ) | 0.11 | | 0.13 | | 0.03 | | 0.65 | 0.76 | 0.76 | | 0.70 | 0.81 |
| Capacity ( *c* ), veh/h | 390 | | 209 | | 56 | | 34 | 1425 | 1425 | 1 | 2497 | 1298 |
| Volume-to-Capacity Ratio ( *X* ) | 0.481 | | 0.234 | | 0.127 | | 0.486 | 0.442 | 0.442 | 0.000 | 0.739 | 0.118 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | 183.7 | | 91.7 | | 14.6 | | 37.6 | 268.5 | 266.1 | 0 | 788.8 | 48.1 |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 7.3 | | 3.7 | | 0.6 | | 1.5 | 10.7 | 10.6 | 0.0 | 31.1 | 1.9 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.46 | | 1.53 | | 0.00 | | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| Uniform Delay ( *d 1* ), s/veh | 75.1 | | 70.3 | | 84.5 | | 88.8 | 6.9 | 6.9 | 0.0 | 19.0 | 3.7 |
| Incremental Delay ( *d 2* ), s/veh | 0.9 | | 0.6 | | 0.4 | | 7.5 | 0.7 | 0.7 | 0.0 | 1.5 | 0.1 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | | 0.0 | | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 76.0 | | 70.9 | | 84.8 | | 96.3 | 7.6 | 7.6 | 0.0 | 20.5 | 3.8 |
| Level of Service (LOS) | E | | E | | F | | F | A | A | | C | A |
| Approach Delay, s/veh / LOS | 75.0 | E | | 84.8 | F | | 8.8 | A | | 19.2 | B | |
| Intersection Delay, s/veh / LOS | 19.3 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.33 | B | 2.49 | B | 1.64 | B | 2.07 | B |
| Bicycle LOS Score / LOS | | F | 0.50 | A | 1.53 | B | 2.19 | B |

 HCS™ Streets Version 7.9.5 Generated: 6/4/2021 2:44:56 PM

## HCS Signalized Intersection Results Summary

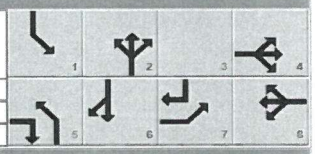
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.98 |
| Urban Street | Preston Highway | Analysis Year | 2024 No Build | Analysis Period | 1> 4:45 |
| Intersection | Interchange Dr | File Name | PM 24 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 192 | 28 | 48 | 221 | 12 | 4 | 28 | 1248 | 82 | 159 | 1764 | 158 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 4.4 | 7.4 | 90.7 | 22.1 | 24.5 | 0.0 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 3.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 28.1 | | 30.5 | 10.9 | 96.6 | 24.8 | 110.5 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 3.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 21.2 | | 24.1 | 3.3 | | 18.1 | |
| Green Extension Time ( *g e* ), s | | 0.9 | | 0.4 | 0.1 | 0.0 | 0.2 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 0.73 | | 1.00 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 196 | 29 | 49 | 226 | 16 | | 26 | 1172 | 77 | 162 | 1792 | 161 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1810 | 1900 | 1610 | 1810 | 1818 | | 1810 | 1795 | 1610 | 1810 | 1781 | 1598 |
| Queue Service Time ( *g s* ), s | 19.2 | 2.4 | 4.8 | 22.1 | 1.4 | | 1.3 | 40.0 | 2.3 | 16.1 | 74.4 | 4.8 |
| Cycle Queue Clearance Time ( *g c* ), s | 19.2 | 2.4 | 4.8 | 22.1 | 1.4 | | 1.3 | 40.0 | 2.3 | 16.1 | 74.4 | 4.8 |
| Green Ratio ( *g/C* ) | 0.12 | 0.12 | 0.15 | 0.14 | 0.14 | | 0.53 | 0.50 | 0.50 | 0.10 | 0.58 | 0.70 |
| Capacity ( *c* ), veh/h | 222 | 233 | 237 | 246 | 248 | | 126 | 1809 | 811 | 184 | 2070 | 1124 |
| Volume-to-Capacity Ratio ( *X* ) | 0.883 | 0.123 | 0.207 | 0.915 | 0.066 | | 0.208 | 0.648 | 0.095 | 0.878 | 0.866 | 0.143 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 14.5 | 2.1 | 3.6 | 15.9 | 1.2 | | 1.0 | 21.9 | 1.6 | 12.0 | 37.2 | 2.7 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.91 | 0.00 | 1.49 | 0.00 | 0.00 | | 0.10 | 0.00 | 0.00 | 3.00 | 0.00 | 0.23 |
| Uniform Delay ( *d 1* ), s/veh | 77.7 | 70.3 | 67.5 | 76.7 | 67.8 | | 32.4 | 27.8 | 11.6 | 88.1 | 28.5 | 6.8 |
| Incremental Delay ( *d 2* ), s/veh | 10.9 | 0.2 | 0.4 | 5.5 | 0.0 | | 0.6 | 1.3 | 0.2 | 3.5 | 3.5 | 0.2 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 88.6 | 70.6 | 68.0 | 82.2 | 67.8 | | 33.0 | 29.1 | 11.8 | 91.6 | 32.0 | 7.0 |
| Level of Service (LOS) | F | E | E | F | E | | C | C | B | F | C | A |
| Approach Delay, s/veh / LOS | 83.0 | F | | 81.2 | F | | 28.1 | C | | 34.7 | C | |
| Intersection Delay, s/veh / LOS | 38.8 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.48 | B | 2.49 | B | 1.92 | B | 2.10 | B |
| Bicycle LOS Score / LOS | 0.94 | A | 0.89 | A | 1.63 | B | 2.24 | B |

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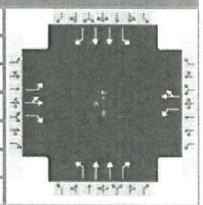
## HCS Signalized Intersection Results Summary

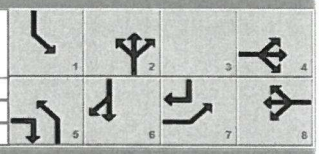
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.98 |
| Urban Street | Preston Highway | Analysis Year | 2024 Build | Analysis Period | 1> 4:45 |
| Intersection | Interchange Dr | File Name | PM 24 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 192 | 28 | 61 | 221 | 12 | 4 | 39 | 1268 | 82 | 159 | 1788 | 158 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 5.0 | 6.8 | 90.7 | 22.1 | 24.5 | 0.0 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 3.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 28.1 | | 30.5 | 11.5 | 96.6 | 24.8 | 109.9 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 3.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 21.2 | | 24.1 | 3.7 | | 18.0 | |
| Green Extension Time ( *g e* ), s | | 1.0 | | 0.4 | 0.1 | 0.0 | 0.2 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 0.83 | | 1.00 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 196 | 29 | 62 | 226 | 16 | | 36 | 1164 | 75 | 162 | 1816 | 161 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1810 | 1900 | 1610 | 1810 | 1818 | | 1810 | 1795 | 1610 | 1810 | 1781 | 1598 |
| Queue Service Time ( *g s* ), s | 19.2 | 2.4 | 6.1 | 22.1 | 1.4 | | 1.7 | 39.7 | 2.3 | 16.0 | 77.4 | 4.8 |
| Cycle Queue Clearance Time ( *g c* ), s | 19.2 | 2.4 | 6.1 | 22.1 | 1.4 | | 1.7 | 39.7 | 2.3 | 16.0 | 77.4 | 4.8 |
| Green Ratio ( *g/C* ) | 0.12 | 0.12 | 0.15 | 0.14 | 0.14 | | 0.53 | 0.50 | 0.50 | 0.10 | 0.58 | 0.70 |
| Capacity ( *c* ), veh/h | 222 | 233 | 243 | 246 | 248 | | 126 | 1808 | 811 | 184 | 2057 | 1119 |
| Volume-to-Capacity Ratio ( *X* ) | 0.881 | 0.122 | 0.257 | 0.915 | 0.066 | | 0.284 | 0.644 | 0.093 | 0.879 | 0.883 | 0.143 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 14.5 | 2.1 | 4.6 | 15.9 | 1.2 | | 1.4 | 21.7 | 1.6 | 11.9 | 38.6 | 2.8 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.91 | 0.00 | 1.91 | 0.00 | 0.00 | | 0.14 | 0.00 | 0.00 | 2.97 | 0.00 | 0.23 |
| Uniform Delay ( *d 1* ), s/veh | 77.6 | 70.3 | 67.5 | 76.7 | 67.8 | | 34.4 | 27.8 | 11.6 | 88.0 | 29.5 | 7.0 |
| Incremental Delay ( *d 2* ), s/veh | 10.8 | 0.2 | 0.6 | 5.5 | 0.0 | | 0.9 | 1.3 | 0.2 | 3.3 | 3.8 | 0.2 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 88.4 | 70.5 | 68.1 | 82.2 | 67.8 | | 35.3 | 29.1 | 11.8 | 91.4 | 33.4 | 7.1 |
| Level of Service (LOS) | F | E | E | F | E | | D | C | B | F | C | A |
| Approach Delay, s/veh / LOS | 82.2 | F | | 81.2 | F | | 28.2 | C | | 35.8 | D | |
| Intersection Delay, s/veh / LOS | 39.5 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.48 | B | 2.49 | B | 1.92 | B | 2.10 | B |
| Bicycle LOS Score / LOS | 0.96 | A | 0.89 | A | 1.66 | B | 2.26 | B |

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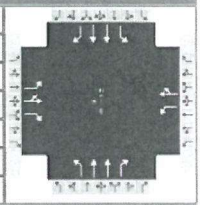
## HCS Signalized Intersection Results Summary

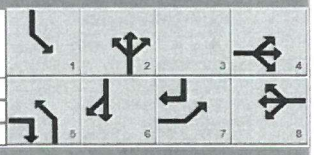
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.98 |
| Urban Street | Preston Highway | Analysis Year | 2034 No Build | Analysis Period | 1> 4:45 |
| Intersection | Interchange Dr | File Name | PM 34 NB Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 201 | 28 | 50 | 221 | 12 | 4 | 29 | 1312 | 82 | 159 | 1854 | 166 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 4.4 | 7.5 | 89.7 | 23.0 | 24.5 | 0.0 | |
| Yellow | 3.5 | 3.5 | 4.3 | 3.6 | 3.6 | 0.0 | |
| Red | 3.0 | 3.0 | 1.6 | 2.4 | 2.4 | 0.0 | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 29.0 | | 30.5 | 10.9 | 95.6 | 24.8 | 109.6 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 3.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 22.1 | | 24.1 | 3.3 | | 18.1 | |
| Green Extension Time ( *g e* ), s | | 0.9 | | 0.4 | 0.1 | 0.0 | 0.2 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 0.73 | | 1.00 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

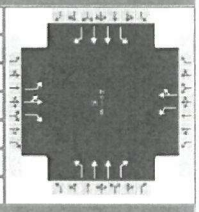
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 205 | 29 | 51 | 226 | 16 | | 26 | 1176 | 73 | 162 | 1888 | 169 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1810 | 1900 | 1610 | 1810 | 1818 | | 1810 | 1795 | 1610 | 1810 | 1781 | 1598 |
| Queue Service Time ( *g s* ), s | 20.1 | 2.4 | 5.0 | 22.1 | 1.4 | | 1.3 | 40.5 | 2.2 | 16.1 | 84.2 | 5.0 |
| Cycle Queue Clearance Time ( *g c* ), s | 20.1 | 2.4 | 5.0 | 22.1 | 1.4 | | 1.3 | 40.5 | 2.2 | 16.1 | 84.2 | 5.0 |
| Green Ratio ( *g/C* ) | 0.13 | 0.13 | 0.15 | 0.14 | 0.14 | | 0.52 | 0.50 | 0.50 | 0.10 | 0.58 | 0.70 |
| Capacity ( *c* ), veh/h | 231 | 243 | 245 | 246 | 248 | | 108 | 1790 | 803 | 184 | 2052 | 1125 |
| Volume-to-Capacity Ratio ( *X* ) | 0.887 | 0.118 | 0.208 | 0.915 | 0.066 | | 0.241 | 0.657 | 0.092 | 0.879 | 0.920 | 0.150 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 15.1 | 2.1 | 3.7 | 15.9 | 1.2 | | 1.0 | 22.1 | 1.5 | 11.8 | 41.3 | 2.8 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.94 | 0.00 | 1.55 | 0.00 | 0.00 | | 0.10 | 0.00 | 0.00 | 2.96 | 0.00 | 0.24 |
| Uniform Delay ( *d 1* ), s/veh | 77.2 | 69.5 | 66.8 | 76.7 | 67.8 | | 37.1 | 28.1 | 11.7 | 88.4 | 30.1 | 6.7 |
| Incremental Delay ( *d 2* ), s/veh | 10.9 | 0.2 | 0.4 | 5.5 | 0.0 | | 0.8 | 1.4 | 0.2 | 3.2 | 5.2 | 0.2 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 88.1 | 69.7 | 67.2 | 82.2 | 67.8 | | 37.9 | 29.5 | 11.9 | 91.5 | 35.3 | 6.9 |
| Level of Service (LOS) | F | E | E | F | E | | D | C | B | F | D | A |
| Approach Delay, s/veh / LOS | 82.5 | F | | 81.2 | F | | 28.6 | C | | 37.2 | D | |
| Intersection Delay, s/veh / LOS | 40.4 | | | | | | D | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.48 | B | 2.49 | B | 1.92 | B | 2.10 | B |
| Bicycle LOS Score / LOS | 0.96 | A | 0.89 | A | 1.69 | B | 2.32 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:33:57 AM

## HCS Signalized Intersection Results Summary

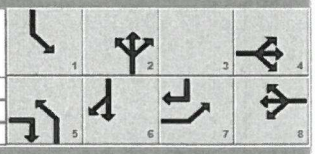
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | Diane B. Zimmerman Traffic Engineering | | | Duration, h | 0.250 |
| Analyst | DBZ | Analysis Date | Sep 20, 2022 | Area Type | Other |
| Jurisdiction | | Time Period | PM Peak | PHF | 0.98 |
| Urban Street | Preston Highway | Analysis Year | 2034 Build | Analysis Period | 1> 4:45 |
| Intersection | Interchange Dr | File Name | PM 34 B Preston.xus | | |
| Project Description | Commerce Crossings 2 | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 201 | 28 | 63 | 221 | 12 | 4 | 40 | 1332 | 82 | 159 | 1878 | 166 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 180.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Fixed | Simult. Gap N/S | On |

| | | | | | | |
|---|---|---|---|---|---|---|
| Green | 5.0 | 6.9 | 89.7 | 23.1 | 24.5 | 0.0 |
| Yellow | 3.5 | 3.5 | 4.3 | 3.6 | 3.6 | 0.0 |
| Red | 3.0 | 3.0 | 1.6 | 2.4 | 2.4 | 0.0 |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 4 | | 8 | 5 | 2 | 1 | 6 |
| Case Number | | 9.0 | | 10.0 | 1.1 | 3.0 | 2.0 | 3.0 |
| Phase Duration, s | | 29.1 | | 30.5 | 11.5 | 95.6 | 24.8 | 109.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | 6.5 | 5.9 | 6.5 | 5.9 |
| Max Allow Headway ( *MAH* ), s | | 4.0 | | 3.0 | 4.0 | 0.0 | 3.0 | 0.0 |
| Queue Clearance Time ( *g s* ), s | | 22.1 | | 24.1 | 3.7 | | 18.1 | |
| Green Extension Time ( *g e* ), s | | 1.0 | | 0.4 | 0.1 | 0.0 | 0.2 | 0.0 |
| Phase Call Probability | | 1.00 | | 1.00 | 0.83 | | 1.00 | |
| Max Out Probability | | 0.00 | | 0.00 | 0.00 | | 0.00 | |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 7 | 4 | 14 | 3 | 8 | 18 | 5 | 2 | 12 | 1 | 6 | 16 |
| Adjusted Flow Rate ( *v* ), veh/h | 205 | 29 | 64 | 226 | 16 | | 35 | 1168 | 72 | 162 | 1912 | 169 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 1810 | 1900 | 1610 | 1810 | 1818 | | 1810 | 1795 | 1610 | 1810 | 1781 | 1598 |
| Queue Service Time ( *g s* ), s | 20.1 | 2.4 | 6.3 | 22.1 | 1.4 | | 1.7 | 40.2 | 2.2 | 16.1 | 88.2 | 5.3 |
| Cycle Queue Clearance Time ( *g c* ), s | 20.1 | 2.4 | 6.3 | 22.1 | 1.4 | | 1.7 | 40.2 | 2.2 | 16.1 | 88.2 | 5.3 |
| Green Ratio ( *g/C* ) | 0.13 | 0.13 | 0.16 | 0.14 | 0.14 | | 0.53 | 0.50 | 0.50 | 0.10 | 0.57 | 0.70 |
| Capacity ( *c* ), veh/h | 232 | 243 | 251 | 246 | 248 | | 107 | 1789 | 802 | 184 | 2039 | 1119 |
| Volume-to-Capacity Ratio ( *X* ) | 0.885 | 0.117 | 0.257 | 0.915 | 0.066 | | 0.328 | 0.653 | 0.090 | 0.879 | 0.938 | 0.151 |
| Back of Queue ( *Q* ), ft/ln ( 95 th percentile) | | | | | | | | | | | | |
| Back of Queue ( *Q* ), veh/ln ( 95 th percentile) | 15.1 | 2.1 | 4.7 | 15.9 | 1.2 | | 1.4 | 21.9 | 1.5 | 11.7 | 43.9 | 3.0 |
| Queue Storage Ratio ( *RQ* ) ( 95 th percentile) | 0.94 | 0.00 | 1.96 | 0.00 | 0.00 | | 0.14 | 0.00 | 0.00 | 2.92 | 0.00 | 0.25 |
| Uniform Delay ( *d 1* ), s/veh | 77.2 | 69.5 | 66.8 | 76.7 | 67.8 | | 40.1 | 28.1 | 11.7 | 88.0 | 32.6 | 7.3 |
| Incremental Delay ( *d 2* ), s/veh | 10.7 | 0.2 | 0.5 | 5.5 | 0.0 | | 1.3 | 1.3 | 0.2 | 3.0 | 6.1 | 0.2 |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay ( *d* ), s/veh | 87.9 | 69.7 | 67.4 | 82.2 | 67.8 | | 41.4 | 29.5 | 11.9 | 91.0 | 38.7 | 7.4 |
| Level of Service (LOS) | F | E | E | F | E | | D | C | B | F | D | A |
| Approach Delay, s/veh / LOS | 81.7 | F | | 81.2 | F | | 28.8 | C | | 40.1 | D | |
| Intersection Delay, s/veh / LOS | 42.1 | | | | | | D | | | | | |

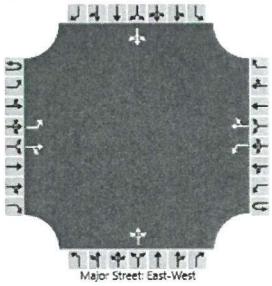
| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 2.48 | B | 2.49 | B | 1.92 | B | 2.10 | B |
| Bicycle LOS Score / LOS | 0.98 | A | 0.89 | A | 1.71 | B | 2.34 | B |

 HCS™ Streets Version 2022 Generated: 9/21/2022 11:35:41 AM

# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 11/10/2021 | East/West Street | Commerce Crossing |
| Analysis Year | 2021 | North/South Street | Cooper Church Rd |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 4 | 62 | 9 | | 118 | 453 | 28 | | 0 | 0 | 3 | | 41 | 0 | 1 |
| Percent Heavy Vehicles (%) | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 5 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.10 | | | | 7.10 | 6.50 | 6.20 | | 7.15 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.20 | | | | 3.50 | 4.00 | 3.30 | | 3.55 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 6 | | | | 164 | | | | | 4 | | | | 58 | |
| Capacity, c (veh/h) | | 931 | | | | 1507 | | | | | | | | | 236 | |
| v/c Ratio | | 0.01 | | | | 0.11 | | | | | | | | | 0.25 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.4 | | | | | | | | | 0.9 | |
| Control Delay (s/veh) | | 8.9 | | | | 7.7 | | | | | | | | | 25.2 | |
| Level of Service (LOS) | | A | | | | A | | | | | | | | | D | |
| Approach Delay (s/veh) | | 0.5 | | | | 1.5 | | | | | | | | 25.2 | | |
| Approach LOS | | | | | | | | | | | | | | D | | |



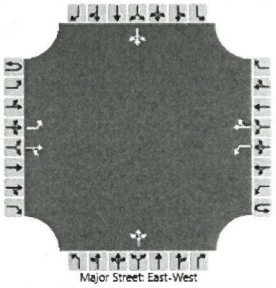
HCS™ TWSC Version 7.9.5
Cooper Church AM 21.xtw

Generated: 11/10/2021 9:04:08 PM

# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 11/10/2021 | East/West Street | Commerce Crossing |
| Analysis Year | 2024 | North/South Street | Cooper Church Rd |
| Time Analyzed | AM Peak No Build | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 4 | 63 | 9 | | 120 | 460 | 28 | | 0 | 0 | 3 | | 42 | 0 | 1 |
| Percent Heavy Vehicles (%) | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 5 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.10 | | | | 7.10 | 6.50 | 6.20 | | 7.15 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.20 | | | | 3.50 | 4.00 | 3.30 | | 3.55 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

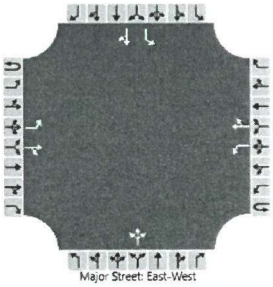
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 6 | | | | 167 | | | | | 4 | | | | 60 | |
| Capacity, c (veh/h) | | 924 | | | | 1505 | | | | | | | | | 231 | |
| v/c Ratio | | 0.01 | | | | 0.11 | | | | | | | | | 0.26 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.4 | | | | | | | | | 1.0 | |
| Control Delay (s/veh) | | 8.9 | | | | 7.7 | | | | | | | | | 25.9 | |
| Level of Service (LOS) | | A | | | | A | | | | | | | | | D | |
| Approach Delay (s/veh) | | 0.5 | | | | 1.5 | | | | | | | | 25.9 | | |
| Approach LOS | | | | | | | | | | | | | | D | | |


HCS™ TWSC Version 7.9.5
Cooper Church AM 24 NB.xtw
Generated: 11/10/2021 9:05:58 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Commerce Crossing |
| Analysis Year | 2024 | North/South Street | Cooper Church Rd |
| Time Analyzed | AM Peak Build | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 1 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | L | | TR |
| Volume (veh/h) | | 6 | 127 | 9 | | 120 | 558 | 42 | | 0 | 0 | 3 | | 82 | 0 | 9 |
| Percent Heavy Vehicles (%) | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.10 | | | | 7.10 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.20 | | | | 3.50 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 8 | | | | 167 | | | | | 4 | | | 114 | | 13 |
| Capacity, c (veh/h) | | 808 | | | | 1397 | | | | | | | | 182 | | 386 |
| v/c Ratio | | 0.01 | | | | 0.12 | | | | | | | | 0.63 | | 0.03 |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.4 | | | | | | | | 3.6 | | 0.1 |
| Control Delay (s/veh) | | 9.5 | | | | 7.9 | | | | | | | | 53.3 | | 14.6 |
| Level of Service (LOS) | | A | | | | A | | | | | | | | F | | B |
| Approach Delay (s/veh) | | 0.4 | | | | 1.3 | | | | | | | | 49.4 | | |
| Approach LOS | | A | | | | A | | | | | | | | E | | |



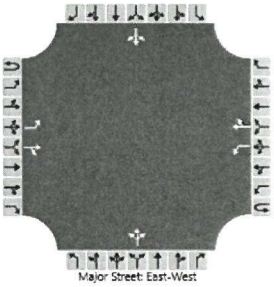
HCS™ TWSC Version 2022
Cooper Church AM 24 B.xtw

Generated: 9/22/2022 2:22:29 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/2022 | East/West Street | Commerce Crossing |
| Analysis Year | 2034 | North/South Street | Cooper Church Rd |
| Time Analyzed | AM Peak Build | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 6 | 125 | 10 | | 126 | 581 | 44 | | 0 | 0 | 3 | | 89 | 0 | 9 |
| Percent Heavy Vehicles (%) | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.10 | | | | 7.10 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.20 | | | | 3.50 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 8 | | | | 175 | | | | | 4 | | | | 136 | |
| Capacity, c (veh/h) | | 785 | | | | 1399 | | | | | | | | | 179 | |
| v/c Ratio | | 0.01 | | | | 0.13 | | | | | | | | | 0.76 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.4 | | | | | | | | | 5.0 | |
| Control Delay (s/veh) | | 9.6 | | | | 7.9 | | | | | | | | | 70.5 | |
| Level of Service (LOS) | | A | | | | A | | | | | | | | | F | |
| Approach Delay (s/veh) | | 0.4 | | | | 1.3 | | | | | | | | 70.5 | | |
| Approach LOS | | A | | | | A | | | | | | | | F | | |



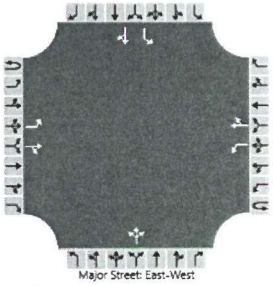
HCS™ TWSC Version 2022
Cooper Church AM 34 B.xtw

Generated: 9/21/2022 10:01:01 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Commerce Crossing |
| Analysis Year | 2034 | North/South Street | Cooper Church Rd |
| Time Analyzed | AM Peak Build | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 1 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | L | | TR |
| Volume (veh/h) | | 6 | 142 | 10 | | 126 | 581 | 44 | | 0 | 0 | 3 | | 72 | 0 | 9 |
| Percent Heavy Vehicles (%) | | 0 | | | | 0 | | | | 0 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.10 | | | | 7.10 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.20 | | | | 3.50 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 8 | | | | 175 | | | | | 4 | | | 100 | | 13 |
| Capacity, c (veh/h) | | 785 | | | | 1371 | | | | | | | | 168 | | 369 |
| v/c Ratio | | 0.01 | | | | 0.13 | | | | | | | | 0.60 | | 0.03 |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.4 | | | | | | | | 3.2 | | 0.1 |
| Control Delay (s/veh) | | 9.6 | | | | 8.0 | | | | | | | | 53.9 | | 15.1 |
| Level of Service (LOS) | | A | | | | A | | | | | | | | F | | C |
| Approach Delay (s/veh) | | 0.4 | | | | 1.3 | | | | | | | | 49.6 | | |
| Approach LOS | | A | | | | A | | | | | | | | E | | |



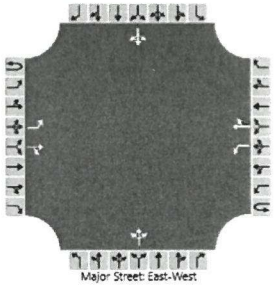
HCS™ TWSC Version 2022
Cooper Church AM 34 B.xtw

Generated: 9/22/2022 2:23:24 PM

# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 11/10/2021 | East/West Street | Commerce Crossing |
| Analysis Year | 2021 | North/South Street | Cooper Church Rd |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 8 | 390 | 1 | | 10 | 116 | 46 | | 10 | 0 | 87 | | 46 | 0 | 2 |
| Percent Heavy Vehicles (%) | | 0 | | | | 10 | | | | 10 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.20 | | | | 7.20 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.29 | | | | 3.59 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 11 | | | | 13 | | | | | 129 | | | | 64 | |
| Capacity, c (veh/h) | | 1366 | | | | 1005 | | | | | 624 | | | | 321 | |
| v/c Ratio | | 0.01 | | | | 0.01 | | | | | 0.21 | | | | 0.20 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.0 | | | | | 0.8 | | | | 0.7 | |
| Control Delay (s/veh) | | 7.7 | | | | 8.6 | | | | | 12.3 | | | | 19.0 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | C | |
| Approach Delay (s/veh) | | 0.2 | | | | 0.5 | | | | 12.3 | | | | 19.0 | | |
| Approach LOS | | | | | | | | | | B | | | | C | | |



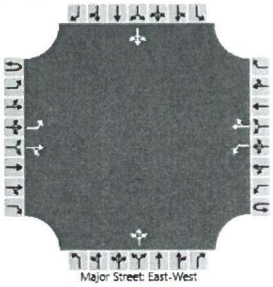
HCS™ TWSC Version 7.9.5
Cooper Church PM 21.xtw

Generated: 11/10/2021 9:11:47 PM

# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 11/10/2021 | East/West Street | Commerce Crossing |
| Analysis Year | 2024 | North/South Street | Cooper Church Rd |
| Time Analyzed | PM Peak No Build | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 8 | 396 | 1 | | 10 | 118 | 47 | | 10 | 0 | 88 | | 47 | 0 | 2 |
| Percent Heavy Vehicles (%) | | 0 | | | | 10 | | | | 10 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.20 | | | | 7.20 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.29 | | | | 3.59 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 11 | | | | 13 | | | | | 131 | | | | 65 | |
| Capacity, c (veh/h) | | 1361 | | | | 998 | | | | | 617 | | | | 315 | |
| v/c Ratio | | 0.01 | | | | 0.01 | | | | | 0.21 | | | | 0.21 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.0 | | | | | 0.8 | | | | 0.8 | |
| Control Delay (s/veh) | | 7.7 | | | | 8.7 | | | | | 12.4 | | | | 19.4 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | C | |
| Approach Delay (s/veh) | | 0.2 | | | | 0.5 | | | | | 12.4 | | | | 19.4 | |
| Approach LOS | | | | | | | | | | | B | | | | C | |



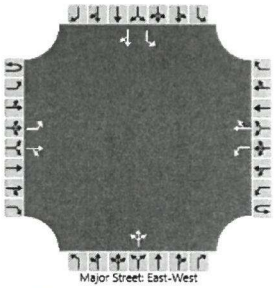
HCS™ TWSC Version 7.9.5
Cooper Church PM 24 NB.xtw

Generated: 11/10/2021 10:37:13 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/22 | East/West Street | Commerce Crossing |
| Analysis Year | 2024 | North/South Street | Cooper Church Rd |
| Time Analyzed | PM Peak Build | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 1 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | L | | TR |
| Volume (veh/h) | | 17 | 502 | 1 | | 10 | 187 | 95 | | 10 | 0 | 88 | | 75 | 0 | 7 |
| Percent Heavy Vehicles (%) | | 0 | | | | 10 | | | | 10 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.20 | | | | 7.20 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.29 | | | | 3.59 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 23 | | | | 13 | | | | | 131 | | | 100 | | 9 |
| Capacity, c (veh/h) | | 1194 | | | | 883 | | | | | 506 | | | 239 | | 732 |
| v/c Ratio | | 0.02 | | | | 0.02 | | | | | 0.26 | | | 0.42 | | 0.01 |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | 0.0 | | | | | 1.0 | | | 1.9 | | 0.0 |
| Control Delay (s/veh) | | 8.1 | | | | 9.1 | | | | | 14.6 | | | 30.4 | | 10.0 |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | D | | A |
| Approach Delay (s/veh) | | 0.3 | | | | 0.3 | | | | 14.6 | | | | 28.7 | | |
| Approach LOS | | A | | | | A | | | | B | | | | D | | |



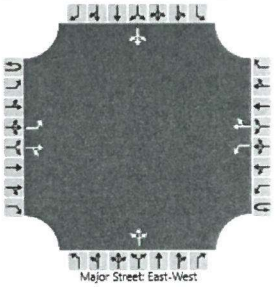
HCS™ TWSC Version 2022
Cooper Church PM 24 B.xtw

Generated: 9/22/2022 2:24:17 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/22 | East/West Street | Commerce Crossing |
| Analysis Year | 2034 | North/South Street | Cooper Church Rd |
| Time Analyzed | PM Peak No Build | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 0 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | | LTR | |
| Volume (veh/h) | | 9 | 416 | 1 | | 11 | 124 | 49 | | 11 | 0 | 93 | | 49 | 0 | 2 |
| Percent Heavy Vehicles (%) | | 0 | | | | 10 | | | | 10 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.20 | | | | 7.20 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.29 | | | | 3.59 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 12 | | | | 15 | | | | | 139 | | | | 68 | |
| Capacity, c (veh/h) | | 1349 | | | | 976 | | | | | 591 | | | | 316 | |
| v/c Ratio | | 0.01 | | | | 0.02 | | | | | 0.23 | | | | 0.22 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | 0.0 | | | | | 0.9 | | | | 0.8 | |
| Control Delay (s/veh) | | 7.7 | | | | 8.7 | | | | | 13.0 | | | | 19.5 | |
| Level of Service (LOS) | | A | | | | A | | | | | B | | | | C | |
| Approach Delay (s/veh) | | 0.2 | | | | 0.5 | | | | 13.0 | | | | 19.5 | | |
| Approach LOS | | A | | | | A | | | | B | | | | C | | |



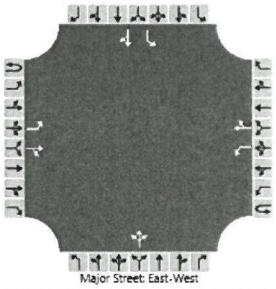
HCS™ TWSC Version 2022
Cooper Church PM 34 NB.xtw

Generated: 9/21/2022 10:02:18 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Commerce Crossing at Coop |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/22 | East/West Street | Commerce Crossing |
| Analysis Year | 2034 | North/South Street | Cooper Church Rd |
| Time Analyzed | PM Peak Build | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | | 0 | 1 | 0 | | 1 | 1 | 0 |
| Configuration | | L | | TR | | L | | TR | | | LTR | | | L | | TR |
| Volume (veh/h) | | 18 | 522 | 1 | | 11 | 193 | 97 | | 11 | 0 | 93 | | 77 | 0 | 7 |
| Percent Heavy Vehicles (%) | | 0 | | | | 10 | | | | 10 | 0 | 0 | | 2 | 0 | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | 4.1 | | | | 7.1 | 6.5 | 6.2 | | 7.1 | 6.5 | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | 4.20 | | | | 7.20 | 6.50 | 6.20 | | 7.12 | 6.50 | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | 2.2 | | | | 3.5 | 4.0 | 3.3 | | 3.5 | 4.0 | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | 2.29 | | | | 3.59 | 4.00 | 3.30 | | 3.52 | 4.00 | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 24 | | | | 15 | | | | | 139 | | | 103 | | 9 |
| Capacity, c (veh/h) | | 1183 | | | | 863 | | | | | 490 | | | 222 | | 724 |
| v/c Ratio | | 0.02 | | | | 0.02 | | | | | 0.28 | | | 0.46 | | 0.01 |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | 0.1 | | | | | 1.2 | | | 2.2 | | 0.0 |
| Control Delay (s/veh) | | 8.1 | | | | 9.2 | | | | | 15.2 | | | 34.5 | | 10.0 |
| Level of Service (LOS) | | A | | | | A | | | | | C | | | D | | B |
| Approach Delay (s/veh) | | 0.3 | | | | 0.3 | | | | | 15.2 | | | 32.5 | | |
| Approach LOS | | A | | | | A | | | | | C | | | D | | |



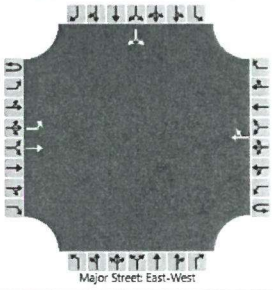
HCS™ TWSC Version 2022
Cooper Church PM 34 B.xtw

Generated: 9/21/2022 10:08:08 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Entrance on Commerce Cro |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 5/25/22 | East/West Street | Commerce Crossings |
| Analysis Year | 2024 | North/South Street | Entrance |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 15 | 80 | | | | 477 | 86 | | | | | | 22 | | 4 |
| Percent Heavy Vehicles (%) | | 3 | | | | | | | | | | | | 3 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.13 | | | | | | | | | | | | 6.43 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.23 | | | | | | | | | | | | 3.53 | | 3.33 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 21 | | | | | | | | | | | | | 36 | |
| Capacity, c (veh/h) | | 831 | | | | | | | | | | | | | 404 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.09 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 9.4 | | | | | | | | | | | | | 14.8 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 1.5 | | | | | | | | | | | | 14.8 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |



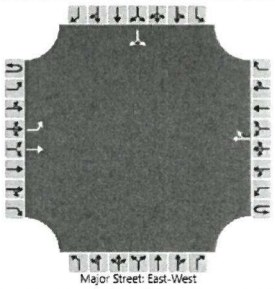
HCS™ TWSC Version 2022
Commerce Entrance AM 24.xtw

Generated: 5/25/2022 7:41:17 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Entrance on Commerce Cro |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/22 | East/West Street | Commerce Crossings |
| Analysis Year | 2034 | North/South Street | Entrance |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 15 | 84 | | | | 499 | 86 | | | | | | 22 | | 4 |
| Percent Heavy Vehicles (%) | | 3 | | | | | | | | | | | | 3 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.13 | | | | | | | | | | | | 6.43 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.23 | | | | | | | | | | | | 3.53 | | 3.33 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 21 | | | | | | | | | | | | | 36 | |
| Capacity, c (veh/h) | | 810 | | | | | | | | | | | | | 390 | |
| v/c Ratio | | 0.03 | | | | | | | | | | | | | 0.09 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 9.6 | | | | | | | | | | | | | 15.2 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | 1.4 | | | | | | | | | | | | 15.2 | | | |
| Approach LOS | A | | | | | | | | | | | | C | | | |



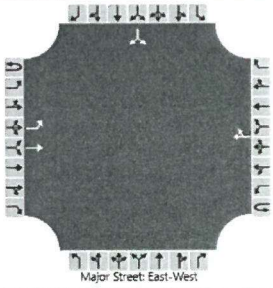
HCS™ TWSC Version 2022
Commerce Entrance AM 34.xtw

Generated: 9/21/2022 10:12:04 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Entrance on Commerce Cro |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 5/25/22 | East/West Street | Commerce Crossings |
| Analysis Year | 2024 | North/South Street | Entrance |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 5 | 421 | | | | 141 | 29 | | | | | | 82 | | 15 |
| Percent Heavy Vehicles (%) | | 3 | | | | | | | | | | | | 3 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.13 | | | | | | | | | | | | 6.43 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.23 | | | | | | | | | | | | 3.53 | | 3.33 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 7 | | | | | | | | | | | | | 129 | |
| Capacity, c (veh/h) | | 1336 | | | | | | | | | | | | | 490 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.26 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 1.1 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 15.0 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.1 | | | | | | | | | | | | 15.0 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |



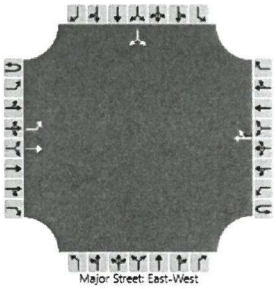
HCS™ TWSC Version 2022
Commerce Entrance PM 24.xtw

Generated: 5/25/2022 7:41:49 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Entrance on Commerce Cro |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/22 | East/West Street | Commerce Crossings |
| Analysis Year | 2034 | North/South Street | Entrance |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 5 | 442 | | | | 146 | 29 | | | | | | 82 | | 15 |
| Percent Heavy Vehicles (%) | | 3 | | | | | | | | | | | | 3 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Left Only | | | | | | | | 1 | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.13 | | | | | | | | | | | | 6.43 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.23 | | | | | | | | | | | | 3.53 | | 3.33 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 7 | | | | | | | | | | | | | 129 | |
| Capacity, c (veh/h) | | 1328 | | | | | | | | | | | | | 475 | |
| v/c Ratio | | 0.01 | | | | | | | | | | | | | 0.27 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 1.1 | |
| Control Delay (s/veh) | | 7.7 | | | | | | | | | | | | | 15.4 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | | 0.1 | | | | | | | | | | | | 15.4 | | |
| Approach LOS | | A | | | | | | | | | | | | C | | |



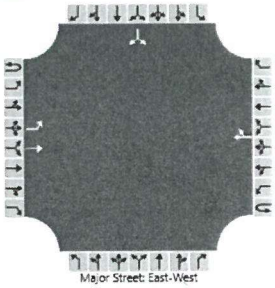
HCS TWSC Version 2022
Commerce Entrance PM 34.xtw

Generated: 9/21/2022 10:12:55 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | Diane Zimmerman | Intersection | Commerce Crossing Apt Ent |
| Agency/Co. | Diane B. Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Commerce Crossing Drive |
| Analysis Year | 2024 | North/South Street | Apart Entrace |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossing 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 2 | 100 | | | | 555 | 12 | | | | | | 42 | | 7 |
| Percent Heavy Vehicles (%) | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | | | | | | | | | 6.40 | | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | | | | | | | | | 3.50 | | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 3 | | | | | | | | | | | | | 68 | |
| Capacity, c (veh/h) | | 841 | | | | | | | | | | | | | 388 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.18 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 0.6 | |
| Control Delay (s/veh) | | 9.3 | | | | | | | | | | | | | 16.2 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | 0.2 | | | | | | | | | | | | 16.2 | | | |
| Approach LOS | A | | | | | | | | | | | | C | | | |



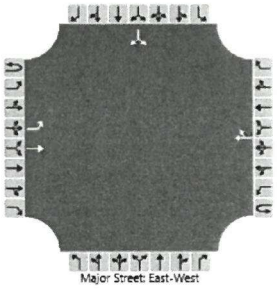
HCS™ TWSC Version 2022
Apt CC AM.xtw

Generated: 9/22/2022 2:40:51 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | Diane Zimmerman | Intersection | Commerce Crossing Apt Ent |
| Agency/Co. | Diane B. Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Commerce Crossing Drive |
| Analysis Year | 2034 | North/South Street | Apart Entrace |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossing 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 2 | 104 | | | | 578 | 12 | | | | | | 57 | | 7 |
| Percent Heavy Vehicles (%) | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | | | | | | | | | 6.40 | | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | | | | | | | | | 3.50 | | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 3 | | | | | | | | | | | | | 89 | |
| Capacity, c (veh/h) | | 818 | | | | | | | | | | | | | 374 | |
| v/c Ratio | | 0.00 | | | | | | | | | | | | | 0.24 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 0.9 | |
| Control Delay (s/veh) | | 9.4 | | | | | | | | | | | | | 17.6 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | 0.2 | | | | | | | | | | | | 17.6 | | | |
| Approach LOS | A | | | | | | | | | | | | C | | | |



HCS™ TWSC Version 2022
Apt CC AM 34.xtw

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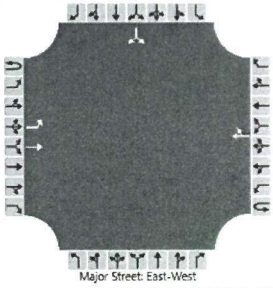
# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | Diane Zimmerman | Intersection | Commerce Crossing Apt Ent |
| Agency/Co. | Diane B. Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 8/15/2022 | East/West Street | Commerce Crossing Drive |
| Analysis Year | 2024 | North/South Street | Apart Entrace |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossing 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 7 | 496 | | | | 164 | 40 | | | | | | 24 | | 4 |
| Percent Heavy Vehicles (%) | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | | | | | | | | | 6.40 | | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | | | | | | | | | 3.50 | | 3.30 |

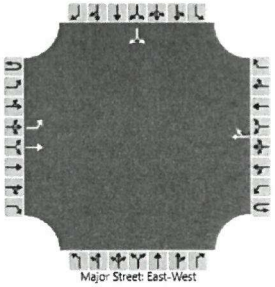
## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 9 | | | | | | | | | | | | | 37 | |
| Capacity, c (veh/h) | | 1303 | | | | | | | | | | | | | 436 | |
| v/c Ratio | | 0.01 | | | | | | | | | | | | | 0.09 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 14.0 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.1 | | | | | | | | | | | | 14.0 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | Diane Zimmerman | Intersection | Commerce Crossing Apt Ent |
| Agency/Co. | Diane B. Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/21/2022 | East/West Street | Commerce Crossing Drive |
| Analysis Year | 2034 | North/South Street | Apart Entrace |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossing 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | L | T | | | | | TR | | | | | | | LR | |
| Volume (veh/h) | | 7 | 517 | | | | 171 | 40 | | | | | | 24 | | 4 |
| Percent Heavy Vehicles (%) | | 0 | | | | | | | | | | | | 0 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Left Only | | | | | | | | 1 | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.10 | | | | | | | | | | | | 6.40 | | 6.20 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.20 | | | | | | | | | | | | 3.50 | | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 9 | | | | | | | | | | | | | 37 | |
| Capacity, c (veh/h) | | 1293 | | | | | | | | | | | | | 423 | |
| v/c Ratio | | 0.01 | | | | | | | | | | | | | 0.09 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.0 | | | | | | | | | | | | | 0.3 | |
| Control Delay (s/veh) | | 7.8 | | | | | | | | | | | | | 14.3 | |
| Level of Service (LOS) | | A | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | 0.1 | | | | | | | | | | | | 14.3 | | | |
| Approach LOS | A | | | | | | | | | | | | B | | | |



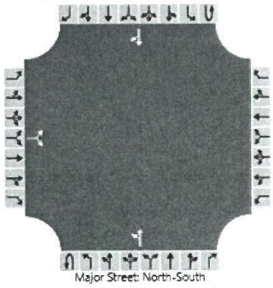
HCS™ TWSC Version 2022
Apt CC PM 34.xtw

Generated: 9/21/2022 10:11:05 AM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Cooper Church at Entrance |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Entrance |
| Analysis Year | 2024 | North/South Street | Cooper Church Road |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | North-South | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | LT | | | | | | TR |
| Volume (veh/h) | | 0 | | 48 | | | | | | 16 | 32 | | | | 43 | 0 |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.43 | | 6.23 | | | | | | 4.13 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 67 | | | | | | | 22 | | | | | | |
| Capacity, c (veh/h) | | | 1003 | | | | | | | 1538 | | | | | | |
| v/c Ratio | | | 0.07 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.2 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 8.8 | | | | | | | 7.4 | 0.1 | | | | | |
| Level of Service (LOS) | | | A | | | | | | | A | A | | | | | |
| Approach Delay (s/veh) | | 8.8 | | | | | | | | 2.5 | | | | | | |
| Approach LOS | | A | | | | | | | | A | | | | | | |



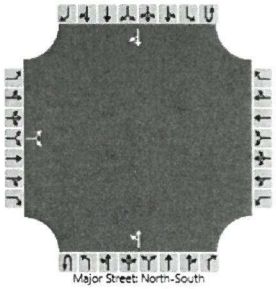
HCS™ TWSC Version 2022
Cooper Ent AM.xtw

Generated: 9/22/2022 3:17:24 PM

# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Cooper Church at Entrance |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 9/22/2022 | East/West Street | Entrance |
| Analysis Year | 2034 | North/South Street | Cooper Church Road |
| Time Analyzed | AM Peak | Peak Hour Factor | 0.72 |
| Intersection Orientation | North-South | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | LT | | | | | | TR |
| Volume (veh/h) | | 0 | | 36 | | | | | | 16 | 32 | | | | 43 | 0 |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.43 | | 6.23 | | | | | | 4.13 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 50 | | | | | | | 22 | | | | | | |
| Capacity, c (veh/h) | | | 1003 | | | | | | | 1538 | | | | | | |
| v/c Ratio | | | 0.05 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.2 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 8.8 | | | | | | | 7.4 | 0.1 | | | | | |
| Level of Service (LOS) | | | A | | | | | | | A | A | | | | | |
| Approach Delay (s/veh) | | 8.8 | | | | | | | | 2.5 | | | | | | |
| Approach LOS | | A | | | | | | | | A | | | | | | |



HCS™ TWSC Version 2022
Cooper Ent AM 34.xtw

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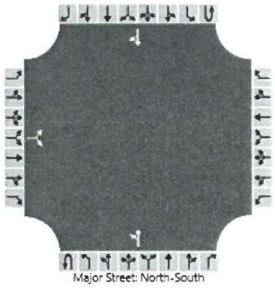
# HCS Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | DBZ | Intersection | Cooper Church at Entrance |
| Agency/Co. | Diane B Zimmerman Traffic Engineering | Jurisdiction | |
| Date Performed | 8/15/2022 | East/West Street | Entrance |
| Analysis Year | 2024 | North/South Street | Cooper Church Road |
| Time Analyzed | PM Peak | Peak Hour Factor | 0.75 |
| Intersection Orientation | North-South | Analysis Time Period (hrs) | 0.25 |
| Project Description | Commerce Crossings 2 | | |

## Lanes




## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | LT | | | | | | TR |
| Volume (veh/h) | | 0 | | 33 | | | | | | 57 | 55 | | | | 49 | 0 |
| Percent Heavy Vehicles (%) | | 3 | | 3 | | | | | | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | | | | | | | | | | | | | | | |
| Median Type \| Storage | Undivided | | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.43 | | 6.23 | | | | | | 4.13 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.53 | | 3.33 | | | | | | 2.23 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 44 | | | | | | | 76 | | | | | | |
| Capacity, c (veh/h) | | | 996 | | | | | | | 1530 | | | | | | |
| v/c Ratio | | | 0.04 | | | | | | | 0.05 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.1 | | | | | | | 0.2 | | | | | | |
| Control Delay (s/veh) | | | 8.8 | | | | | | | 7.5 | 0.4 | | | | | |
| Level of Service (LOS) | | | A | | | | | | | A | A | | | | | |
| Approach Delay (s/veh) | 8.8 | | | | | | | | 4.0 | | | | | | | |
| Approach LOS | A | | | | | | | | A | | | | | | | |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AM PEAK HOUR Commerce Crossings Entrance

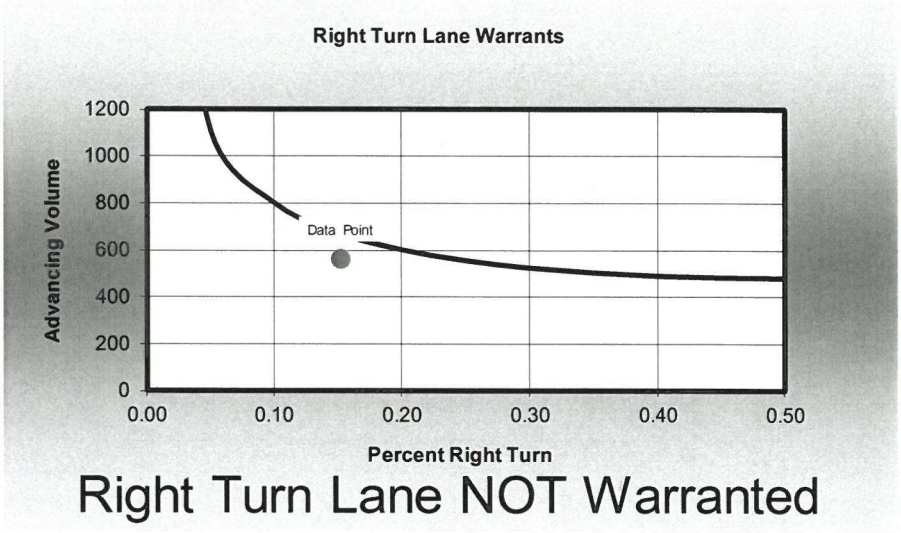
## Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph) 86

Speed Limit (mph) 35

Advancing Volume (vph) 562




**Right Turn Lane NOT Warranted**

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

PM PEAK HOUR Entrance on Cooper Church Road

## Left Turn Lane Warrants

Input Fields

| | | | |
|---|---|---|---|
| Left Turn Volume (vph) | 57 | Speed Limit (mph) | 35 |
| Advancing Volume (vph) | 112 | No. of through lanes | 1 |
| Opposing Volume (vph) | 49 | Percent Heavy Vehicles (decimal percent) | 0.01 |


Left Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.