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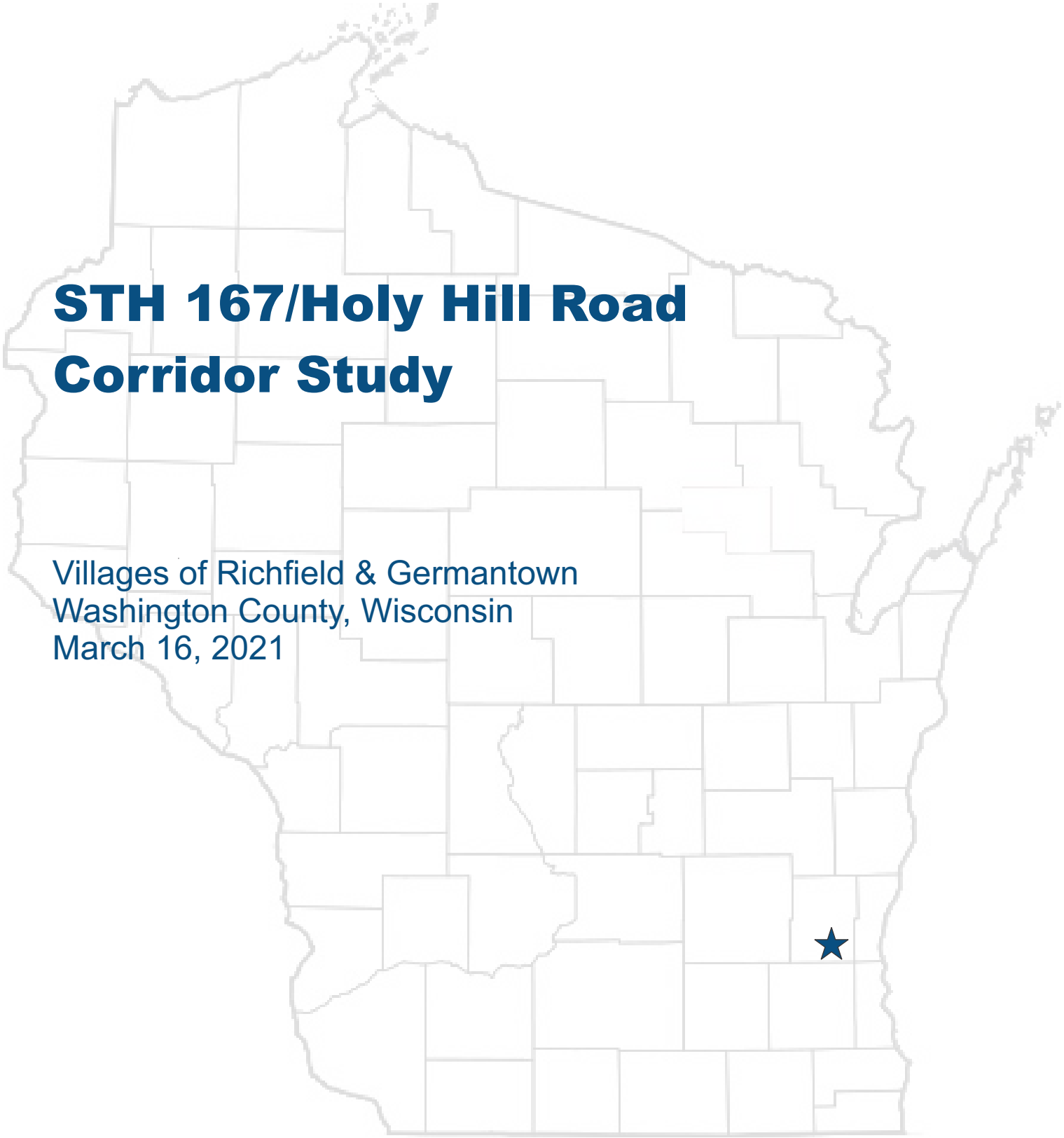
STH 167/Holy Hill Road Corridor Study

Villages of Richfield & Germantown
Washington County, Wisconsin
March 16, 2021



TRAFFIC IMPACT STUDY FOR:

STH 167/HOLY HILL ROAD CORRIDOR STUDY

VILLAGE OF RICHFIELD, VILLAGE OF GERMANTOWN, AND WASHINGTON COUNTY, WISCONSIN

DATE SUBMITTED: March 16, 2021

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"I certify that this Traffic Impact Analysis has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering."

STH 167/Holy Hill Road Corridor Study
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CHAPTER I – INTRODUCTION & EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

The Village of Germantown is investigating the future needs of the Holy Hill Road corridor (from the IH-41/45 interchange ramps to Goldendale Road) to accommodate planned and potential future development in tax incremental districts (TID) and vacant developable lands to the north and the south of the corridor. Several traffic impact analysis (TIA) reports have been prepared to evaluate traffic issues and improvements related to the additional traffic that could be generated by these developments.

Based on the previous TIA reports, geometric and traffic control changes are recommended at the IH-41/45 interchange ramps to Holy Hill Road. From IH-41/45 to the west, Holy Hill Road is also designated as State Trunk Highway (STH) 167. Since other future developments to the west of IH-41/45 in the Village of Richfield may also impact traffic operations at the IH-41/45 interchange ramps, the Wisconsin Department of Transportation (WisDOT) recommended that a new TIA report be prepared. This new TIA report extends the study area west to STH 175 (Appleton Avenue) and includes potential future development on vacant developable land north of STH 167 (Holy Hill Road), between STH 175 (Appleton Avenue) and IH-41/45. Weekday AM and PM peak hour traffic impacts in the study area were evaluated for the base year 2025 (year of initial buildout) and horizon year 2040 (five years after full buildout evaluated in this study).

This report serves as a planning study for the Village of Richfield, the Village of Germantown, and WisDOT to determine the potential for future geometric and traffic control needs for the STH 167/Holy Hill Road corridor.

PART B – EXECUTIVE SUMMARY

The executive summary includes a description of the study area, description of the development and conclusions based on the findings of this TIA.

B1. Study Area

The Project Location Map for this study is shown on Exhibit 1-1. The STH 167/Holy Hill Road study area extends between STH 175 and Goldendale Road. The study intersections include:

- STH 167 (Holy Hill Road) & STH 175 (Appleton Avenue)
- STH 167 (Holy Hill Road) & Wolf Road
- STH 167 (Holy Hill Road) & Richfield Parkway
- STH 167 (Holy Hill Road) & IH-41/45 Southbound Ramps
- STH 167 (Holy Hill Road) & IH-41/45 Northbound Ramps
- Holy Hill Road & Gateway Frontage Road
- Holy Hill Road & Gateway Crossing
- Holy Hill Road & Gateway Court
- Holy Hill Road & Goldendale Road

For simplicity's sake, STH 167 (Holy Hill Road) is referred to herein as STH 167 and STH 175 (Appleton Avenue) is referred to herein as STH 175.

A mix of 2017, 2018, and 2020 traffic count volumes were collected at the study intersections. Using this data, WisDOT provided peak hour traffic forecasts for the base year 2025 and horizon year 2040.

B2. Proposed Development

The Villages of Richfield and Germantown were consulted to determine future potential development areas to be included in this study. These areas were grouped as the "West Development Area" located north of STH 167 and west of IH-41/45, the "East Development Area" located north and south of STH 167, east of IH-41/45, and the "South Development Area" located north of CTH F & east of Goldendale Road.

With the exception of the buildout of the Village of Germantown's TID 7 (Speakercorp property in the South Development Area) and TID 8 areas (Germantown Gateway Corporate Park, the Dickman property, and the Dielectric Manufacturing Site in the East Development Area), which are in varied stages of development, no specific plans exist for the vacant lands evaluated in this study. The development land uses, densities, and buildout timelines were estimated by TADI to generate planning-level traffic volume estimates for this study. The location of the West, East, and South development areas, and development timelines (by 2025 and by 2035) estimated for this study are shown on Exhibit 1-1.

Based on the development land use types and sizes estimated for this study, the year 2025 buildout (evaluated in the base year 2025) of the area developments are expected to generate 11,035 daily driveway trips, 1,085 weekday AM peak hour driveway trips, and 1,115 weekday PM peak hour driveway trips. The year 2035 buildout (evaluated in the horizon year 2040) of the area developments, which includes the year 2025 buildout traffic projections, are expected to generate 36,495 daily driveway trips, 3,100 weekday AM peak hour driveway trips, and 3,305 weekday PM peak hour driveway trips.

B3. Recommended Improvements

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM) 6th Edition. Intersection operation is defined by "Level of Service". Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A', to very poor, represented by LOS 'F'. For the purpose of this study, LOS D or better was used to define desirable peak hour operating conditions.

The following modifications are recommended to accommodate future traffic based on the assumptions outlined in the TIA. As this study evaluates the future potential development of vacant lands with no current development plans, the Build recommended modifications (particularly the 2040 Build scenarios) are listed here for planning purposes only. It is recommended that future studies be conducted as properties are developed to determine if and when the recommended modifications should be implemented.

Modifications are split into two categories:

- "Background Traffic" – These modifications are recommended to mitigate a Background (pre-development) traffic impact and are *not* driven by the full buildout of the area developments.
- "Build Traffic" – These modifications are recommended in addition to the Background traffic modifications to mitigate an impact created by the 2025 and 2035 buildouts of the area developments.

Improvements are for jurisdictional consideration and are not legally binding. WisDOT, the Village of Richfield, and the Village of Germantown reserve the right to determine alternative solutions.

Background Traffic Recommendations (Exhibit 1-2)

STH 167 & STH 175

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Wolf Road

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Richfield Parkway

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & IH-41/45 Southbound Ramps

- *2025 Background Traffic:* Extend the southbound right-turn lane.
- *2040 Background Traffic:* No additional modifications

STH 167 & IH-41/45 Northbound Ramps

- *2025 Background Traffic:*
  - Install traffic signal control with an eastbound protected/permitted left-turn phase.
  - Extend the eastbound left-turn lane as much as feasible on the bridge over IH-41/45.
- *2040 Background Traffic:* No additional modifications

STH 167 & Gateway Frontage Road

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Gateway Crossing

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Goldendale Road

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

Build Traffic Recommendations (Exhibits 1-3 and 1-4)

General corridor recommendations include widening STH 167/Holy Hill Road from a two-lane cross-section to a four-lane divided cross-section from STH 175 through the Gateway Court intersection (transitioning back to a two-lane cross-section at Goldendale Road). Widening STH 167 through the IH-41/45 interchange would require reconstructing the bridge over IH-41/45.

When the road is widened, it is recommended to provide left-turn lanes at all study intersections on Holy Hill Road. Right-turn lanes are recommended based on right-turn "warrant" criteria published in the WisDOT Facilities Development Manual (FDM). Build modifications in addition to those recommended for the Background traffic condition are listed below:

STH 167 & STH 175

- *2025 Build Traffic:* If feasible, widen the roundabout to provide an eastbound right-turn lane and a westbound left-turn lane. Maximize the turn lane storage to the adjacent driveways.

- *2040 Build Traffic:* If feasible, widen the roundabout with two lanes at each approach.
    - Configure the eastbound and westbound approaches with two through lanes (shared left and right turns).
    - Configure the northbound approach with a shared left-turn/through lane and right-turn lane.
    - Configure the southbound approach with a left-turn lane and shared through/right-turn lane.

STH 167 & Wolf Road

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:* No modifications

STH 167 & Richfield Parkway

- *2025 Build Traffic:* Extend the southbound left-turn lane.
- *2040 Build Traffic:* Provide a second southbound left-turn lane (dual lefts).

STH 167 & IH-41/45 Southbound Ramps

- *2025 Build Traffic:* Install traffic signal control with a westbound protected/permitted left-turn phase.
- *2040 Build Traffic:*
    - Provide a second southbound left-turn lane (dual lefts).
    - Provide a second southbound on-ramp lane to allow free right-turn movements from eastbound traffic on STH 167.

STH 167 & IH-41/45 Northbound Ramps

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Provide a second northbound left-turn lane (dual lefts).
    - Provide a second northbound on-ramp lane to allow free right-turn movements from westbound traffic on Holy Hill Road.

STH 167 & Gateway Frontage Road

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install traffic signal control with eastbound and westbound protected/permitted left-turn phases.
    - Provide left-turn lanes on all approaches.
    - Provide a right-turn lane on the westbound approach.

STH 167 & Gateway Crossing

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install traffic signal control with an eastbound protected/permitted left-turn phase.
    - Provide left-turn lanes on all approaches.
    - Provide eastbound and westbound right-turn lanes.

STH 167 & Gateway Court

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install stop sign control and a single lane on the northbound approach.
    - Provide eastbound and westbound left-turn lanes.
    - Provide an eastbound right-turn lane.

STH 167 & Goldendale Road

- *2025 Build Traffic:* Install stop signs on Holy Hill Road for all-way stop control.
- *2040 Build Traffic:*
    - Install traffic signal control with two-phased signal operation.
    - Provide left-turn lanes on all approaches.
    - Provide right-turn lanes on the eastbound and southbound approaches.

B4. Conclusion

This study evaluates the STH 167/Holy Hill Road corridor with projected traffic volumes from potential developments on nearly all vacant land along the corridor from STH 175 through Goldendale Road. This study assumes buildout of those lands by 2035 (14 years from now), although actual buildout will depend on market forces and other factors. If buildout density evaluated in this study is realized, then the STH 167/Holy Hill Road corridor will need to be widened to at least a four-lane cross-section, requiring reconstruction of the bridge over IH-41/45. Traffic signals will also need to be installed at many of the study intersections, and the roundabout at STH 167/STH 175 will need to be widened (if feasible). It is recommended that future studies be conducted as properties are developed to determine if and when the recommended modifications should be implemented.

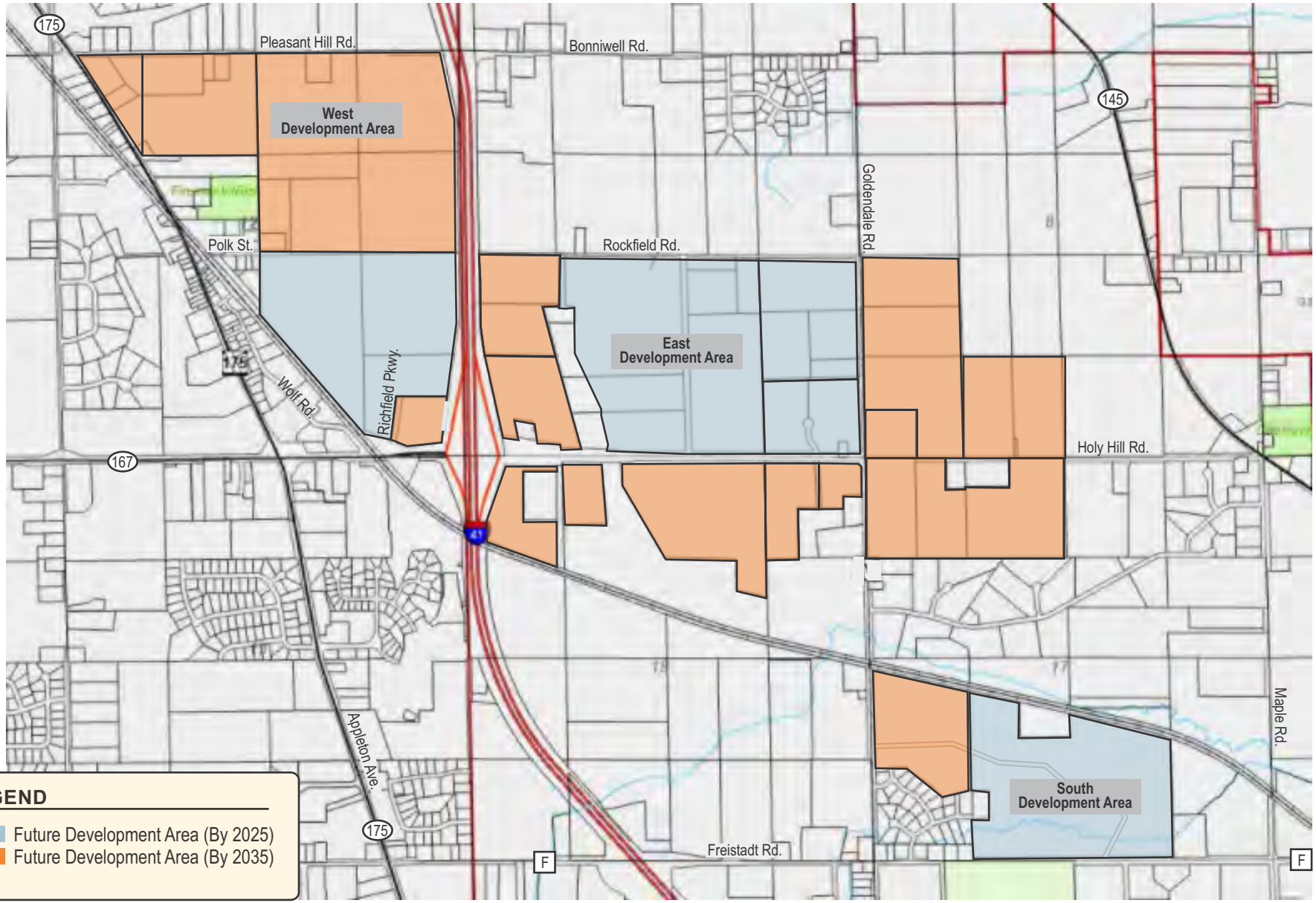

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EXHIBIT 1-1
PROJECT LOCATION MAP/
FUTURE POTENTIAL DEVELOPMENT AREAS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

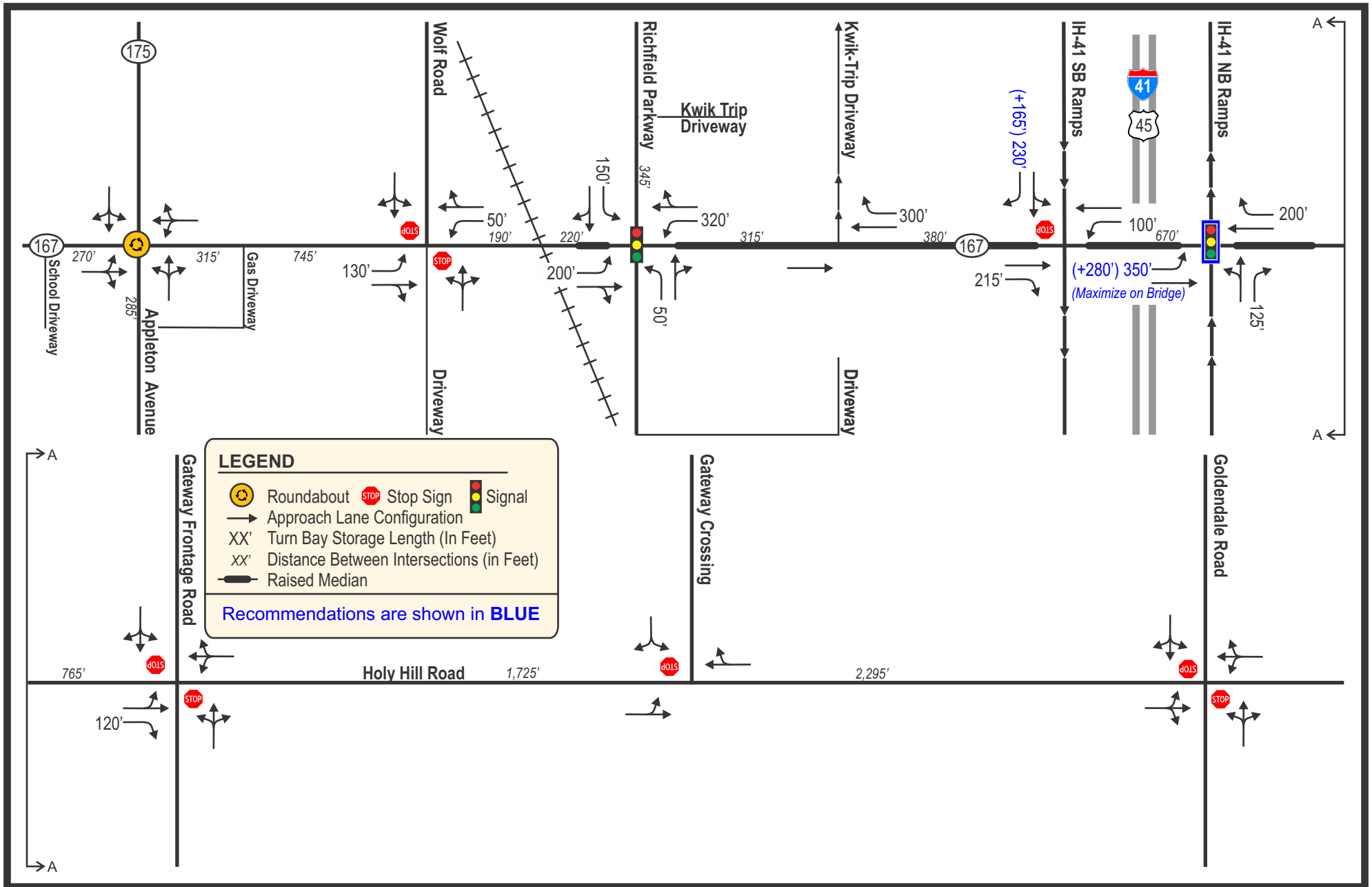

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EXHIBIT 1-2
YEAR 2025 & 2040 BACKGROUND TRAFFIC RECOMMENDATIONS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

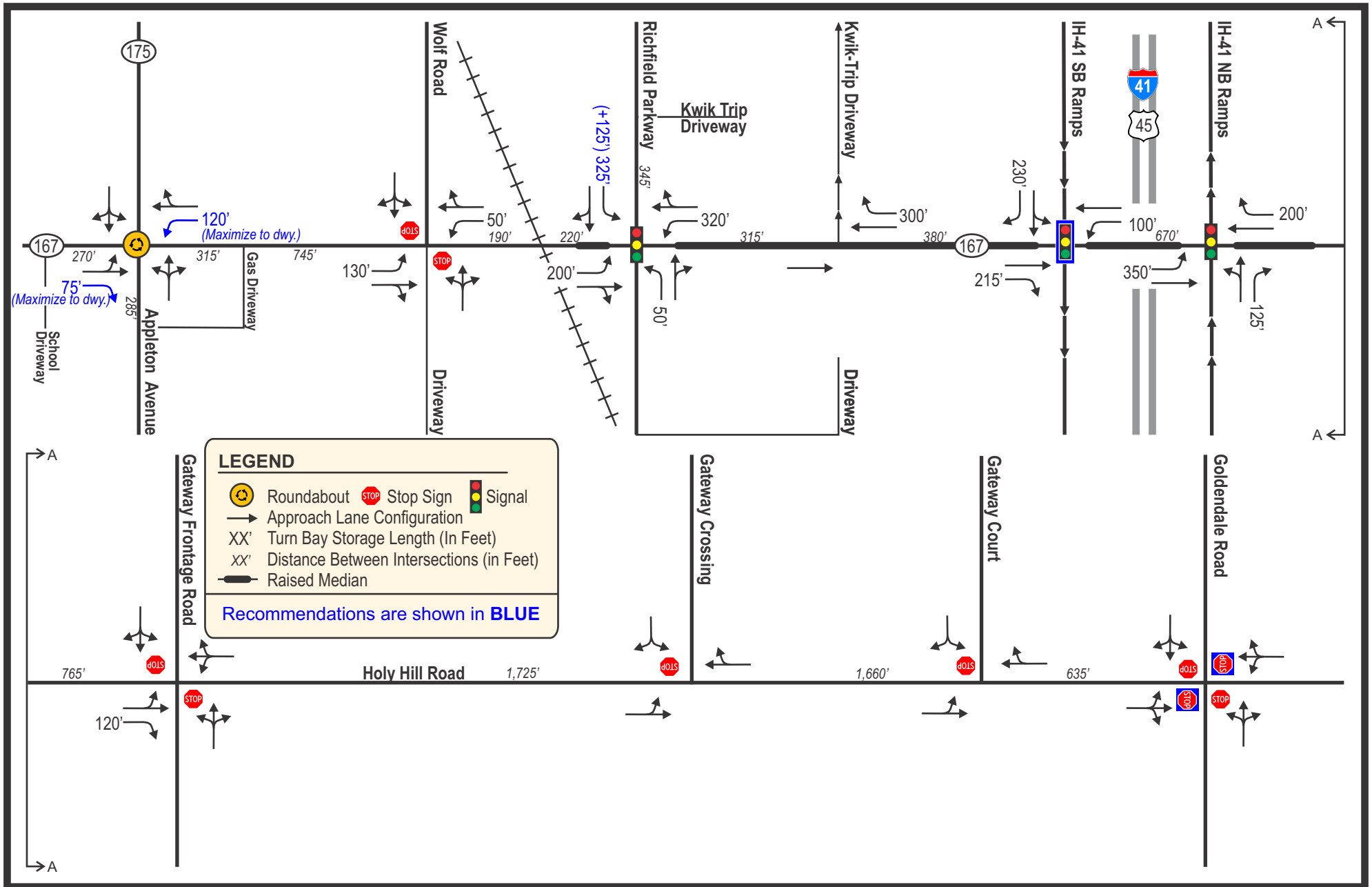

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EXHIBIT 1-3
YEAR 2025 BUILD TRAFFIC RECOMMENDATIONS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

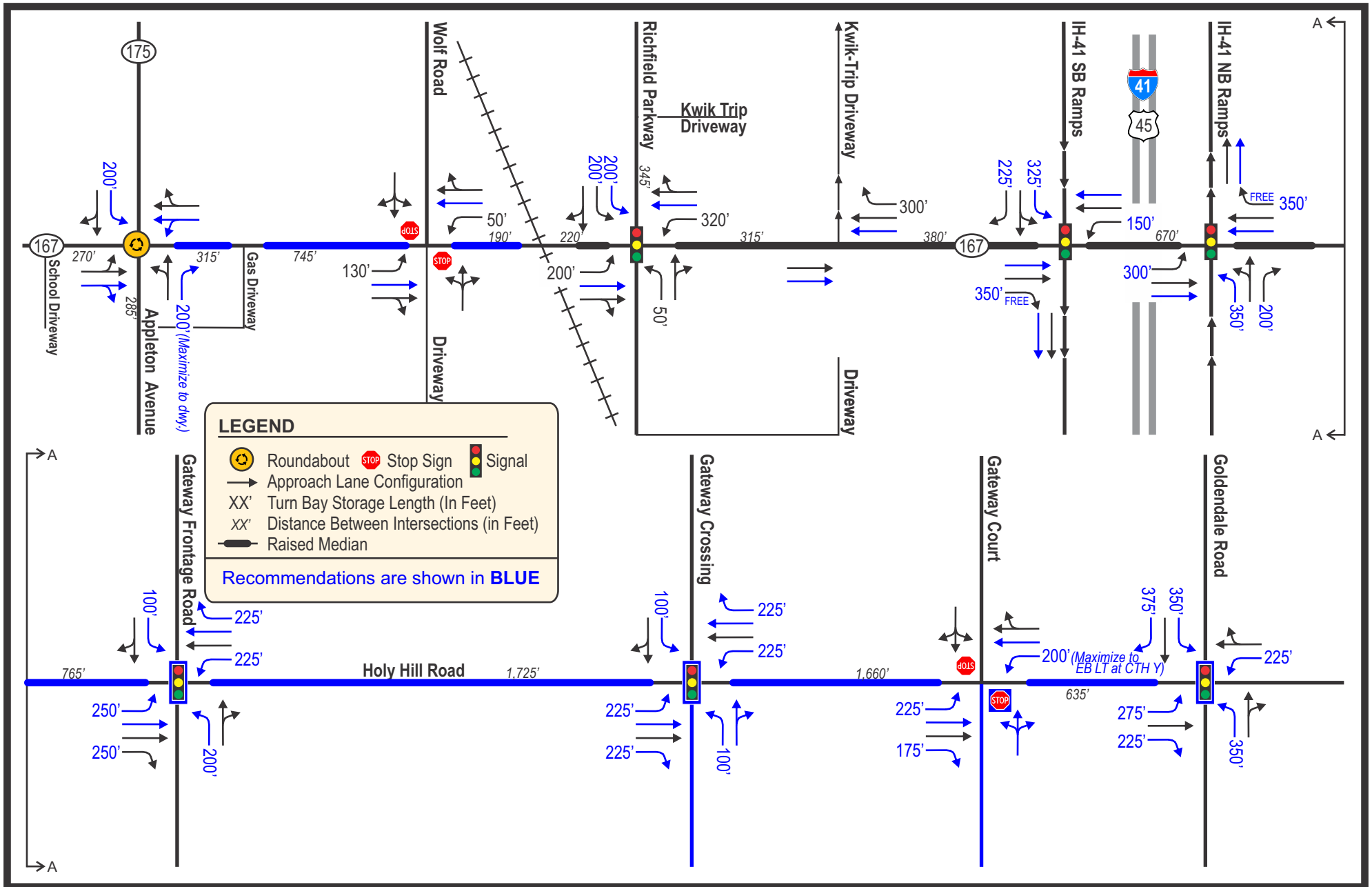

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EXHIBIT 1-9
YEAR 2040 BUILD TRAFFIC RECOMMENDATIONS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

CHAPTER II – PROPOSED DEVELOPMENT

PART A – ON-SITE DEVELOPMENT

The Villages of Richfield and Germantown were consulted to determine future potential development areas to be included in this study. These areas were grouped as the "West Development Area" located north of STH 167 and west of IH-41/45, the "East Development Area" located north and south of STH 167, east of IH-41/45, and the "South Development Area" located north of CTH F & east of Goldendale Road.

With the exception of the buildout of the Village of Germantown's TID 7 (Speakercorp property in the South Development Area) and TID 8 areas (Germantown Gateway Corporate Park, the Dickman property, and the Dielectric Manufacturing Site in the East Development Area), which are in varied stages of development, no specific plans exist for the vacant lands evaluated in this study. The development land uses, densities, and buildout timelines were estimated by TADI to generate planning-level traffic volume estimates for this study. The location of the West, East, and South development areas are shown on Exhibit 2-1. The development staging detail, showing development areas expected by the year 2025 and those expected by the year 2035 are shown on Exhibit 2-3.

The breakdown of land use types and sizes estimated for each development area and year are listed below. The letter for to each development area corresponds to the letter on the proposed land use map on Exhibit 2-4B.

A1. Year 2025 Development

<u>West Development Area</u>

- Area D: Light industrial development within the Richfield Business Park, west of IH-41/45. Access would be to Richfield Parkway, north of STH 167 (Holy Hill Road), which is proposed to extend northward across Pleasant Hill Road to connect to the Endeavor Business Park. Per WisDOT, all light industrial developments evaluated in this study that do not have specific development plans should be evaluated with 50% high-cube transload warehouse and 50% industrial park uses. Due to proximity, it was estimated that about 5% of the light industrial trips in Area D will be "internally" linked (along Richfield Parkway) with the Kwik Trip in Area E.
    - 570,800 square feet of high-cube transload warehouse & short-term warehouse
    - 570,800 square feet of industrial park
- Area E: Kwik Trip development at Richfield Parkway, north of STH 167. Although this development is fully constructed and operational, and the traffic volumes for this site have already been included in this study, WisDOT believes that the driveway trips will increase as additional developments are constructed in the study area. By 2035, it is expected that the trips will increase to match the trips calculated from the ITE trip generation table (using fueling positions as the independent variable). By 2025, it was estimated that only 25 percent of this additional growth will occur. About 80% of the additional Kwik Trip trips were estimated to be diverted linked trips from developments on Holy Hill Road, east of IH-41/45. The remaining 20% of additional trips were estimated to be pass-by trips from existing trips already traveling past Richfield Parkway on STH 167.

East Development Area

- Area H: Remaining buildout of the Germantown Gateway Corporate Park in the Village of Germantown's TID 8. Access to this area is at Gateway Crossing.
    - 10 additional employees in the Briggs & Stratton building
    - 665,995 square feet of high-cube transload warehouse & short-term warehouse
    - 665,995 square feet of industrial park
- Area I: Dickman light industrial development (currently under construction) in TID 8 with access to both Goldendale Road and Rockfield Road.
    - 260,648-square feet of industrial park
    - 260,648 square feet of manufacturing (120-employees)
- Area J: Dielectric Manufacturing development in TID 8, with access to Holy Hill Road.
    - 100,000 square feet of manufacturing (currently under construction)
    - 100,000 square foot manufacturing (not yet identified, but estimated for additional vacant land on site)

South Development Area

- Area U: Buildout of the Village of Germantown TID 7 area, which is home to Speakercorp. Speakercorp is located north of Freistadt Road and east of Goldendale Road, with access both roadways. Some or all of the Speakercorp buildings listed below have recently been constructed but were added here as they were not completed yet when this study began in the Spring of 2020.
    - 30,000 square feet of manufacturing (LED electronic assembly)
    - 90,000 square feet of manufacturing (Speakercorp building expansion)
    - 40,000 square feet of general office building (design center)
    - 2,000 square feet of general office building (retreat/meeting center)

A2. Year 2035 Development

The Year 2035 development includes developments previously listed for the Year 2025.

- Area A: An approximate 15-acre light industrial development south of Pleasant Hill Road along STH 175. Access was estimated to be at Pleasant Hill Road and/or STH 175.
    - 201,000 square feet of general light industrial
- Area B: An approximate 32-acre mixed-residential development south of Pleasant Hill Road. Access was estimated to be at Pleasant Hill Road, STH 175, and Richfield Parkway.
    - 44 units of single-family housing
    - 80 units of multi-family housing (low-rise)

  Note that the Village of Richfield has indicated that low-density two-family, rather than multi-family uses are more likely for this area. Therefore, the multi-family housing estimated for this study represents a more conservative (higher) estimate of traffic flow through this area.
- Area C: An approximate 120-acre light industrial development north of the Richfield Business Park. Access was estimated to be at Pleasant Hill Road and Richfield Parkway. About 5% of the light industrial trips were estimated to be internally linked with the Kwik Trip on Richfield Parkway.

  - 804,000 square feet of high-cube transload warehouse & short-term warehouse
  - 804,000 square feet of industrial park

- Area D: Richfield Business Park light industrial development (as estimated for the Year 2025 Buildout). About 5% of the light industrial trips were estimated to be internally linked with the Kwik Trip on Richfield Parkway.
  - 570,800 square feet of high-cube transload warehouse & short-term warehouse
  - 570,800 square feet of industrial park

- Area E: Kwik Trip development at Richfield Parkway, north of STH 167. By 2035, it is expected that the trips will increase to match the trips calculated from the ITE trip generation table (using fueling positions as the independent variable). About 75% of the additional Kwik Trip trips were estimated to be diverted linked trips from developments on Holy Hill Road, east of IH-41/45. The remaining 25% of additional trips were estimated to be pass-by trips from existing trips already traveling past Richfield Parkway on STH 167.

<u>East Development Area</u>

- Area F: 27-acre light industrial development north of Holy Hill Road and just east of IH-41/45. Access is assumed at an extension of the Gateway Frontage Road.
  - 147,000 square feet of high-cube transload warehouse & short-term warehouse
  - 147,000 square feet of industrial park

- Area G: 20-acre highway commercial along IH-41/45, north of Holy Hill Road. Access is assumed at an extension of the Gateway Frontage Road. About 5% of the commercial trips were estimated to be internally linked with the light industrial development to the north (Area F). About 15% of the commercial trips were estimated to be externally linked with other land uses along Holy Hill Road.
  - 3,000 square feet of fast-food restaurant with drive-through window.
  - 4,000 square feet of high-turnover sit-down restaurant.
  - 3-lane drive-in bank
  - 65,340-square feet of general office space.

- Area H: Remaining buildout of the Germantown Gateway Corporate Park in the Village of Germantown's TID 8. Access to this area is at Gateway Crossing.
  - 10 additional employees in the Briggs & Stratton building
  - 665,995 square feet of high-cube transload warehouse & short-term warehouse
  - 665,995 square feet of industrial park

- Area I: Dickman light industrial development (currently under construction) in TID 8 with access to both Goldendale Road and Rockfield Road.
  - 260,648-square feet of industrial park
  - 260,648 square feet of manufacturing (120-employees)

- Area J: Dielectric Manufacturing development in TID 8, with access to Holy Hill Road.
  - 100,000 square feet of manufacturing (currently under construction)
  - 100,000 square foot manufacturing (not yet identified, but estimated for additional vacant land on site)

- Area K: 52-acre light industrial development east of Goldendale Road between Rockfield Road and Holy Hill Road. Access is assumed at Goldendale Road and Rockfield Road.
    - 283,100 square feet of high-cube transload warehouse & short-term warehouse
    - 283,100 square feet of industrial park
- Area L: 10-acre commercial development in the northeast corner of Holy Hill Road and Goldendale Road. Access is assumed at Holy Hill Road.
    - 65,340 square feet of general office
- Area M: 38-acre single-family development north of Holy Hill Road, east of Goldendale Road. Access is assumed at Holy Hill Road. About 20% of the residential trips were estimated to be externally linked with areas light industrial uses Holy Hill Road.
    - 66 units of single-family housing.
- Area N: 13-acre commercial development south of Holy Hill Road between IH-41/45 and the Gateway Frontage Road. Access is assumed at an extension of the Gateway Frontage Road. About 10% of the commercial trips were estimated to be externally linked with light industrial and office uses along Holy Hill Road.
    - 65,340 square feet of automobile sales (new)
    - 16,355 square feet auto parts store
- Area O: 6.7-acre commercial development in the southeast corner of Holy Hill Road and the Gateway Frontage Road. Access is assumed at the Gateway Frontage Road. About 5% of the commercial trips were estimated to be internally linked with the commercial development to the west (Area N). About 15% of the commercial trips were estimated to be externally linked with other land uses along Holy Hill Road.
    - 3,000 square feet of fast-food restaurant with drive-through window.
    - 4,000 square feet of high-turnover sit-down restaurant.
    - 3-lane drive-in bank
- Area P: 47.4-acre light industrial development just south of TID 8, south of Holy Hill Road. Access is assumed at an extension of Gateway Crossing, south of Holy Hill Road.
    - 258,100 square feet of high-cube transload warehouse & short-term warehouse
    - 258,100 square feet of industrial park
- Area Q: 15-acre light industrial development south of Holy Hill Road, south of the Dielectric Manufacturing site. Access is assumed at Holy Hill Road.
    - 81,700 square feet of high-cube transload warehouse & short-term warehouse
    - 81,700 square feet of industrial park
- Area R: 6-acre commercial development in the southwest corner of the Holy Hill Road intersection with Goldendale Road. Access is assumed at Holy Hill Road.
    - 39,205 square feet of general office
- Area S: 64-acre single-family development in the southeast corner of the Holy Hill Road intersection with Goldendale Road. Access is assumed at Holy Hill Road and Goldendale Road. About 20% of the residential trips were estimated to be externally linked with light industrial uses on Holy Hill Road.
    - 112 units of single-family housing.

South Development Area

- Area T: additional buildout along Whitney Drive in TID 7. Access is expected at both CTH F and Goldendale Road.
    - 150,000 square feet of light industrial
- Area U: Recent buildout of the Speakercorp development in TID 7 as estimated for the Year 2025 buildout.
    - 30,000 square feet of manufacturing (LED electronic assembly)
    - 90,000 square feet of manufacturing (Speakercorp building expansion)
    - 40,000 square feet of general office building (design center)
    - 2,000 square feet of general office building (retreat/meeting center)

PART B – STUDY AREA

B1. Influence Area

Based on the location of the sites in relation to IH-41/45, the proposed developments are expected to draw from a local and regional customer base. Therefore, the areas of significant influence include the Villages of Jackson, Germantown and other surrounding cities, villages and towns.

B2. Area of Significant Traffic Impact

The study intersections evaluated in this TIA include:

- STH 167 & STH 175 (roundabout control)
- STH 167 & Wolf Road (stop signs on Wolf Road)
- STH 167 & Richfield Parkway (traffic signal control)
- STH 167 & IH-41/45 Southbound Ramps (stop signs on the Southbound Ramp)
- STH 167 & IH-41/45 Northbound Ramps (all-way stop control)
- Holy Hill Road & Gateway Frontage Road (stop signs on the Gateway Frontage Road)
- Holy Hill Road & Gateway Crossing (stop signs on Gateway Crossing)
- Holy Hill Road & Gateway Court (stop signs on the driveway)
- Holy Hill Road & Goldendale Road (stop signs on Goldendale Road)

PART C – OFF-SITE LAND USE AND DEVELOPMENT

No other developments outside of the West, East, and South development areas were included in this study. The existing land uses in the study area are shown on Exhibit 2-4A and the proposed (site) land uses in the study area are shown on Exhibit 2-4B.

PART D – SITE ACCESSIBILITY

D1. Study Area Roadways

STH 167 (Holy Hill Road) is a two-lane east/west Principal Arterial that is divided through the Kwik Trip right-in only driveway and the IH-41/45 interchange. Holy Hill Road has a 45-mph posted speed limit and is designated as STH 167 west of the IH-41/45 Northbound Ramps. The WisDOT Traffic Count Map (TCMap) online shows that STH 167/Holy Hill Road has a 2019 Annual Average Daily Traffic (AADT) volume of 12,200 vehicles per day (vpd) east of Wolf Road, 3,200 vpd west of Gateway Crossing, and 1,200 vpd east of Goldendale Road.

STH 175 (Appleton Avenue) is a two-lane undivided north/south roadway classified as a Collector roadway with a 30-mph speed limit north of STH 167 and a Principal Arterial with a 45-mph speed limit south of STH 167. The WisDOT Traffic Count Map (TCMap) online shows

that Appleton Avenue has a 2019 AADT volume of 4,100 vpd about one mile north of STH 167 and 5,600 vpd south of STH 167.

Wolf Road is a two-lane undivided north/south local road with a posted speed limit of 25 mph. AADT volumes are not currently available on Wolf Road.

Richfield Parkway is a two-lane undivided north/south local road that was recently constructed to provide additional access to the Kwik Trip development. Richfield Parkway is proposed to be extended northward to provide access for developments within the West Development Area. AADT volumes are not currently available on Richfield Parkway.

IH-41/45 is a north/south freeway that connects the City of Milwaukee (about 20 miles to the south) to the Cities of Fond du Lac (40 miles to the north), Appleton, Green Bay and more. IH-41/45 has local interchange connections to STH 145 to the north, STH 167 in the study area, and Lannon Road to the south. The WisDOT TCMap shows that the IH-41/45 Northbound and Southbound Ramps have 2019 AADT volumes ranging from 3,300 vpd to 3,800 vpd.

Gateway Frontage Road is a two-lane undivided local roadway that provides access to a gas station on the north side of Holy Hill Road and a storage facility on the south side. The Gateway Frontage Road is expected to extend further to the north and south to provide access for the future buildout of the East Development Area. AADT volumes are not currently available on the Gateway Frontage Road.

Gateway Crossing is a two-lane undivided local roadway that provides access to the Germantown Gateway Corporate Park on the north side of Holy Hill Road. Gateway Crossing is expected to extend to the south to provide access for future buildout of the East Development Area. AADT volumes are not currently available on Gateway Crossing.

Gateway Court is a two-lane undivided driveway that provides access to the Dielectric Manufacturing building on the north side of Holy Hill Road. This driveway is expected to extend to the south to provide access for future buildout of the East Development Area.

Goldendale Road is a two-lane north/south Collector roadway with a 45-mph posted speed limit south of Holy Hill Road and a 55-mph posted speed limit from Holy Hill Road to STH 145. The WisDOT TCMap shows that Goldendale Road has 2019 AADT volumes of 930 vpd north of Holy Hill Road and 1,300 vpd south of Holy Hill Road.

D2. Pedestrian & Bicycle Accommodations

Generally, there are no sidewalks along the roadways within the study area, except for all four corners of the STH 167/STH 175 roundabout and the west side of STH 175, north of STH 167.

D3. Transit Accommodations

No regularly scheduled transit exists within the study area.

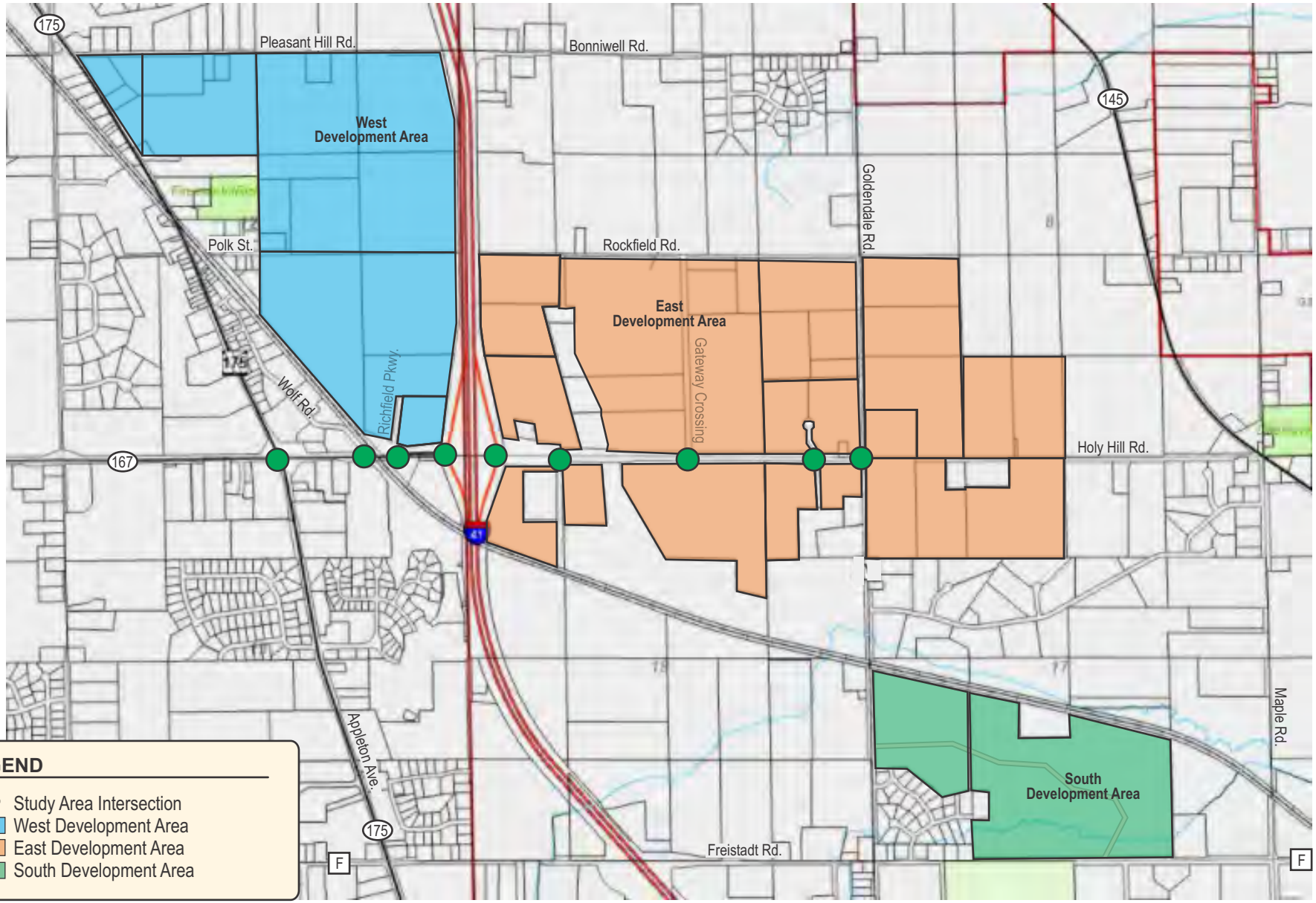

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EXHIBIT 2-1
PROJECT LOCATION MAP

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

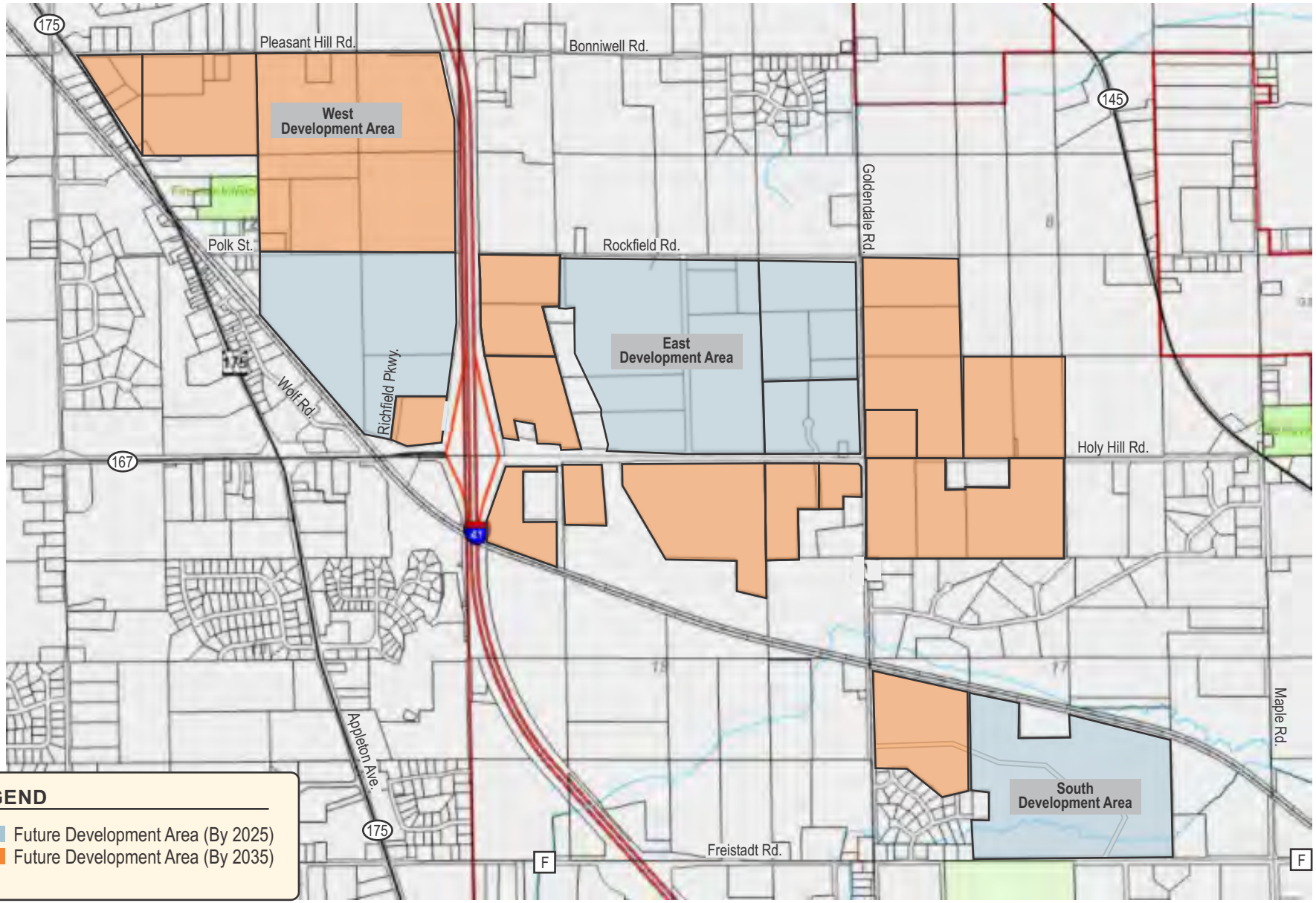

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EXHIBIT 2-3
DEVELOPMENT STAGING DETAIL

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

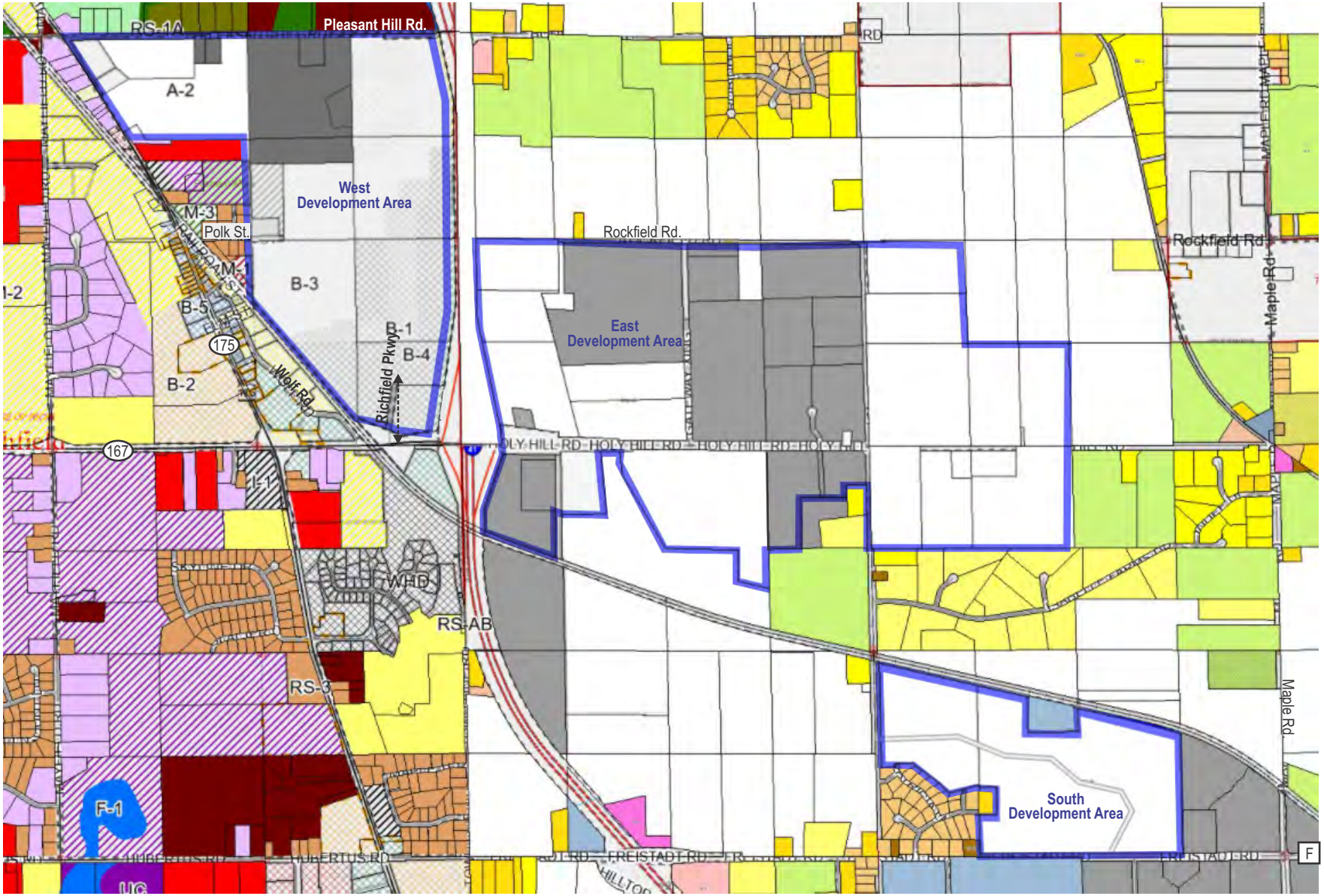

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EXHIBIT 2-4A
EXISTING LAND USES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

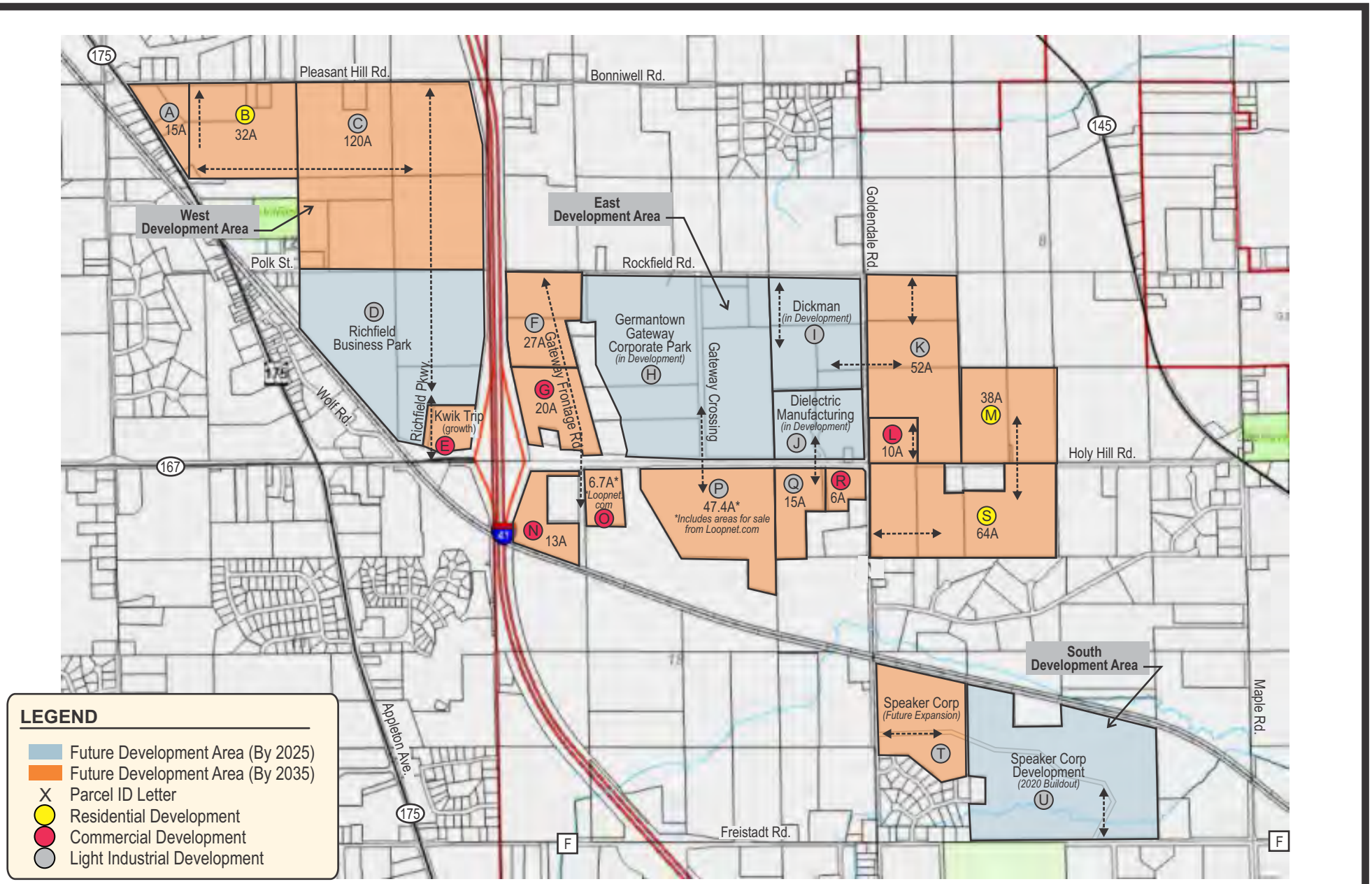

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EXHIBIT 2-4B
PROPOSED LAND USES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

CHAPTER III – ANALYSIS OF EXISTING CONDITIONS

PART A – PHYSICAL CHARACTERISTICS

A transportation detail showing the existing lane configurations, traffic controls, posted speed limits, WisDOT AADT, and approximate intersection spacing is included in Exhibit 3-1.

PART B – TRAFFIC VOLUMES

B1. Traffic Counts

Because of the Covid-19 Pandemic that is still resulting in lower-than-normal traffic volumes throughout Wisconsin, new traffic counts were not collected at most of the study intersections. Therefore, traffic volume counts collected in 2017, 2018, and 2019 were obtained from WisDOT and previous studies completed for the area. New 2020 turning movement counts were collected for the now-opened Kwik Trip development at Richfield Parkway, west of IH-41/45 and for the now-opened Briggs & Stratton distribution center at Gateway Crossing, east of IH-41/45 in the Germantown Gateway Corporate Park. New counts for these developments were collected so that they could be added to the 2017 and 2018 traffic counts for development of background traffic for the TIA.

The following table shows the days, dates, and time periods of the traffic volume count data at each study intersection. The turning movement traffic count data is in Appendix A.

Intersection	Weekday AM	Weekday PM
STH 167 & STH 175	Thur. 12/7/2017 6 a.m. – 12 p.m.	Thur. 12/7/2017 12 p.m. – 7 p.m.
STH 167 & Wolf Road	Thur. 10/26/2017 6 a.m. – 12 p.m.	Thur. 10/26/2017 12 p.m. – 7 p.m.
STH 167 & Richfield Parkway	Tues. 3/24/2020 6 a.m. – 9 a.m.	Mon. 3/23/2020 3 p.m. – 6 p.m.
STH 167 & Exxon Driveway	Thurs. 10/26/2020 6 a.m. – 12 p.m.	Thurs. 10/26/2020 12 p.m. – 7 p.m.
STH 167 & Kwik Trip In-Only Driveway	Tues. 3/24/2020 6 a.m. – 9 a.m.	Mon. 3/23/2020 3 p.m. – 6 p.m.
STH 167 & IH-41/45 SB Ramps	Tues. 8/28/2018 6 a.m. – 12 p.m.	Tues. 8/28/2018 12 p.m. – 7 p.m.
STH 167 & IH-41/45 NB Ramps	Tues. 8/28/2018 6 a.m. – 12 p.m.	Tues. 8/28/2018 12 p.m. – 7 p.m.
Holy Hill Road & Gateway Frontage Road	Thurs. 5/31/2018 6 a.m. – 9 a.m.	Wed. 5/30/2018 3 p.m. – 6 p.m.
Holy Hill Road & Gateway Crossing	Tues. 3/24/2020 6 a.m. – 9 a.m.	Mon. 3/23/2020 3 p.m. – 6 p.m.
Holy Hill Road & Goldendale Road	Thurs. 5/31/2018 6 a.m. – 9 a.m. Wed. 10/23/2019 9 a.m. – 12 p.m.	Wed. 5/30/2018 3 p.m. – 6 p.m. Wed. 10/23/2019 12 p.m. – 3 p.m.

B2. Peak Hour Time Periods

Based on the compilation of the 2017 and 2018 turning movement counts, the peak hours were selected as:

- AM Peak Hour: 7:00-8:00 a.m.
- PM Peak Hour: 4:00-5:00 p.m.

The intersection peak hour factors and heavy vehicle percentages for each intersection approach were compiled for these peak hours and are shown in a table in Appendix A.

B3. Existing 2017 & 2018 Peak Hour Traffic Volumes

The 2017 and 2018 traffic counts were compiled for the peak hours and balanced between intersections as shown on Exhibit 3-2A.1. These counts represent traffic volume levels prior to the construction of the Kwik Trip and Briggs & Stratton developments, as well as prior to the construction of both Richfield Parkway and Gateway Crossing. The Exxon gas station, which eventually was torn down to make room for the Kwik Trip development was open and operating at the time of the 2017 and 2018 traffic counts. Therefore, the Exxon gas station traffic was removed from the transportation system (Exhibit 3-2A.2) based on existing turning movement traffic patterns at the study intersections. Exhibit 3-2A.2 also shows rerouted traffic volumes from the driveway across from the Exxon driveway to the new Richfield Parkway.

B4. Kwik Trip & Briggs & Stratton New Trips

New counts were collected in 2020 to/from Richfield Parkway, the Kwik Trip in-only driveway, and Gateway Crossing. The traffic counts collected at Gateway Crossing mostly represented traffic to/from the Briggs & Stratton distribution center, although one of the other recently constructed light industrial buildings within the Germantown Gateway Corporate Park was partially occupied and open during that same time. Based on the type of business operations and traffic counts collected, it was assumed that the Briggs & Stratton counts fairly represented the traffic volume levels at full operation of the building. The Briggs & Stratton traffic to/from Gateway Crossing was added to the transportation system (Exhibit 3-2A.3) based on existing turning movement traffic patterns at the study intersections.

Traffic counts collected at the Kwik Trip driveways were lower than expected due to the Covid-19 stay home order that was in place during the counts. In order to normalize the Kwik Trip driveway counts to pre-Covid-19 traffic volume levels, Kwik Trip hourly transaction data was obtained for Mondays and Tuesdays beginning with February 3 and 4, 2020 and ending with the driveway count dates of Monday, March 23 and Tuesday, March 24, 2020 (Exhibit 3-2A.4). Monday PM and Tuesday AM transaction data were averaged for the five-week pre-Covid-19 time period from February 3, 2020 to March 3, 2020. Comparing this average transaction data to the transactions that occurred at the same time as the Kwik Trip driveway traffic counts shows that pre-Covid-19 transactions were 64% higher in the AM peak hour and 12% higher in the PM peak hour than the Covid-19 counts collected in March 2020. The peak hour driveway volumes turning into and out of the Kwik Trip driveways were increased by these factors and added to the transportation system (Exhibit 3-2A.5) based on the existing turning movement traffic patterns at the study intersections.

B5. Background 2025 Traffic Volumes

WisDOT prepared base year 2025 and horizon year 2040 traffic forecasts from the existing balanced traffic counts developed for this study. The 2025 Forecasted Traffic Volumes are shown on Exhibit 3-2B.1. The traffic forecast worksheets are in Appendix A.

The removed Exxon traffic volumes, new Briggs & Stratton traffic volumes, and adjusted new Kwik Trip traffic volumes were added to the 2025 Forecasted Traffic Volumes to form the 2025 Background Traffic Volumes for this study. The 2025 Background Traffic Volumes are shown on Exhibit 3-2B.2. Through the Initial Development Review process for the TIA, WisDOT has reviewed and concurred with the traffic volume assumptions summarized herein.

PART C – CAPACITY LEVEL OF SERVICE

C1. Level of Service Definitions

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM), 6th Edition. Intersection operation is defined by "Level of Service". Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A', to very poor, represented by LOS 'F'. For the purpose of this study, LOS D or better was used to define desirable peak hour operating conditions. Descriptions of the various levels of service are as follows:

LOS	Signalized Intersections Control Delay/Vehicle (sec/veh)	Unsignalized Intersections Avg. Control Delay (sec/veh)	Relative Delay
A	≤10	≤10	Short Delays
	Free-flow traffic operations at avearge travel speeds. Vehicles completely unimpeded in ability to maneuver. Minimal delay at signalized intersections		
B	> 10 - 20	> 10 - 15	
	Reasonably unimpeded traffic operations at average travel speeds. Vehicle maneuverability slightly restricted. Low traffic delays.		
C	> 20 - 35	> 15 - 25	
	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds. Longer		
D	> 35 - 55	> 25 - 35	Moderate Delays
	Small increases in traffic flow can cause increased delays. Delays likely attributable to increased traffic, reduced signal progression, and adverse		
E	> 55 - 80	> 35 - 50	
	Significant delays. Travel speeds reduced to one-third of average free flow travel speed.		
F	> 80	> 50	Long Delays
	Extremely low speeds. Intersection congestion. Long delays. Extensive traffic queues at intersections.		

Source: Highway Capacity Manual, Transportation Research Board, Washington, D.C., 2010

C2. Year 2025 Background Traffic Operations – Existing Transportation System

The 2025 background traffic analysis was conducted using the existing intersection geometrics, existing traffic control, and existing traffic signal phasing/timing provided by WisDOT for the STH 167/Richfield Parkway intersection. The traffic signal phasing and timing parameters for this intersection are in Appendix A.

Exhibit 3-3 shows the 2025 background traffic peak hour operating conditions at the study intersections. With the pre-development traffic volumes, side-street delays are expected to be just over the LOS D threshold for movements at the STH 167/Wolf Road and STH 167/IH-41/45 Southbound Ramps intersections. Greater unacceptable (LOS E and LOS F) delays are expected for both eastbound and northbound left-turn movements at the STH 167/IH-41/45 Northbound Ramps intersection. The analysis worksheets for the 2025 background traffic condition are in Appendix B.

PART D – SOURCES OF DATA

The following sources of data were obtained for use in conducting this traffic study:

- AADT Counts – WisDOT online TCMap
- Turning movement traffic counts – TADI & WisDOT
- Traffic forecasts – WisDOT
- Existing field geometrics – TADI, Google Earth, Washington County GIS
- Right-of-Way and Property Lines – Washington County GIS
- Area development plans – Village of Richfield and Village of Germantown
- Traffic signal phasing/timing – WisDOT

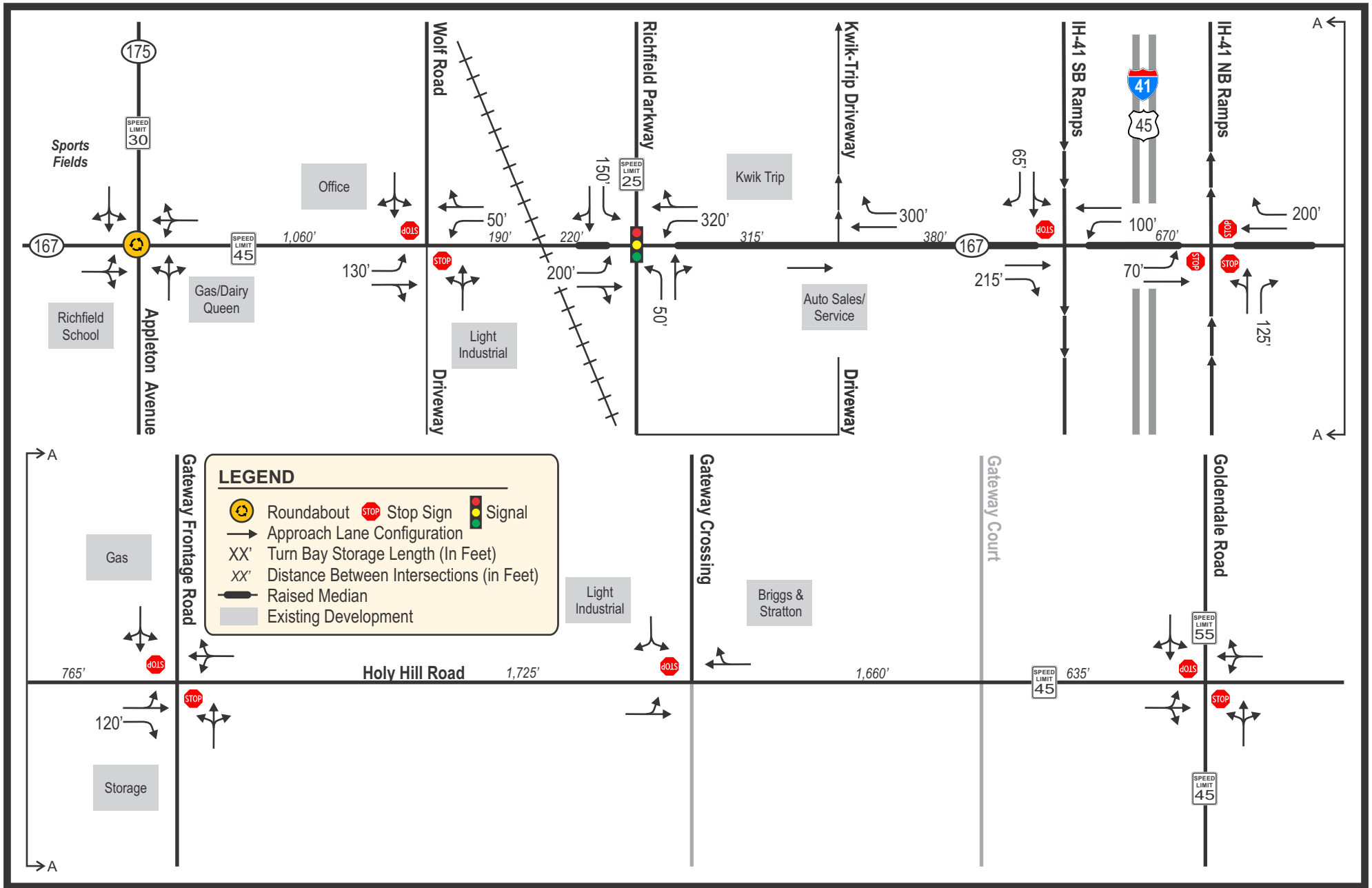

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EXHIBIT 3-1
EXISTING TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

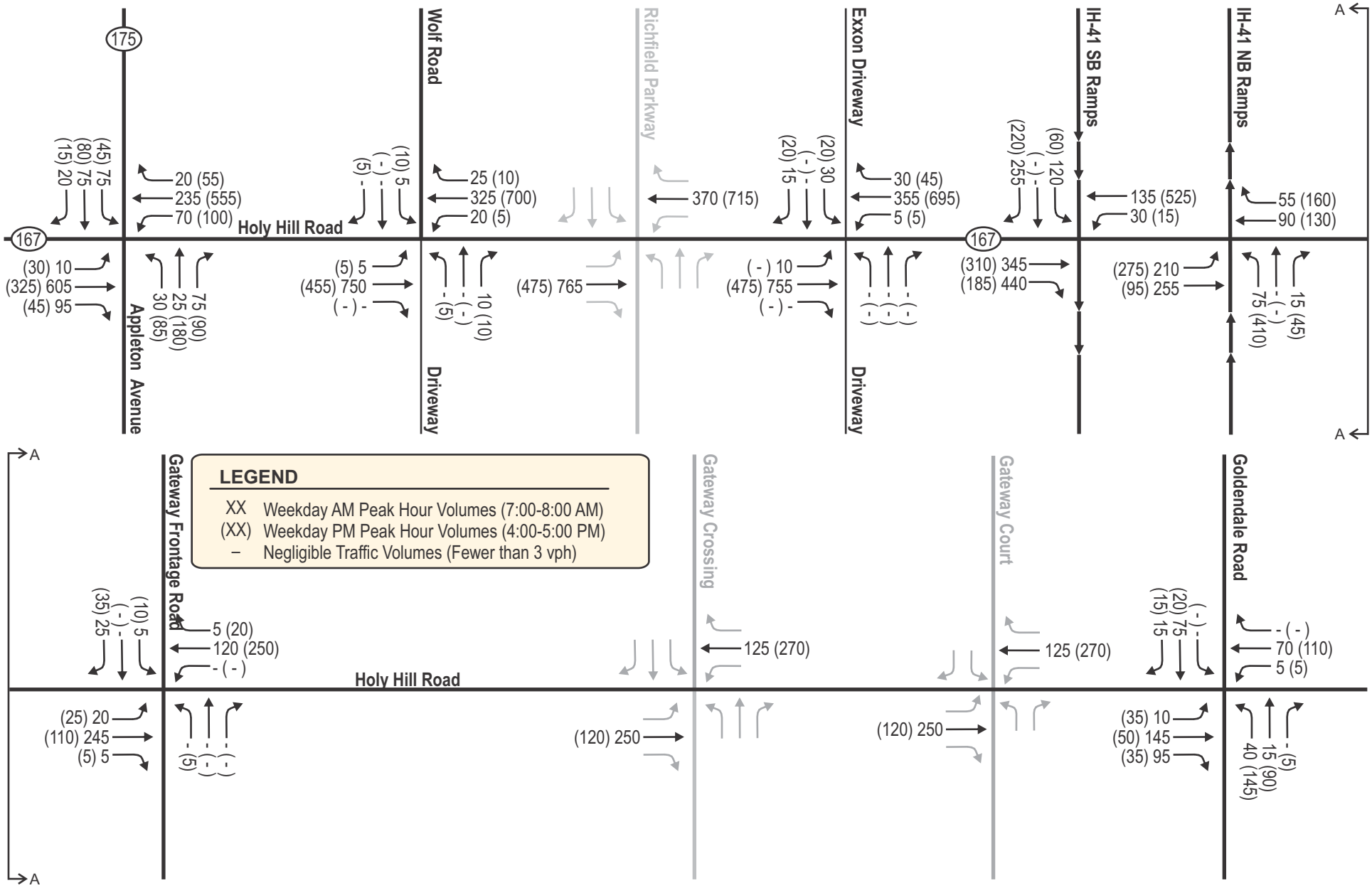

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EXHIBIT 3-2A.1

2017 & 2018 EXISTING TRAFFIC VOLUMES - BALANCED (PRE-KWIK TRIP, PRE-BRIGGS & STRATTON)

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

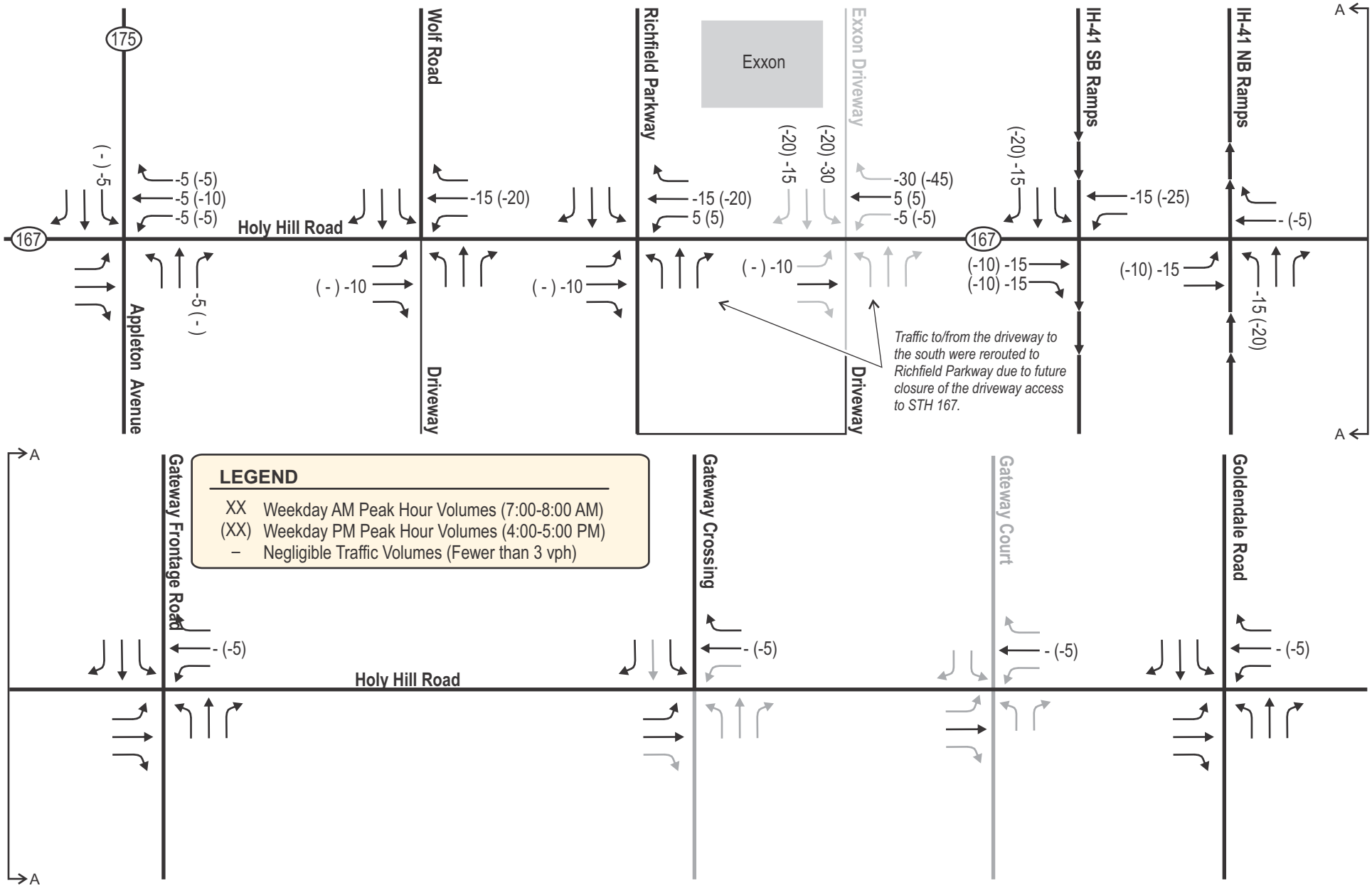

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EXHIBIT 3-2A.2
REMOVED EXXON TRAFFIC VOLUMES
(EXXON CLOSED)

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

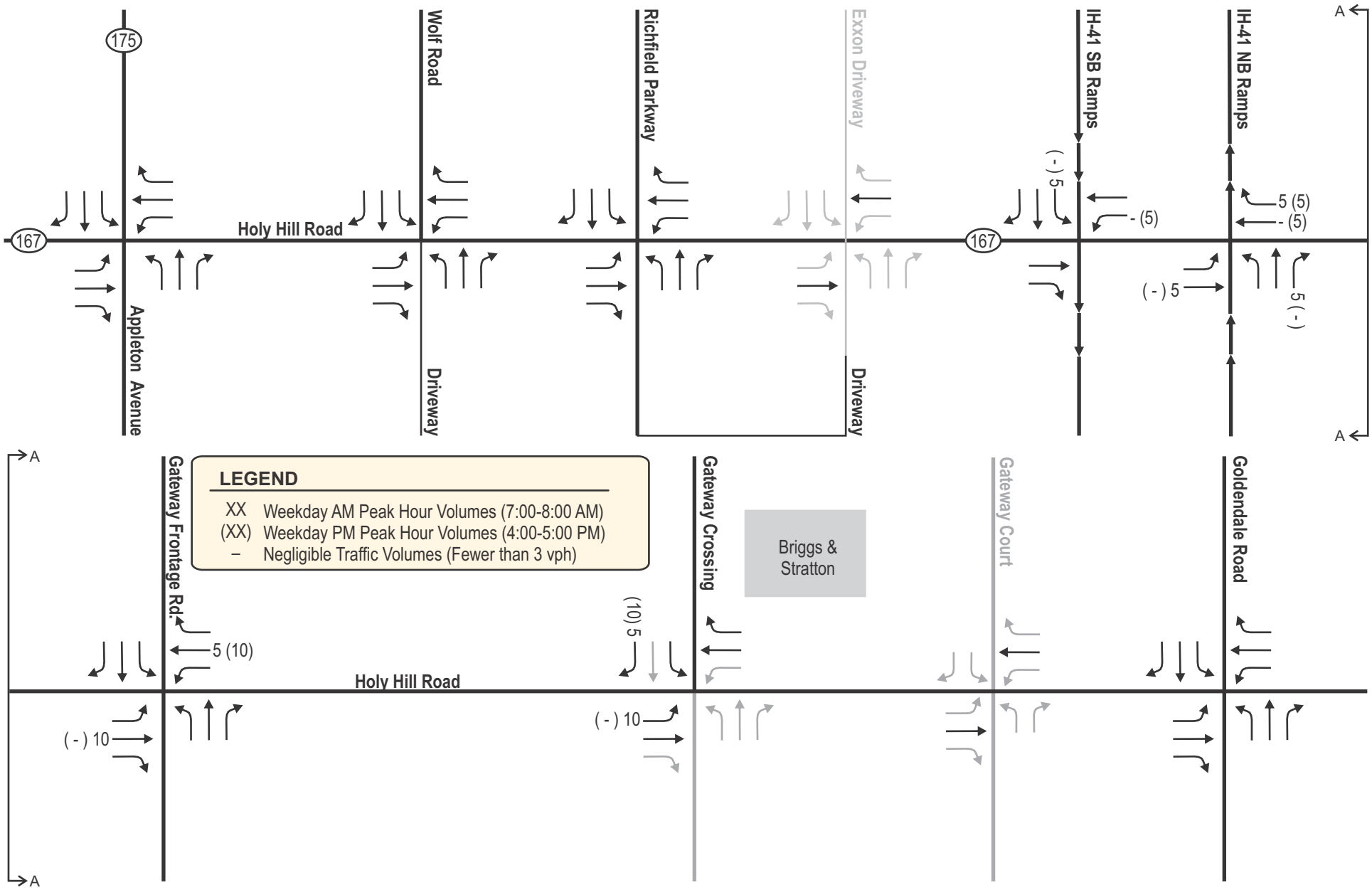

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EXHIBIT 3-2A.3
NEW BRIGGS & STRATTON TRAFFIC VOLUMES
(2020 COUNTS)

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

KWIK TRIP #1013:RICHFIELD

Transactions by Date												
Time Of Day Hour	2020-02-03	2020-02-04	2020-02-10	2020-02-11	2020-02-17	2020-02-18	2020-02-24	2020-02-25	2020-03-02	2020-03-03	2020-03-23	2020-03-24
	Monday	Tuesday	Monday	Tuesday	Monday	Tuesday	Monday	Tuesday	Monday	Tuesday	Monday	Tuesday
12 AM	18	24	13	18	15	33	21	30	14	24	20	17
1 AM	18	30	24	19	13	24	21	28	20	28	18	27
2 AM	15	17	16	21	14	22	14	25	15	27	15	13
3 AM	31	25	23	30	26	38	27	20	19	31	18	20
4 AM	55	58	67	63	57	72	56	83	52	72	50	63
5 AM	126	119	95	142	145	163	133	144	149	174	100	97
6 AM	193	221	177	188	188	202	178	210	171	188	133	155
7 AM	197	245	209	212	195	238	249	233	204	254	166	144
8 AM	144	170	166	212	140	161	175	186	178	168	95	97
9 AM	144	151	148	166	150	183	168	149	143	153	95	106
10 AM	107	141	149	141	149	143	128	136	139	125	109	101
11 AM	138	175	173	158	138	165	178	185	161	173	170	139
12 PM	145	183	165	142	184	164	142	145	169	168	169	125
1 PM	137	122	129	144	121	133	137	129	146	176	151	118
2 PM	147	160	130	166	149	161	187	177	165	165	154	141
3 PM	175	169	187	170	183	205	155	179	178	149	162	156
4 PM	164	160	141	178	165	164	200	157	157	159	148	137
5 PM	143	169	177	171	124	172	156	125	143	143	114	114
6 PM	116	106	113	132	77	134	104	127	120	136	92	87
7 PM	70	87	86	79	62	81	74	88	83	79	72	73
8 PM	49	58	65	69	54	57	71	73	54	52	47	51
9 PM	45	58	56	57	37	63	46	57	60	42	41	39
10 PM	45	40	62	40	35	54	44	29	41	48	33	27
11 PM	38	30	35	28	27	40	21	26	30	31	19	20
Total	**2,460**	**2,718**	**2,606**	**2,746**	**2,448**	**2,872**	**2,685**	**2,741**	**2,611**	**2,765**	**2,191**	**2,067**

	Pre-Covid 19 Impact Average (2/3-3-3)		Covid 19 Impact* Count days (3/23-24	
Daily	**2,562**	**2,768**	**17%**	**34%**
AM Peak Hour (Tues)	**236**			**64%**
PM Peak Hour (Mon)	**165**		**12%**	

**Pre-Covid Counts XX% higher than March 2020 counts.*

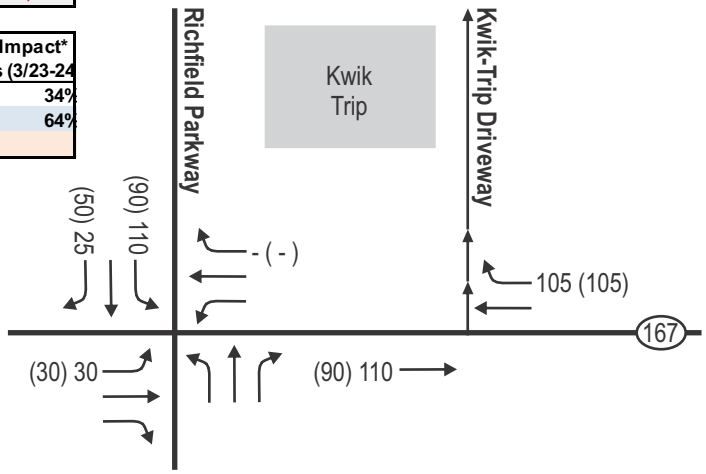

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EXHIBIT 3-2A.4
KWIK TRIP HOURLY TRANSACTION DATA &
2020 KWIK TRIP PEAK HOUR DRIVEWAY COUNTS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

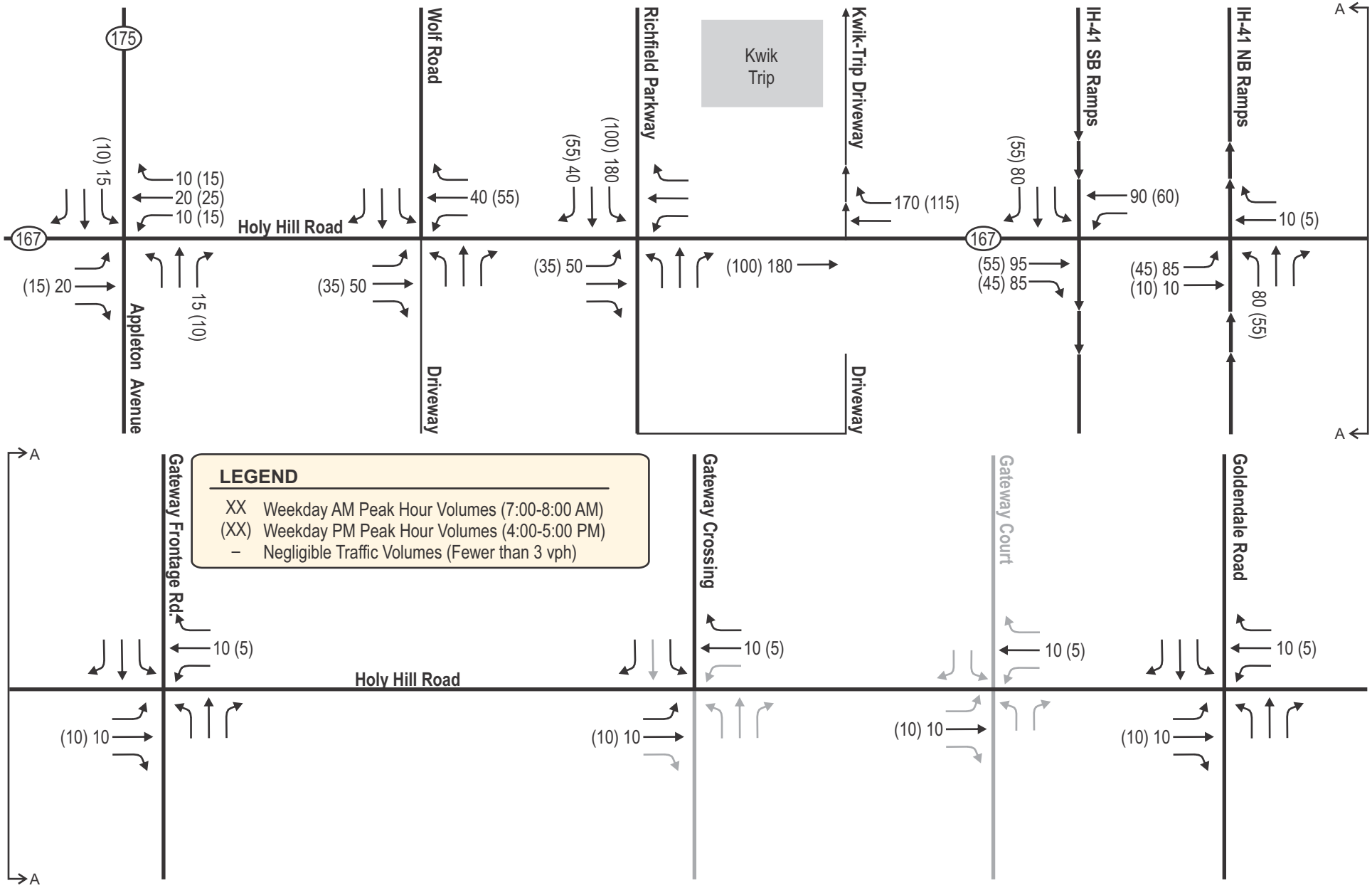

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EXHIBIT 3-2A.5
NEW KWIK TRIP TRAFFIC VOLUMES
(2020 COUNTS - ADJUSTED TO PRE-COVID-19 LEVELS)

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

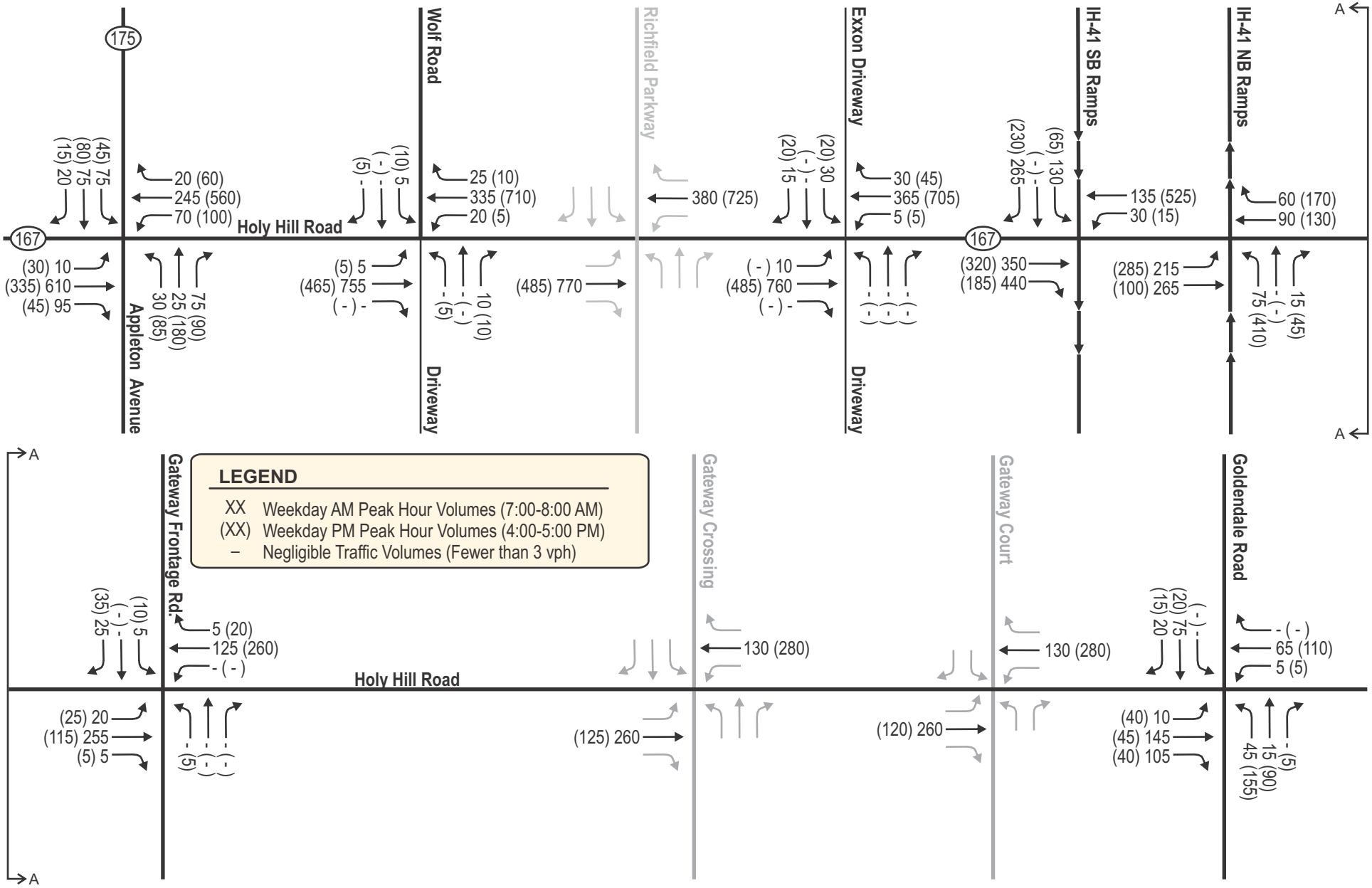

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EXHIBIT 3-2B.1
2025 FORECASTED TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

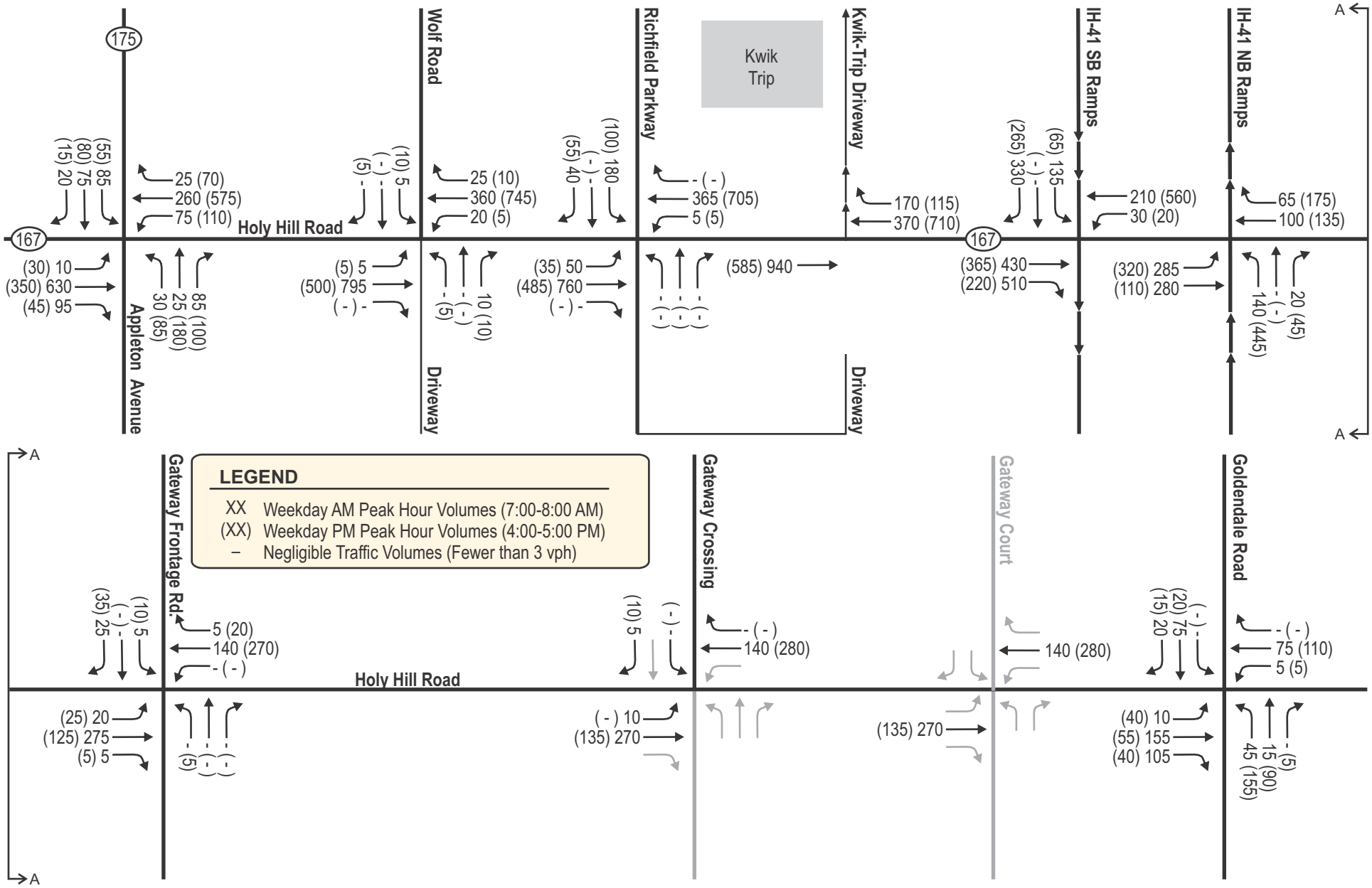

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EXHIBIT 3-2B.2
2025 BACKGROUND TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2025 Background Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	C			A			A			A			B
		Delay	21			6			9			7			
		Queue	240			45			25			25			
	PM	LOS	A			C			B			A			C
		Delay	9			22			10			9			
		Queue	65			250			65			25			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		C			**E**			A
		Delay	8	*		10	*		22			37			
		Queue	0	*		5	*		5			5			
	PM	LOS	A	*		A	*		C			D			A
		Delay	9	*		8	*		21			30			
		Queue	0	*		0	*		5			10			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	A	B		B	B		B	B		C	B		B
		Delay	7	13		18	12		17	15		20	16		
		Queue	30	640		10	260		5	5		150	40		
	PM	LOS	A	A		A	B		C	B		C	C		B
		Delay	9	6		8	15		21	19		21	20		
		Queue	15	180		5	525		5	5		95	60		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	B	*	-	-			**E**	B		A
		Delay	-	*	*	10	*	-	-			37	12		
		Queue	-	*	*	5	*	-	-			80	55		
	PM	LOS	-	*	*	A	*	-	-			**E**	D		A
		Delay	-	*	*	9	*	-	-			36	25		
		Queue	-	*	*	5	*	-	-			45	115		
#600 STH 167 & IH-41/45 Northbound Ramps (Stop Signs - All-way)	AM	LOS	B	B	-	-	A	A	B	A		-			B
		Delay	13	11	-	-	9	8	12	8		-			
		Queue	65	55	-	-	15	10	30	5		-			
	PM	LOS	**E**	B	-	-	B	B	**F**	A		-			**E**
		Delay	35	12	-	-	14	14	93	9		-			
		Queue	180	25	-	-	35	45	415	10		-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			B			B			A
		Delay	7		0	7			11			10			
		Queue	0		0	0			0			5			
	PM	LOS	A		A	A			B			B			A
		Delay	8		0	7			13			11			
		Queue	5		0	0			5			10			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	7		-	-	*		-			10			
		Queue	0		-	-	*		-			0			
	PM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			10			
		Queue	0		-	-	*		-			5			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			B			B			A
		Delay	7			7			14			12			
		Queue	0			0			15			20			
	PM	LOS	A			A			C			B			B
		Delay	7			7			19			11			
		Queue	5			0			85			5			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

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EXHIBIT 3-3
2025 BACKGROUND TRAFFIC CAPACITY/LOS ANALYSIS
EXISTING TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

CHAPTER IV – FORECASTED TRAFFIC

PART A – BACKGROUND TRAFFIC FORECASTING

As previously mentioned, WisDOT prepared base year 2025 and horizon year 2040 traffic forecasts from the existing balanced traffic counts developed for this study. The 2040 Forecasted Traffic Volumes are shown on Exhibit 4-2A. The traffic forecast worksheets are in Appendix A.

The removed Exxon traffic volumes, new Briggs & Stratton traffic volumes, and adjusted new Kwik Trip traffic volumes were added to the 2040 Forecasted Traffic Volumes to form the 2040 Background Traffic Volumes for this study. The 2040 Background Traffic Volumes are shown on Exhibit 4-2B.

PART B – ON-SITE DEVELOPMENT TRAFFIC FORECASTING

Through the Initial Development Review process, WisDOT has reviewed and concurred with the trip generation and traffic assignment assumptions summarized herein.

B1. Trip Generation

The expected traffic volumes generated by the proposed developments were calculated based on trip rates or equations published in the ITE *Trip Generation Manual, 10th Edition*. The use of trip rates or equations was determined based on procedures listed in the ITE *Trip Generation Handbook, 3rd Edition*.

In coordination with WisDOT, land use codes from the Institute of Transportation Engineer's *Trip Generation Manual, 10th Edition* were applied to each land use category determined for the different area development types. WisDOT also provided input on the percentages for internally linked trips (trips between developments located on the same site), externally linked trips (trips between different developments along the STH 167/Holy Hill Road and Goldendale Road corridors), and pass-by trips (existing trips on their way somewhere else that stop into the developments). The trip generation tables were compiled separately for the Year 2025 and Year 2035 buildouts, which were then compiled separately for the West, East, and South Development Areas. The trip generation tables for the Year 2025 buildout are shown on Exhibit 4-3A (West, East, and South Development Areas). The trip generation tables for the Year 2035 buildout (evaluated for the horizon year 2040) are shown on Exhibit 4-3B (West and South Development Areas) and on Exhibit 4-3C (East Development Area).

B2. Mode Split

For this study, the effect of organized carpools, van pools, buses, bicycles, and pedestrians were considered insignificant factors on traffic volumes in the area, and therefore, the effects of these alternative modes of travel were not included in this project.

B3. Trip Distribution – New Trips

Trip distributions were developed separately for the West, East, and South development areas. The trip distributions were calculated from the existing traffic patterns and were adjusted based on each area's proximity to nearby interchanges, arterial roadways, and population centers. The trip distributions estimated for this study are listed below and in the tables on Exhibits 4-3A, 4-3B, and 4-3C. The trip distributions are also shown graphically on an area map on Exhibit 4-4.

<u>West Development Area Trip Distribution</u>

- 15% to/from the west on STH 167 (Holy Hill Road)
- 10% to/from the north on STH 175
- 10% to/from the south on STH 175

- 30% to/from the north on IH-41/45
- 30% to/from the south on IH-41/45
- 0% to/from the north on Goldendale Road
- 0% to/from the south on Goldendale Road
- 5% to/from the east on Holy Hill Road

East Development Area Trip Distribution (Also Applies to Externally Linked Trips)

- 10% to/from the west on STH 167 (Holy Hill Road)
- 5% to/from the north on STH 175
- 5% to/from the south on STH 175
- 30% to/from the north on IH-41/45
- 25% to/from the south on IH-41/45
- 5% to/from the north on Goldendale Road
- 10% to/from the south on Goldendale Road
- 10% to/from the east on Holy Hill Road

South Development Area Trip Distribution

- 10% to/from the west on STH 167 (Holy Hill Road)
- 5% to/from the north on STH 175
- 0% to/from the south on STH 175
- 30% to/from the north on IH-41/45
- 5% to/from the south on IH-41/45
- 5% to/from the north on Goldendale Road
- 45% to/from the south on Goldendale Road
- 0% to/from the east on Holy Hill Road

B4. Trip Distribution – Diverted Linked Trips & Pass-by Trips

Trip distributions for diverted linked trips and pass-by trips were estimated from existing peak hour traffic patterns at the study intersections. The pass-by trip distributions were estimated separately for the AM and PM peak hours.

Diverted Linked Trip Distribution (Area E/Kwik Trip)

- 40% to/from the north on IH-41/45
- 40% to/from the south on IH-41/45
- 20% to/from driveways to the east on Holy Hill Road

Pass-by Trip Distribution

- 65% AM and 35% PM eastbound on STH 167 (Holy Hill Road)
- 35% AM and 65% PM westbound on STH 167 (Holy Hill Road)

B5. Trip Assignment

The total peak hour new, linked, and pass-by trips for each development area (as shown on the trip generation tables) were assigned to the study intersections based on the corresponding trip

distributions listed previously. The traffic assignments for each time period and development area are shown on the following exhibits:

Year 2025 Buildout (Base Year 2025) Traffic Assignments

- Exhibit 4-5A: New Trips – West Development Area
- Exhibit 4-5B: Pass-by Trips – West Development Area
- Exhibit 4-5C: Diverted Linked Trips – West Development Area
- Exhibit 4-5D: New Trips – East Development Area
- Exhibit 4-5E: New Trips – South Development Area
- Exhibit 4-5F: Driveway Trips – West, East, & South Development Area

2035 Buildout (Horizon Year 2040) Traffic Assignments

- Exhibit 4-7A: New Trips – West Development Area
- Exhibit 4-7B: Pass-by Trips – West Development Area
- Exhibit 4-7C: Diverted Linked Trips – West Development Area
- Exhibit 4-7D: New Trips – East Development Area
- Exhibit 4-7E: Pass-by Trips – East Development Area
- Exhibit 4-7F: Externally Linked Trips – East Development Area
- Exhibit 4-7G: New Trips – South Development Area
- Exhibit 4-7H: Driveway Trips – West, East, & South Development Area

PART C – BUILD TRAFFIC

The 2025 Build Traffic Volumes (Exhibit 4-11) were generated by adding the 2025 Buildout Driveway Trips to the 2025 Background Traffic Volumes. The 2040 Build Traffic Volumes (Exhibit 4-13) were generated by adding the 2035 Buildout Driveway Trips to the 2040 Background Traffic Volumes.

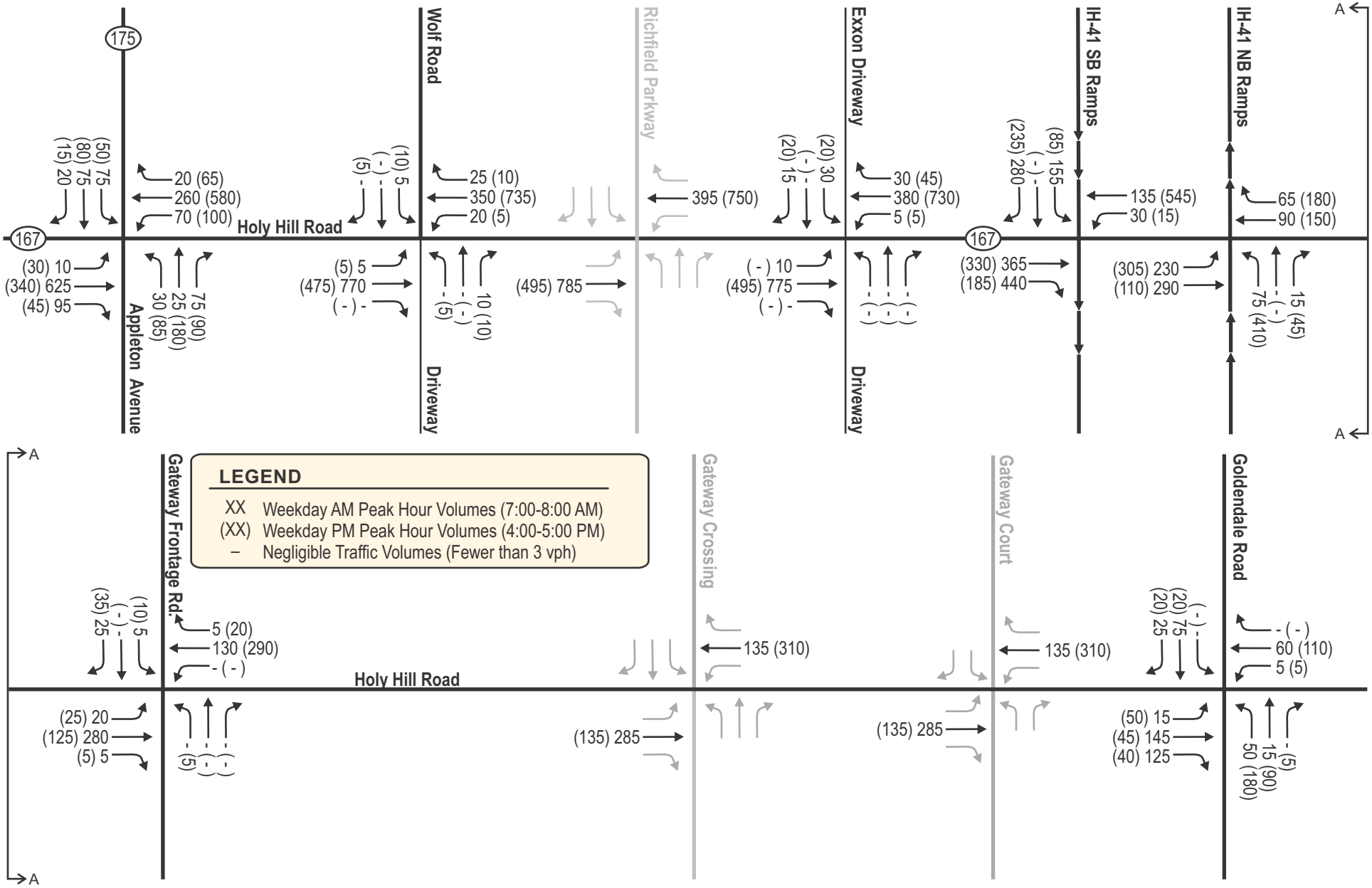

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EXHIBIT 4-2A
2040 FORECASTED TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

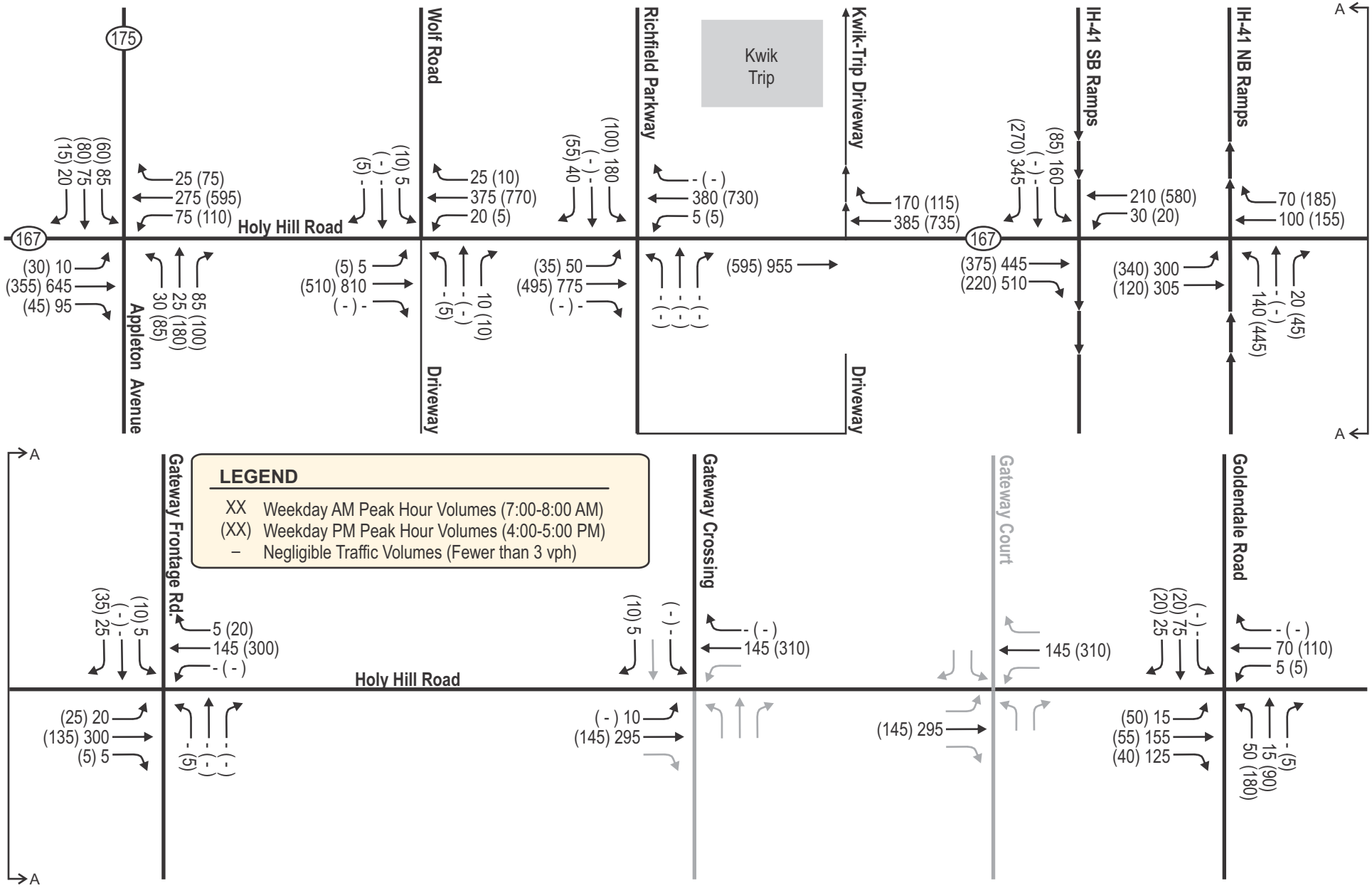

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EXHIBIT 4-2B
2040 BACKGROUND TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2025 Buildout - West Development Area (Richfield)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
D	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	570,800 SF	800 (1.40)	35 (77%)	10 (23%)	45 (0.08)	15 (28%)	40 (72%)	55 (0.10)
D	Industrial Park (Richfield Business Park)	130	570,800 SF	2,325 FCE	185 (81%)	45 (19%)	230 (0.40)	50 (21%)	180 (79%)	230 (0.40)
E	Kwik Trip: 100% Growth to Trip Generation Values	960	24 Fuel Positions	5,530 (230.52)	340 (50%)	335 (50%)	675 (28.08)	275 (50%)	275 (50%)	550 (22.96)
E	Kwik Trip: Less Existing Trips [1]	Actual/ Adjust.	24 Fuel Positions	-3,100 (PM k=10%	-220	-220	-440	-155	-155	-310
E	Kwik Trip: Less 75% of Growth (does not occur until 2035)[1]		24 Fuel Positions	-1,825	-90	-90	-180	-90	-90	-180
	Total Trips			**3,730**	**250**	**80**	**330**	**95**	**250**	**345**
	Internally Linked Trips [2]	*D*	*5%*	*-155*	*-10*	*-5*	*-15*	*-5*	*-10*	*-15*
	Total Driveway Trips			**3,575**	**240**	**75**	**315**	**90**	**240**	**330**
	Diverted Linked Trips [3]	*E*	*80%*	*-480*	*-20*	*-20*	*-40*	*-25*	*-25*	*-50*
	Pass-by Trips [3]	*E*	*20%*	*-125*	*-5*	*-5*	*-10*	*-5*	*-5*	*-10*
	Total 2025 New Trips			**2,970**	**215**	**50**	**265**	**60**	**210**	**270**

[1] Approximately 25% of the Kwik Trip growth to trip generation values are assumed to occur by 2025 (based on the ratio of total area new trips expected between 2025 and 2035).

[2] Internally linked trips are between the Kwik Trip and developments along Richfield Parkway.

[3] Diverted Linked Trips are expected from new development traffic east of I-41 that do not pass-through the Kwik Trip driveway. Pass-by trips are expected from new development traffic passing through the Kwik Trip driveway on the west side of I-41. Values rounded so in/out splits would be equal.

TRIP DISTRIBUTION (Area D New Trips)

W. on STH 167	15%	445	35	5	10	30
N. on STH 175	10%	300	20	5	5	20
S. on STH 175	10%	295	20	5	5	20
N. on I-41	30%	890	65	15	20	65
S. on I-41	30%	890	65	15	20	65
N. on CTH Y	0%	0	0	0	0	0
S. on CTH Y	0%	0	0	0	0	0
E. on Holy Hill Road	5%	150	10	5	0	10
	100%	***2970***	***215***	***50***	***60***	***210***

TRIP DISTRIBUTION (Area E Pass-by Trips)

EB on Holy Hill Road	80% (30%)	5	5	0	0
WB on Holy Hill Road	20% (70%)	0	0	5	5
		5	***5***	***5***	***5***

Distribution based on AM & PM split of new traffic passing through at Richfield Parkway on STH 167.

TRIP DISTRIBUTION (Area E Diverted Linked Trips)

N. on I-41	40%	10	10	10	10
S. on I-41	40%	10	10	10	10
E. on Holy Hill Road	20%	0	0	5	5
		20	***20***	***25***	***25***

Developments without driveways to Holy Hill Road are not expected to divert unless they are already heading toward I-41.

Year 2025 Buildout - East Development Area (Germantown)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
H	Briggs & Stratton Building - Future Expansion (150,280 sf)	130	10 Employees	135 FCE	10 (86%)	0 (14%)	10 FCE	5 (20%)	10 (80%)	15 FCE
H	Germantown Gateway Corporate Park - Remaining Buildout	130	665,995 SF	2,515 FCE	215 (81%)	50 (19%)	265 (0.40)	55 (21%)	210 (79%)	265 (0.40)
H		154	665,995 SF	930 (1.40)	40 (77%)	15 (23%)	55 (0.08)	20 (28%)	45 (72%)	65 (0.10)
I	Dickman Development - North Building	130	260,648 SF	1,545 FCE	85 (81%)	20 (19%)	105 (0.40)	20 (21%)	85 (79%)	105 (0.40)
I	Dickman Development - South Building (Illing Company)	140	120 Employees	385 FCE	50 (74%)	15 (26%)	65 FCE	25 (39%)	40 (61%)	65 FCE
J	Dielectric Manufacturing Building	140	200,000 SF	790 FCE	95 (77%)	30 (23%)	125 (0.62)	40 (31%)	95 (69%)	135 (0.67)
	Total 2025 New/Driveway Trips			**6,300**	**495**	**130**	**625**	**165**	**485**	**650**

TRIP DISTRIBUTION (Areas H-J New Trips)

W. on STH 167	10%	630	50	10	15	45
N. on STH 175	5%	315	25	5	10	25
S. on STH 175	5%	315	25	5	10	25
N. on I-41	30%	1890	145	40	50	145
S. on I-41	25%	1575	125	35	40	120
N. on CTH Y	5%	315	25	5	10	25
S. on CTH Y	10%	630	50	15	15	50
E. on Holy Hill Road	10%	630	50	15	15	50
	100%	***6300***	***495***	***130***	***165***	***485***

Year 2025 Buildout - South Development Area (Germantown)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
U	Manufacturing (LED Electronic Assembly)	140	30,000 SF	255 FCE	15 (77%)	5 (23%)	20 (0.62)	5 (31%)	15 (69%)	20 (0.67)
U	Manufacturing (Speaker Corp building expansion)	140	90,000 SF	445 FCE	40 (77%)	15 (23%)	55 (0.62)	20 (31%)	40 (69%)	60 (0.67)
U	General Office Building (Design Center)	710	40,000 SF	435 FCE	55 (86%)	10 (14%)	65 FCE	10 (16%)	40 (84%)	50 FCE
U	General Office Building (Retreat/Meetings)	710	2,000 SF	25 FCE	5 (86%)	0 (14%)	5 (1.16)	0 (16%)	5 (84%)	5 FCE
	Total 2025 New/Driveway Trips			**1,160**	**115**	**30**	**145**	**35**	**100**	**135**

TRIP DISTRIBUTION (Area U New Trips)

W. on STH 167	10%	115	10	5	5	10
N. on STH 175	5%	55	5	0	5	5
S. on STH 175	0%	0	0	0	0	0
N. on I-41	30%	350	35	10	10	30
S. on I-41	5%	60	5	0	0	5
N. on CTH Y	5%	60	5	0	0	5
S. on CTH Y (to/from Freistadt)	45%	520	55	15	15	45
E. on Holy Hill Road	0%	0	0	0	0	0
	100%	***1160***	***115***	***30***	***35***	***100***

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EXHIBIT 4-3A
2025 BUILDOUT TRIP GENERATION TABLES
WEST, EAST, AND SOUTH DEVELOPMENT AREAS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2035 Buildout - West Development Area (Richfield)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
A	General Light Industrial (~15 Acres)	110	201,000 SF	820 FCE	65 (88%)	10 (12%)	75 FCE	10 (13%)	50 (87%)	60 (0.10)
B	Single-Family Detached Housing (~22 Acres @ 2 Units/Acre)	210	44 Units	490 FCE	10 (25%)	25 (75%)	35 FCE	30 (63%)	15 (37%)	45 FCE
	Multi-Family Housing (Low-Rise) (~10 Acres @ 8 Units/Acre)	220	80 Units	565 FCE	10 (23%)	30 (77%)	40 FCE	30 (63%)	20 (37%)	50 FCE
C	Industrial Park (~120 Acres for Area C)	130	804,000 SF	2,775 FCE	260 (81%)	60 (19%)	320 (0.40)	65 (21%)	255 (79%)	320 (0.40)
	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	804,000 SF	1,125 (1.40)	50 (77%)	15 (23%)	65 (0.08)	20 (28%)	60 (72%)	80 (0.10)
D	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	570,800 SF	800 (1.40)	35 (77%)	10 (23%)	45 (0.08)	15 (28%)	40 (72%)	55 (0.10)
	Industrial Park (Richfield Business Park)	130	570,800 SF	2,325 FCE	185 (81%)	45 (19%)	230 (0.40)	50 (21%)	180 (79%)	230 (0.40)
E	Kwik Trip: 100% Growth to Trip Generation Values	960	24 Fuel Positions	5,530 (230.52)	340 (50%)	335 (50%)	675 (28.08)	275 (50%)	275 (50%)	550 (22.96)
	Kwik Trip: Less Existing Trips [1]	Actual/ Adjust.	24 Fuel Positions	-3,100 (PM k=10%	-225	-220	-445	-155	-155	-310
	Total Trips			**11,330**	**730**	**310**	**1,040**	**340**	**740**	**1,080**
	Internally Linked Trips [2]	*C*	*5%*	*-195*	*-15*	*-5*	*-20*	*-5*	*-15*	*-20*
	Internally Linked Trips [2]	*D*	*5%*	*-155*	*-10*	*-5*	*-15*	*-5*	*-10*	*-15*
	Total 2035 Driveway Trips			**10,980**	**705**	**300**	**1,005**	**330**	**715**	**1,045**
	Diverted Linked Trips [3]	*E*	*75%*	*-1,820*	*-85*	*-85*	*-170*	*-90*	*-90*	*-180*
	Pass-by Trips [3]	*E*	*25%*	*-610*	*-30*	*-30*	*-60*	*-30*	*-30*	*-60*
	Total 2035 New Trips			**8,550**	**590**	**185**	**775**	**210**	**595**	**805**

[1] Values adjusted so pass-by and diverted linked in/out trips would be equal.

[2] Internally linked trips are between the Kwik Trip and developments along Richfield Parkway.

[3] Diverted Linked Trips are expected from new development traffic east of I-41 that do not pass-through the Kwik Trip driveway. Pass-by trips are expected from new development traffic passing through the Kwik Trip driveway on the west side of I-41. Values rounded so in/out splits would be equal.

TRIP DISTRIBUTION (Area A-E New Trips)

W. on STH 167	15%	1280	90	25	30	90
N. on STH 175	10%	855	60	20	20	60
S. on STH 175	10%	855	60	20	20	60
N. on I-41	30%	2565	175	55	65	175
S. on I-41	30%	2565	175	55	65	180
N. on CTH Y	0%	0	0	0	0	0
S. on CTH Y	0%	0	0	0	0	0
E. on Holy Hill Road	5%	430	30	10	10	30
	100%	***8550***	***590***	***185***	***210***	***595***

TRIP DISTRIBUTION (Area E Pass-by Trips)

EB on Holy Hill Road	65% (35%)	20	20	10	10
WB on Holy Hill Road	35% (65%)	10	10	20	20
		30	***30***	***30***	***30***

Distribution based on AM & PM split of new traffic passing through at Richfield Parkway on STH 167.

TRIP DISTRIBUTION (Area E Diverted Linked Trips)

N. on I-41	40%	35	35	35	35
S. on I-41	40%	35	35	35	35
E. from driveways on Holy Hill Rd	20%	15	15	20	20
		85	***85***	***90***	***90***

Developments without driveways to Holy Hill Rd., west of CTH Y are not expected to divert unless they are already heading toward I-41.

Year 2035 Buildout - South Development Area (Germantown)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
T	Light Industrial (Whitney Drive Expansion Area)	130	150,000 SF	1,160 FCE	50 (81%)	10 (19%)	60 (0.40)	15 (21%)	45 (79%)	60 (0.40)
U	Manufacturing (LED Electronic Assembly)	140	30,000 SF	255 FCE	15 (77%)	5 (23%)	20 (0.62)	5 (31%)	15 (69%)	20 (0.67)
	Manufacturing (Speaker Corp building expansion)	140	90,000 SF	445 FCE	40 (77%)	15 (23%)	55 (0.62)	20 (31%)	40 (69%)	60 (0.67)
	General Office Building (Design Center)	710	40,000 SF	435 FCE	55 (86%)	10 (14%)	65 FCE	10 (16%)	40 (84%)	50 FCE
	General Office Building (Retreat/Meetings)	710	2,000 SF	25 FCE	5 (86%)	0 (14%)	5 (1.16)	0 (16%)	5 (84%)	5 FCE
	Total 2035 New/Driveway Trips			**2,320**	**165**	**40**	**205**	**50**	**145**	**195**

TRIP DISTRIBUTION (Area T-U New Trips)

W. on STH 167	10%	235	15	5	5	15
N. on STH 175	5%	115	5	0	0	5
S. on STH 175	0%	0	0	0	0	0
N. on I-41	30%	695	50	10	15	45
S. on I-41	5%	115	10	0	5	10
N. on CTH Y	5%	115	10	5	0	5
S. on CTH Y (to/from Freistadt)	45%	1045	75	20	25	65
E. on Holy Hill Road	0%	0	0	0	0	0
	100%	***2320***	***165***	***40***	***50***	***145***

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EXHIBIT 4-3B
2035 BUILDOUT TRIP GENERATION TABLE
WEST AND SOUTH DEVELOPMENT AREAS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2035 Buildout - East Development Area (Germantown)

	Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
F	Industrial Park (27 Acres @ 25% FAR LU#130 & #154)	130	147,000 SF	1,145 FCE	50 (81%)	10 (19%)	60 (0.40)	15 (21%)	45 (79%)	60 (0.40)
	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	147,000 SF	205 (1.40)	10 (77%)	0 (23%)	10 (0.08)	5 (28%)	10 (72%)	15 (0.10)
G	Fast-Food Restaurant with Drive-Through	934	3,000 SF	1,415 (470.95)	60 (51%)	60 (49%)	120 (40.19)	50 (52%)	50 (48%)	100 (32.67)
	High-Turnover Sit-Down Restaurant	932	4,000 SF	450 (112.18)	20 (55%)	20 (45%)	40 (9.94)	25 (62%)	15 (38%)	40 (9.77)
	Drive-in Bank	912	3 Lanes	375 (124.76)	15 (61%)	10 (39%)	25 (8.83)	40 (49%)	40 (51%)	80 (27.15)
	General Office (10 Acres @ 15% FAR)	710	65,340 SF	700 FCE	75 (86%)	15 (14%)	90 FCE	10 (16%)	65 (84%)	75 FCE
H	Briggs & Stratton Building - Future Expansion (150,280 sf)	130	10 Employees	135 FCE	10 (86%)	0 (14%)	10 FCE	5 (20%)	10 (80%)	15 FCE
	Germantown Gateway Corporate Park - Remaining Buildout	130	665,995 SF	2,515 FCE	215 (81%)	50 (19%)	265 (0.40)	55 (21%)	210 (79%)	265 (0.40)
		154	665,995 SF	930 (1.40)	40 (77%)	15 (23%)	55 (0.08)	20 (28%)	45 (72%)	65 (0.10)
I	Dickman Development - North Building	130	260,648 SF	1,545 FCE	85 (81%)	20 (19%)	105 (0.40)	20 (21%)	85 (79%)	105 (0.40)
	Dickman Development - South Building (Illing Company)	140	120 Employees	385 FCE	50 (74%)	15 (26%)	65 FCE	25 (39%)	40 (61%)	65 FCE
J	Dielectric Manufacturing Building	140	200,000 SF	790 FCE	95 (77%)	30 (23%)	125 (0.62)	40 (31%)	95 (69%)	135 (0.67)
K	Industrial Park (52 Acres @ 25% FAR LU#130 & #154)	130	283,100 SF	1,615 FCE	95 (81%)	20 (19%)	115 (0.40)	25 (21%)	90 (79%)	115 (0.40)
	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	283,100 SF	395 (1.40)	20 (77%)	5 (23%)	25 (0.08)	10 (28%)	20 (72%)	30 (0.10)
L	General Office (10 Acres @ 15% FAR)	710	65,340 SF	700 FCE	75 (86%)	15 (14%)	90 FCE	10 (16%)	65 (84%)	75 FCE
M	Single-Family Detached Housing (38 Acres @ 25,000 SF/Lot)	210	66 Units	710 FCE	10 (25%)	40 (75%)	50 FCE	45 (63%)	25 (37%)	70 FCE
N	Automobile Sales (New) (10.5 Acres @ 15% FAR)	840	65,340 SF	1,820 (27.84)	90 (73%)	30 (27%)	120 (1.87)	55 (40%)	85 (60%)	140 FCE
	Auto Parts Store (2.5 Acres @ 15% FAR)	843	16,335 SF	905 (55.34)	20 (55%)	20 (45%)	40 (2.59)	40 (48%)	40 (52%)	80 (4.91)
O	Fast-Food Restaurant with Drive-Through	934	3,000 SF	1,415 (470.95)	60 (51%)	60 (49%)	120 (40.19)	50 (52%)	50 (48%)	100 (32.67)
	High-Turnover Sit-Down Restaurant	932	4,000 SF	450 (112.18)	20 (55%)	20 (45%)	40 (9.94)	25 (62%)	15 (38%)	40 (9.77)
	Drive-in Bank	912	3 Lanes	375 (124.76)	15 (61%)	10 (39%)	25 (8.83)	40 (49%)	40 (51%)	80 (27.15)
P	Industrial Park (47.4 Acres @ 25% FAR LU#130 & #154)	130	258,100 SF	1,535 FCE	85 (81%)	20 (19%)	105 (0.40)	20 (21%)	85 (79%)	105 (0.40)
	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	258,100 SF	360 (1.40)	15 (77%)	5 (23%)	20 (0.08)	5 (28%)	20 (72%)	25 (0.10)
Q	Industrial Park (15 Acres @ 25% FAR LU#130 & #154)	130	81,700 SF	845 FCE	30 (81%)	5 (19%)	35 (0.40)	5 (21%)	30 (79%)	35 (0.40)
	High-Cube Transload Warehouse & Short-Term Storage Warehse	154	81,700 SF	115 (1.40)	5 (77%)	0 (23%)	5 (0.08)	5 (28%)	5 (72%)	10 (0.10)
R	General Office (6 Acres @ 15% FAR)	710	39,205 SF	430 FCE	55 (86%)	10 (14%)	65 FCE	5 (16%)	40 (84%)	45 FCE
S	Single-Family Detached Housing (64 Acres @ 25,000 SF/unit)	210	112 Units	1,155 FCE	20 (25%)	65 (75%)	85 FCE	70 (63%)	45 (37%)	115 FCE
	Total 2035 Trips			**23,415**	**1,340**	**570**	**1,910**	**720**	**1,365**	**2,085**

Year 2035 Buildout - East Development Area (Germantown) - Continued

Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
Total 2035 Trips			**23,415**	**1,340**	**570**	**1,910**	**720**	**1,365**	**2,085**
Internally Linked Trips	*G*	*5%*	*-110*	*-5*	*-5*	*-10*	*-5*	*-5*	*-10*
Internally Linked Trips	*O*	*5%*	*-110*	*-5*	*-5*	*-10*	*-5*	*-5*	*-10*
Total 2035 Driveway Trips			**23,195**	**1,330**	**560**	**1,890**	**710**	**1,355**	**2,065**
Externally Linked Trips	*G*	*15%*	*-335*	*-15*	*-15*	*-30*	*-15*	*-15*	*-30*
Externally Linked Trips	*O*	*15%*	*-335*	*-15*	*-15*	*-30*	*-15*	*-15*	*-30*
Externally Linked Trips	*M*	*20%*	*-140*	*0*	*-10*	*-10*	*-10*	*-5*	*-15*
Externally Linked Trips	*N*	*10%*	*-275*	*-10*	*-5*	*-15*	*-10*	*-15*	*-25*
Externally Linked Trips	*S*	*20%*	*-230*	*-5*	*-15*	*-20*	*-15*	*-10*	*-25*
Pass-by Trips	*G*	*30% (20%)*	*-360*	*-20*	*-20*	*-40*	*-20*	*-20*	*-40*
Pass-by Trips	*O*	*30% (20%)*	*-360*	*-20*	*-20*	*-40*	*-20*	*-20*	*-40*
Total 2035 New Trips			**21,160**	**1,245**	**460**	**1,705**	**605**	**1,255**	**1,860**

Notes: Pass-by trips calculated after Internally and Externally linked trip reductions.
Internally Linked Trips for Areas G & O were calculated for LU #912, #932, #934.
Externally Linked Trips for Areas G & O were calculated for LU #912, #932, #934.

TRIP DISTRIBUTION (Area F-S New Trips)

W. on STH 167	10%	2115	125	45	60	125
N. on STH 175	5%	1060	60	25	30	65
S. on STH 175	5%	1060	60	25	30	65
N. on I-41	30%	6345	375	135	185	375
S. on I-41	25%	5290	310	115	150	315
N. on CTH Y	5%	1060	65	25	30	60
S. on CTH Y	10%	2115	125	45	60	125
E. on Holy Hill Road	10%	2115	125	45	60	125
	100%	***21160***	***1245***	***460***	***605***	***1255***

TRIP DISTRIBUTION (Area G & O Pass-by Trips)

EB on Holy Hill Road	65% (35%)	25	25	15	15
WB on Holy Hill Road	35% (65%)	15	15	25	25
		40	***40***	***40***	***40***

TRIP DISTRIBUTION (Area G, M-O, S Externally Linked Trips)

W. on STH 167	10%	-135	-5	-5	-5	-5
N. on STH 175	5%	-65	0	-5	-5	-5
S. on STH 175	5%	-65	0	-5	-5	0
N. on I-41	30%	-395	-15	-20	-20	-20
S. on I-41	25%	-330	-10	-15	-15	-15
N. on CTH Y	5%	-65	-5	0	-5	-5
S. on CTH Y	10%	-130	-5	-5	-5	-5
E. on Holy Hill Road	10%	-130	-5	-5	-5	-5
	100%	***-1315***	***-45***	***-60***	***-65***	***-60***

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2521: 03-16-21

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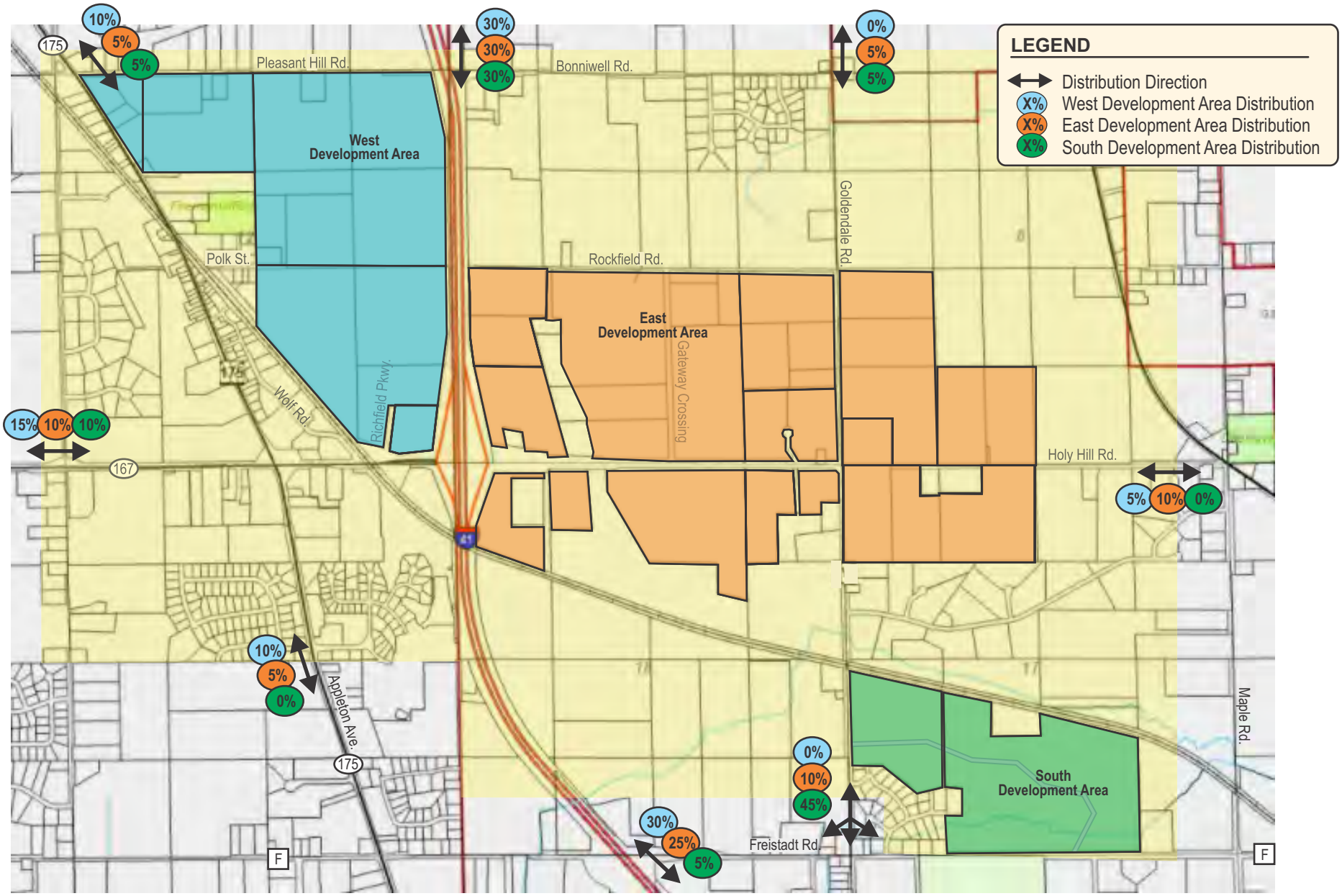
NOT TO SCALE

EXHIBIT 4-3C
YEAR 2035 BUILDOUT TRIP GENERATION TABLE
EAST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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2521: 03-16-21

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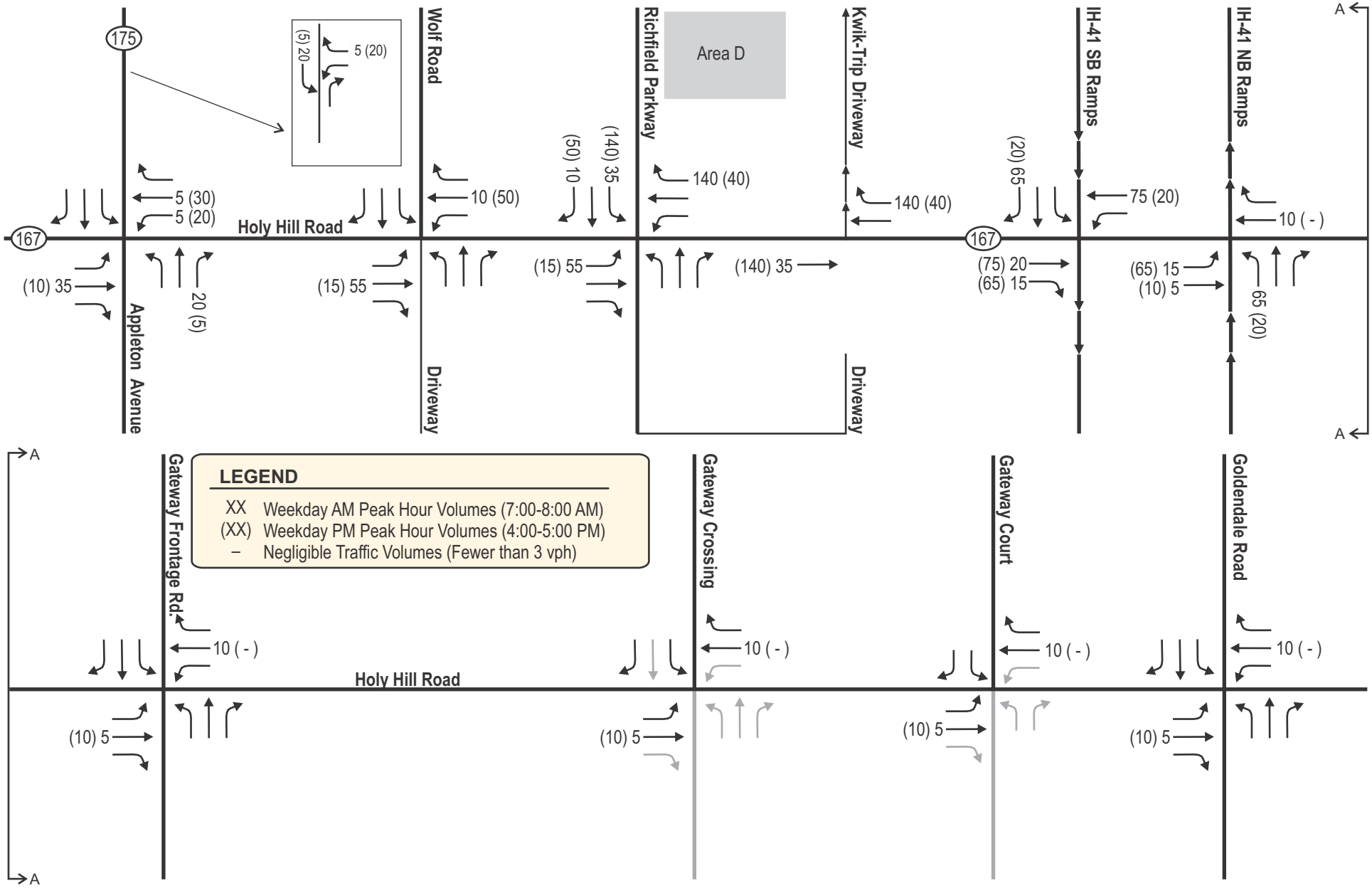
EXHIBIT 4-4
TRIP DISTRIBUTION DIAGRAM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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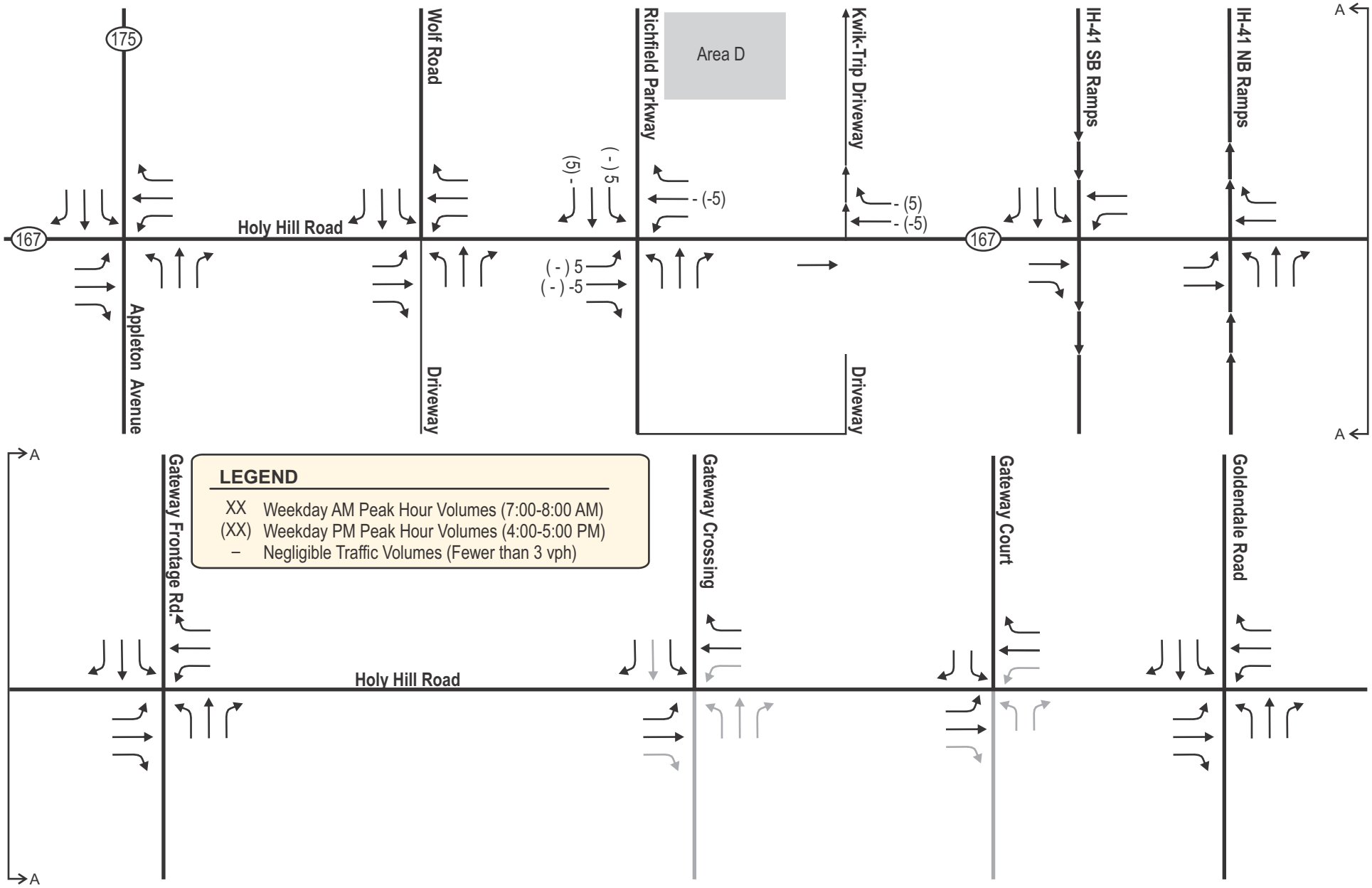
NOT TO SCALE

EXHIBIT 4-5A
2025 BUILDOUT NEW TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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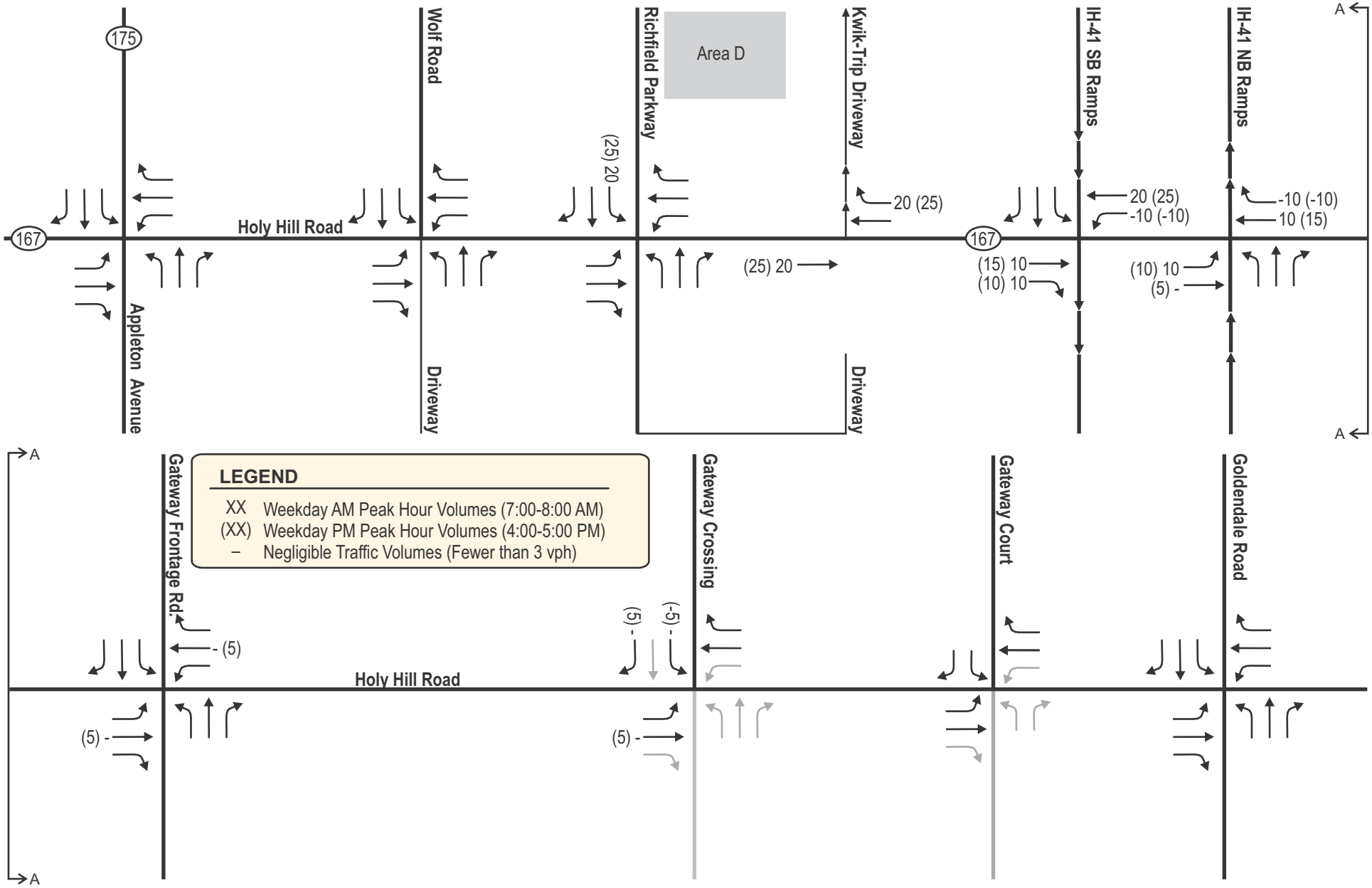
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-5B
2025 BUILDOUT PASS-BY TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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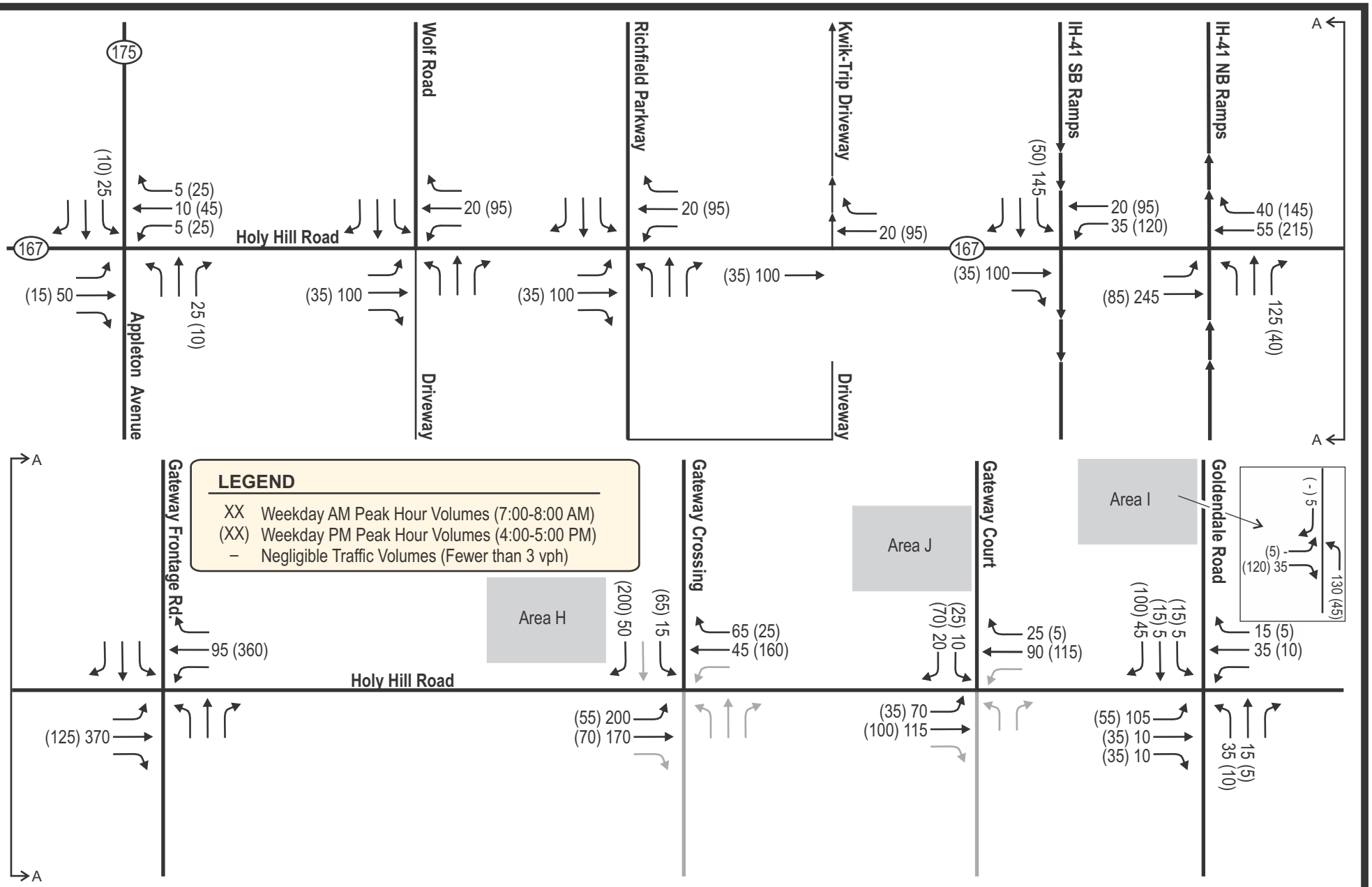
NOT TO SCALE

EXHIBIT 4-5C
2025 BUILDOUT DIVERTED LINK TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

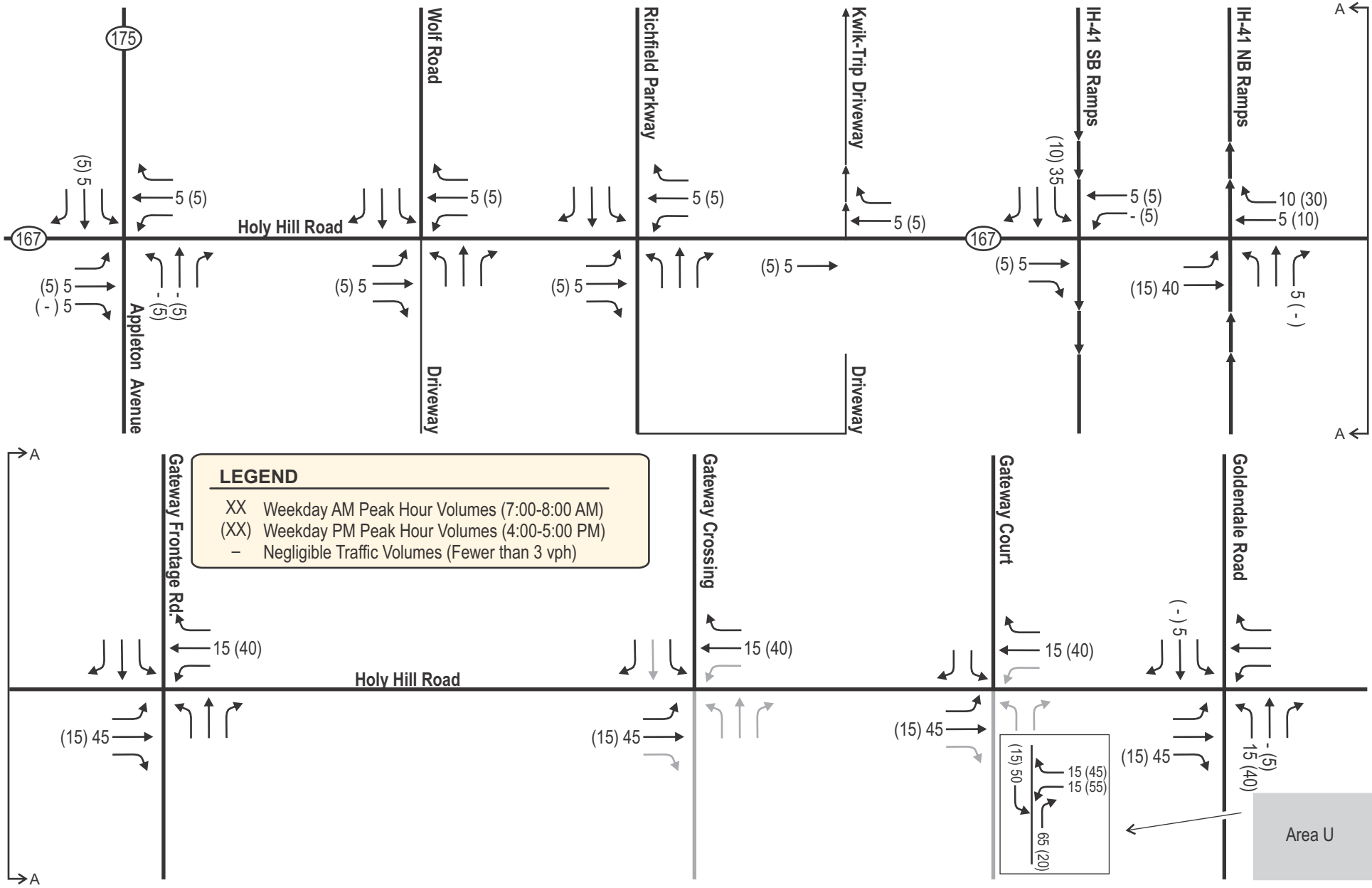


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-5D
2025 BUILDOUT NEW TRIPS
EAST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



TADi TRAFFIC ANALYSIS & DESIGN, INC.

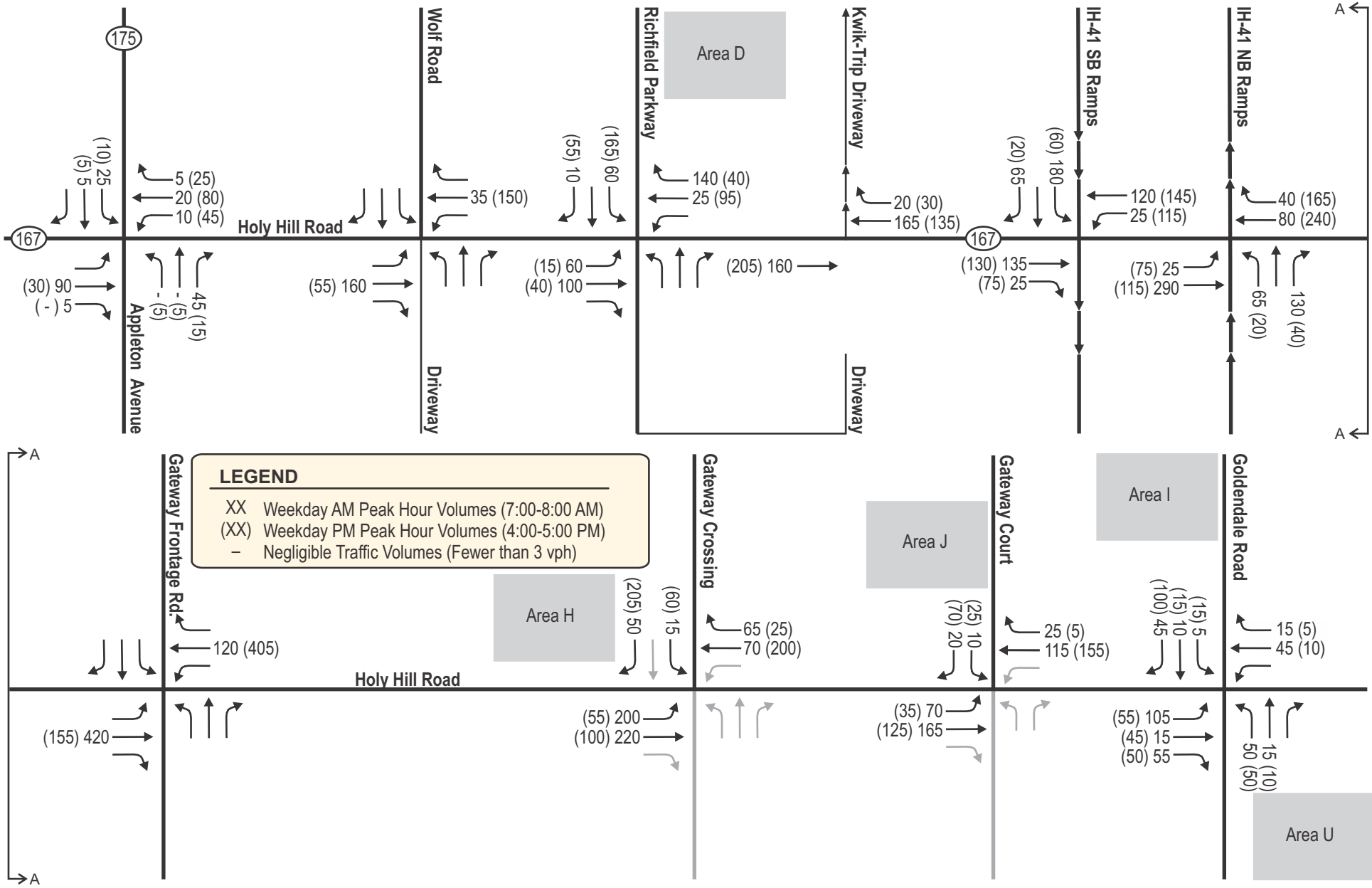
2521: 03-16-21

N

NOT TO SCALE

EXHIBIT 4-5E
2025 BUILDOUT NEW TRIPS
SOUTH DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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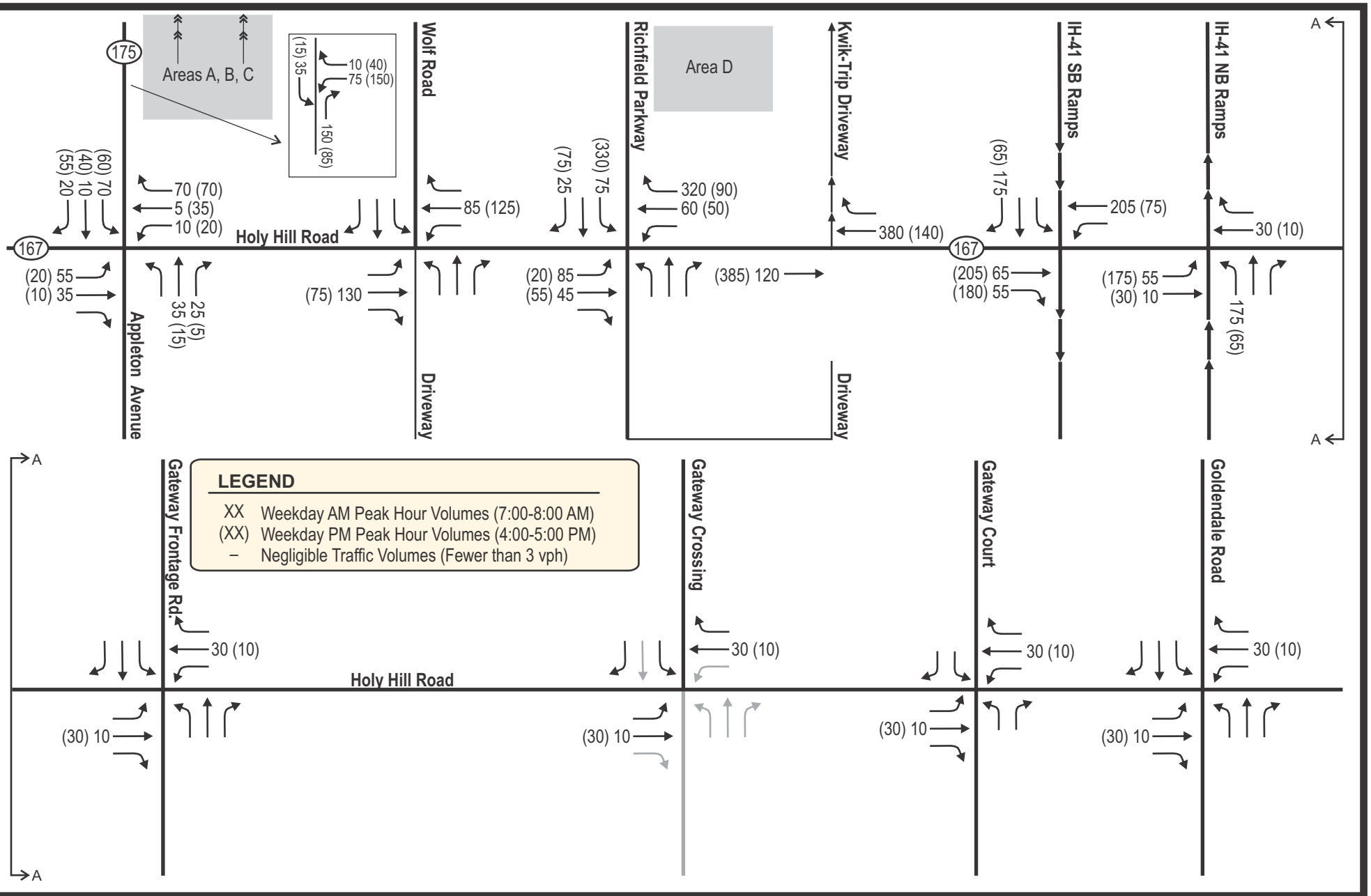
NOT TO SCALE

EXHIBIT 4-5F
2025 BUILDOUT DRIVEWAY TRIPS
WEST, EAST, AND SOUTH DEVELOPMENT AREAS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

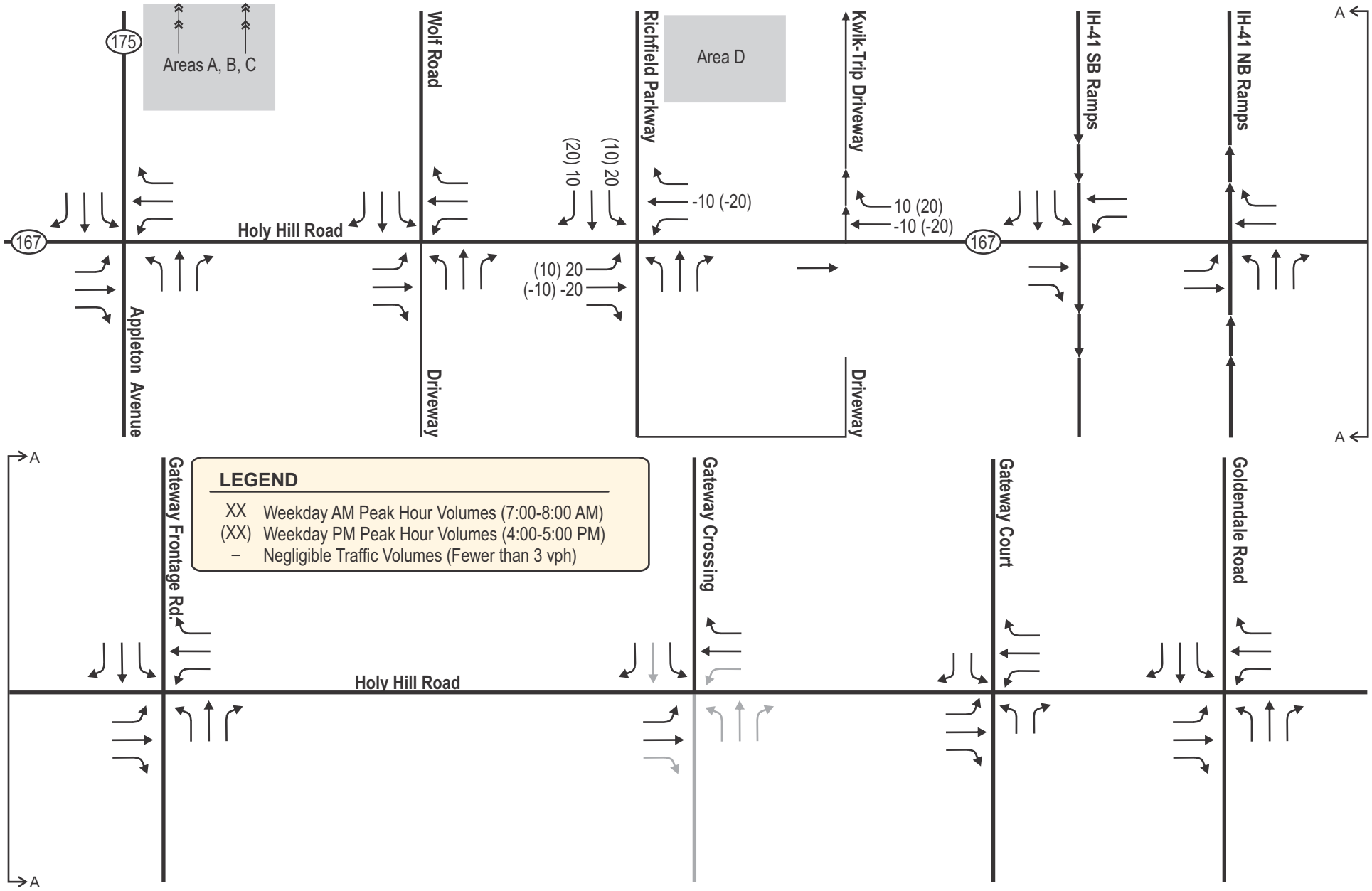


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7A
2035 BUILDOUT NEW TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

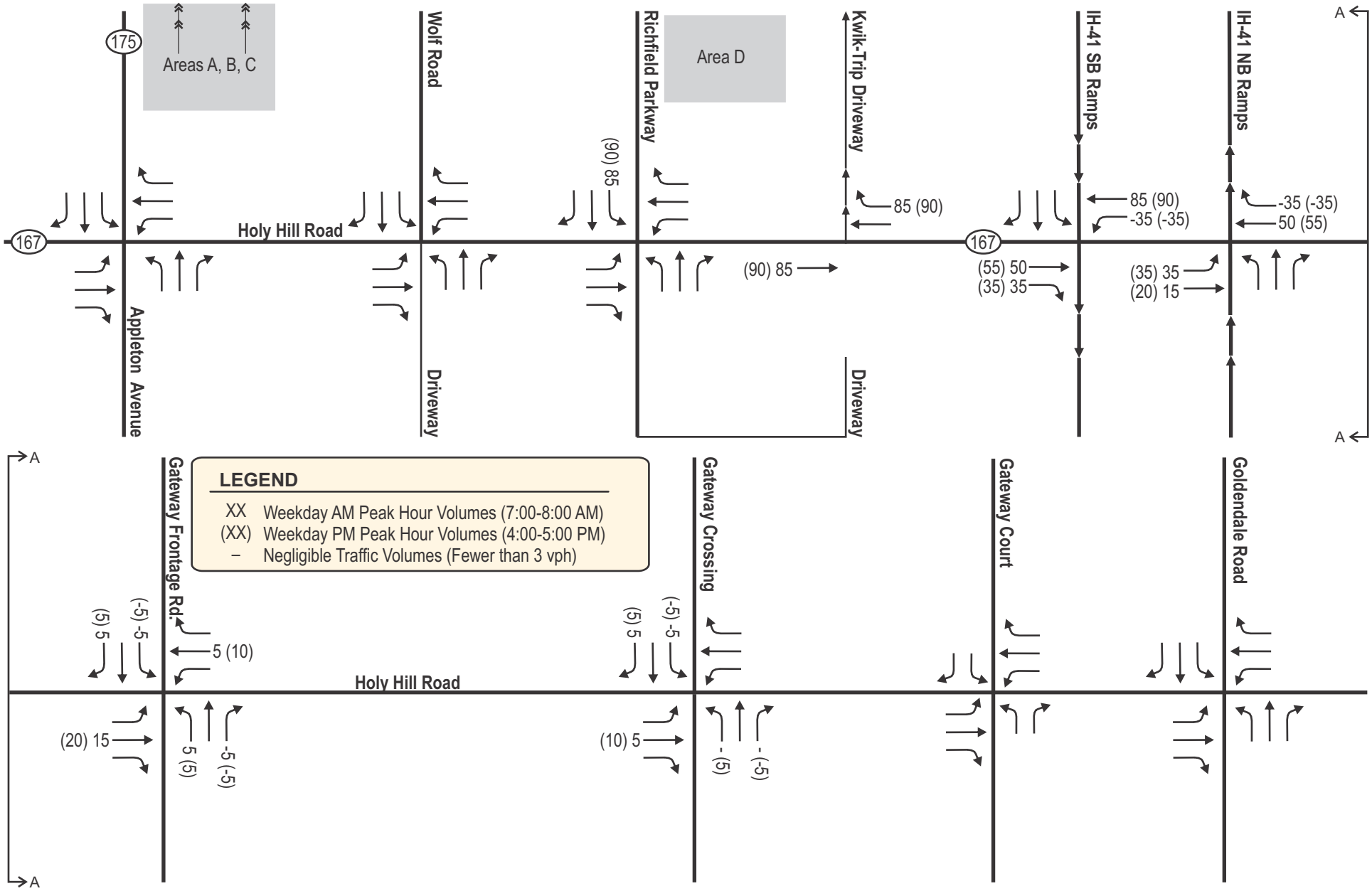


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7B
2035 BUILDOUT PASS-BY TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

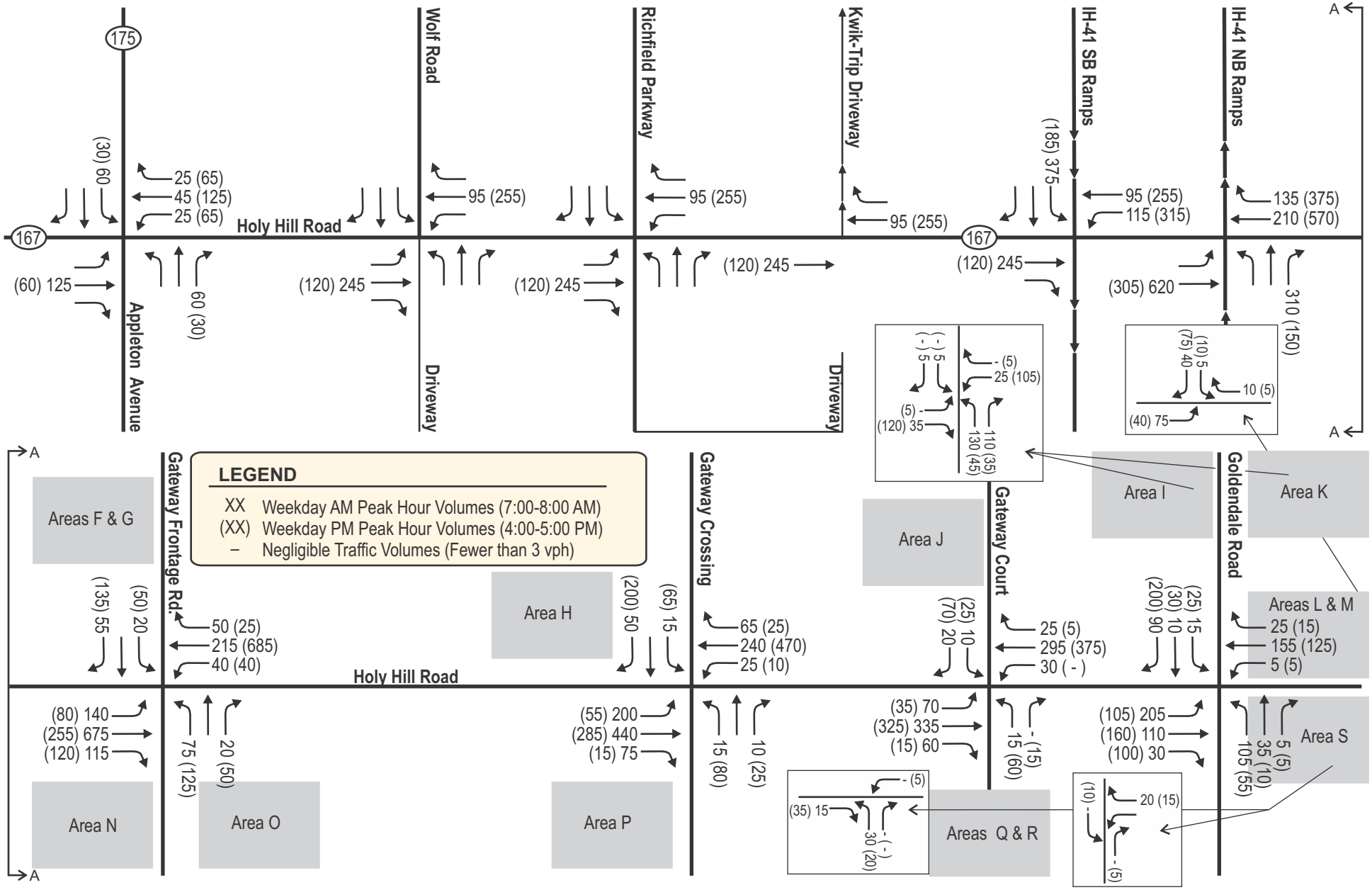


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7C
2035 BUILDOUT DIVERTED LINK TRIPS
WEST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

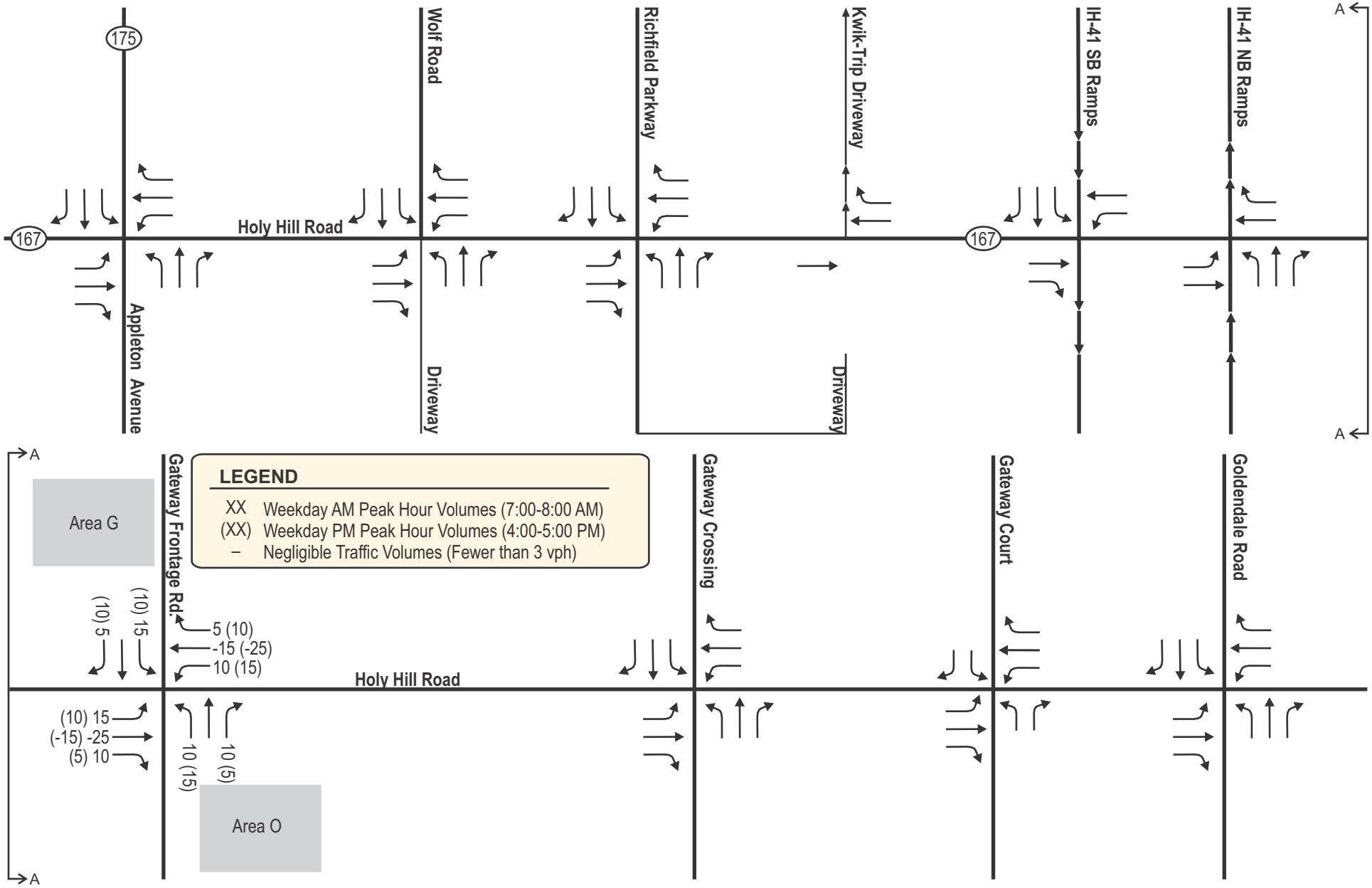


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7D
2035 BUILDOUT NEW TRIPS
EAST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

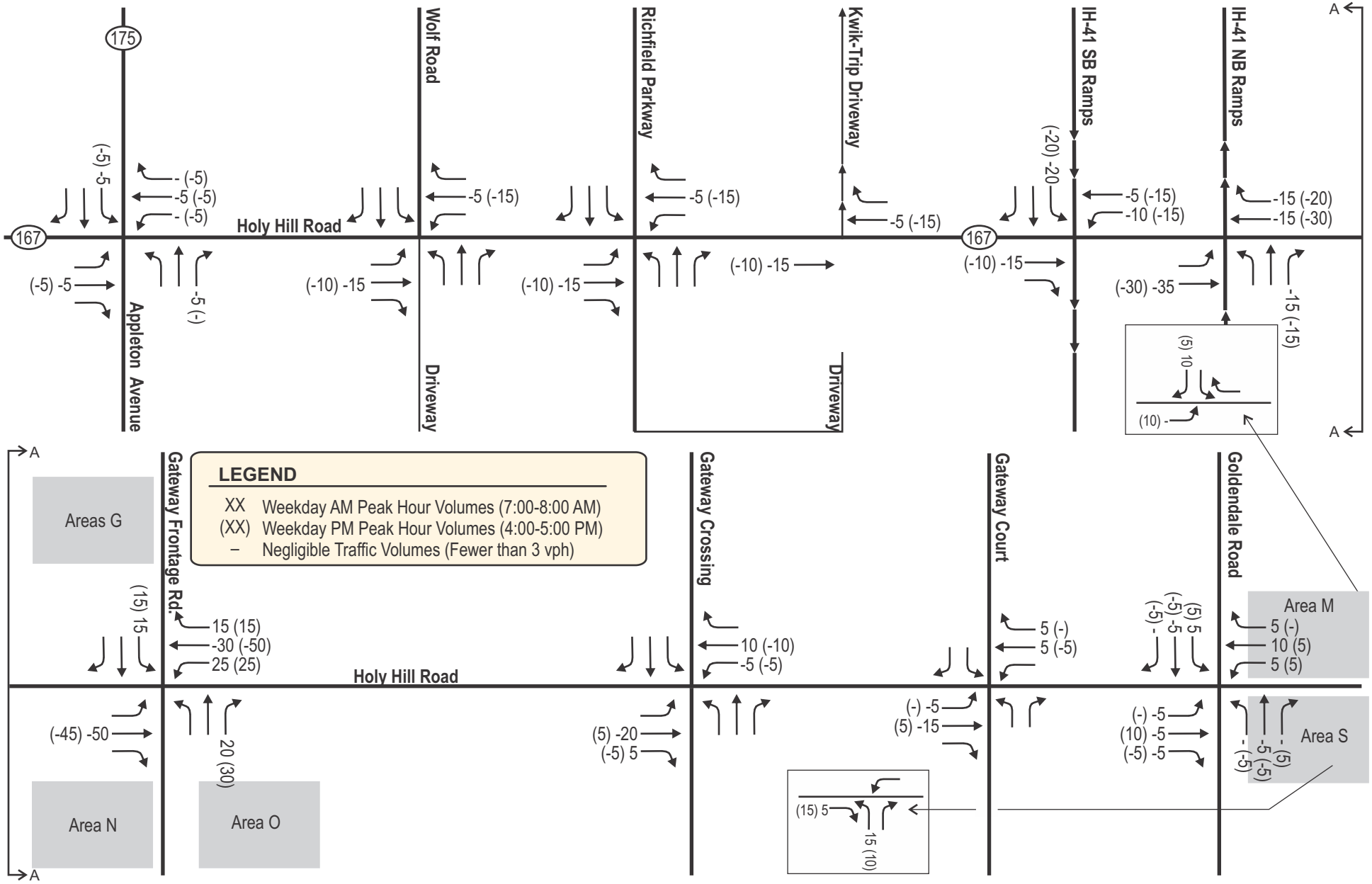


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7E
2035 BUILDOUT PASS-BY TRIPS
EAST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

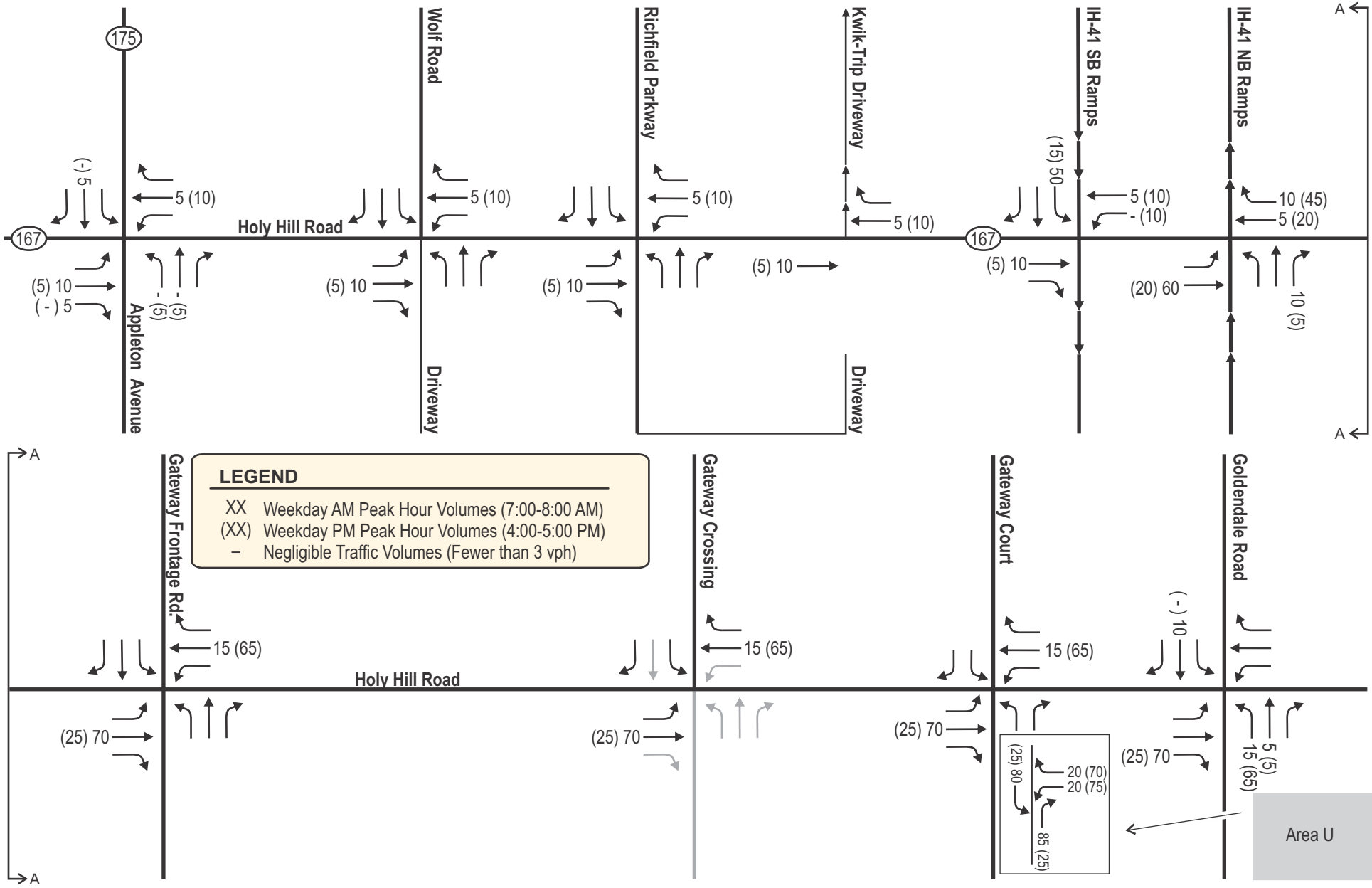


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7F
2035 BUILDOUT EXTERNALLY LINKED TRIPS
EAST DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

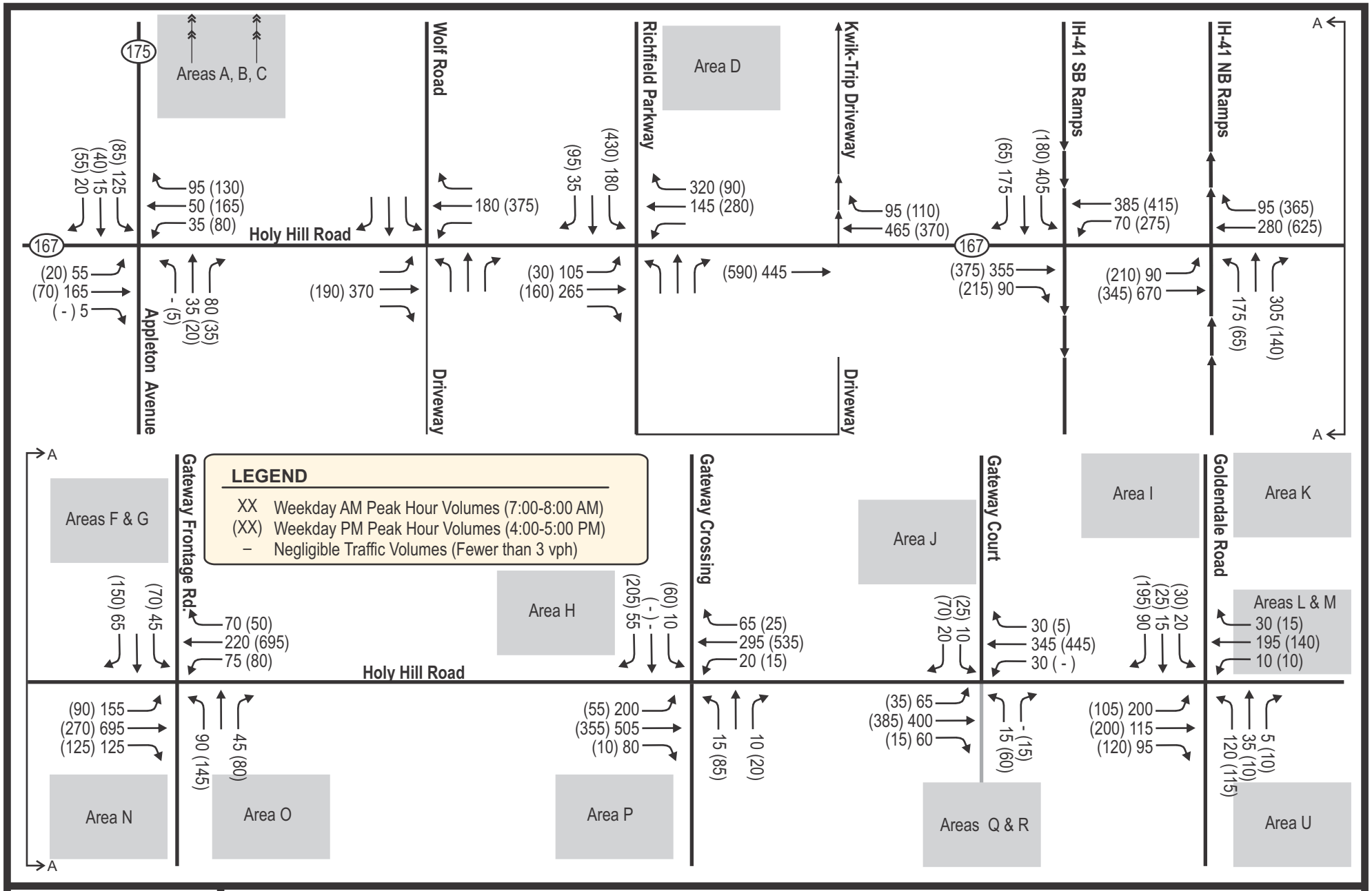


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7G
2035 BUILDOUT NEW TRIPS
SOUTH DEVELOPMENT AREA

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

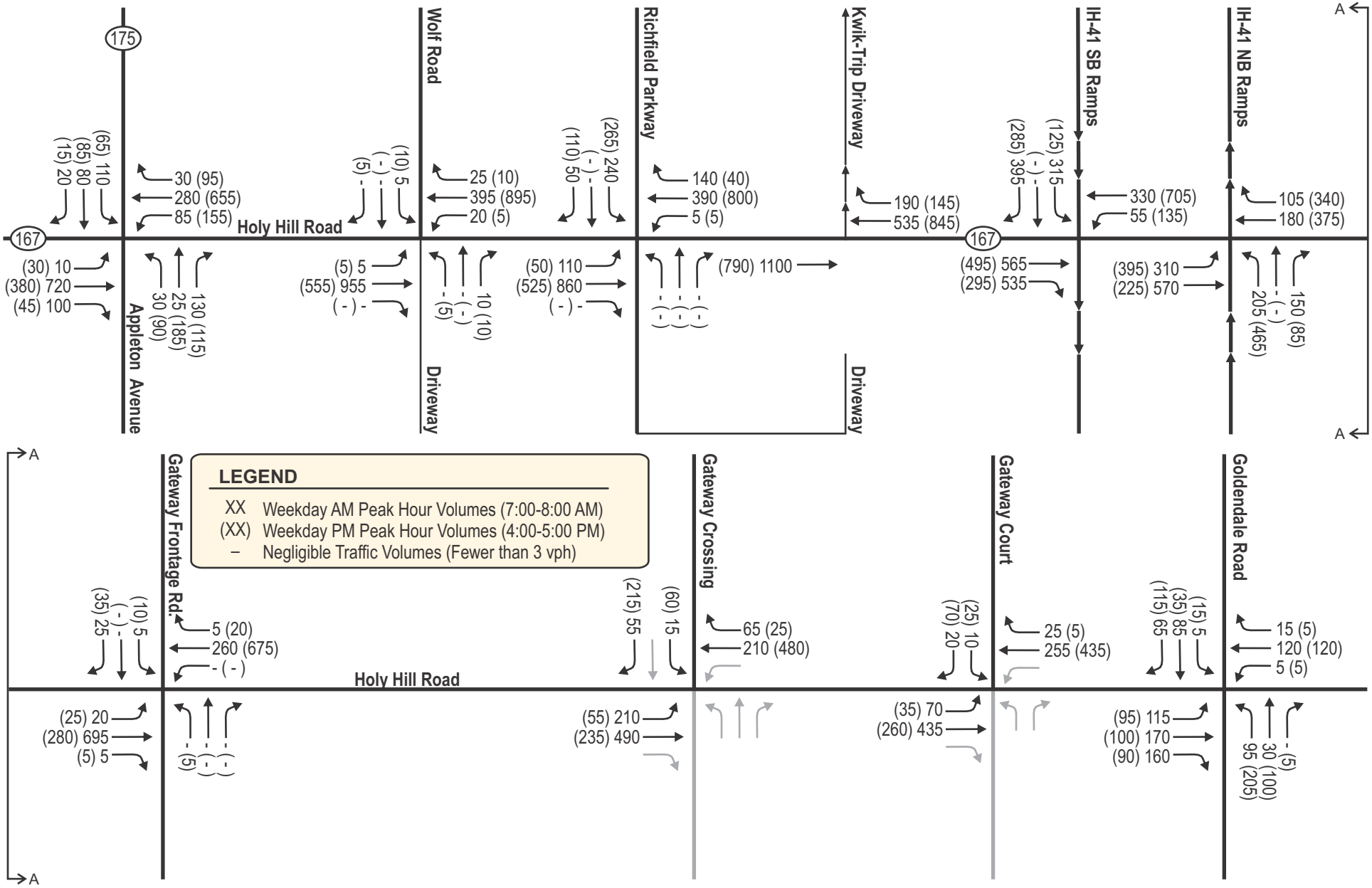


TADi
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-7H
2035 BUILDOUT DRIVEWAY TRIPS
WEST, EAST, AND SOUTH DEVELOPMENT AREAS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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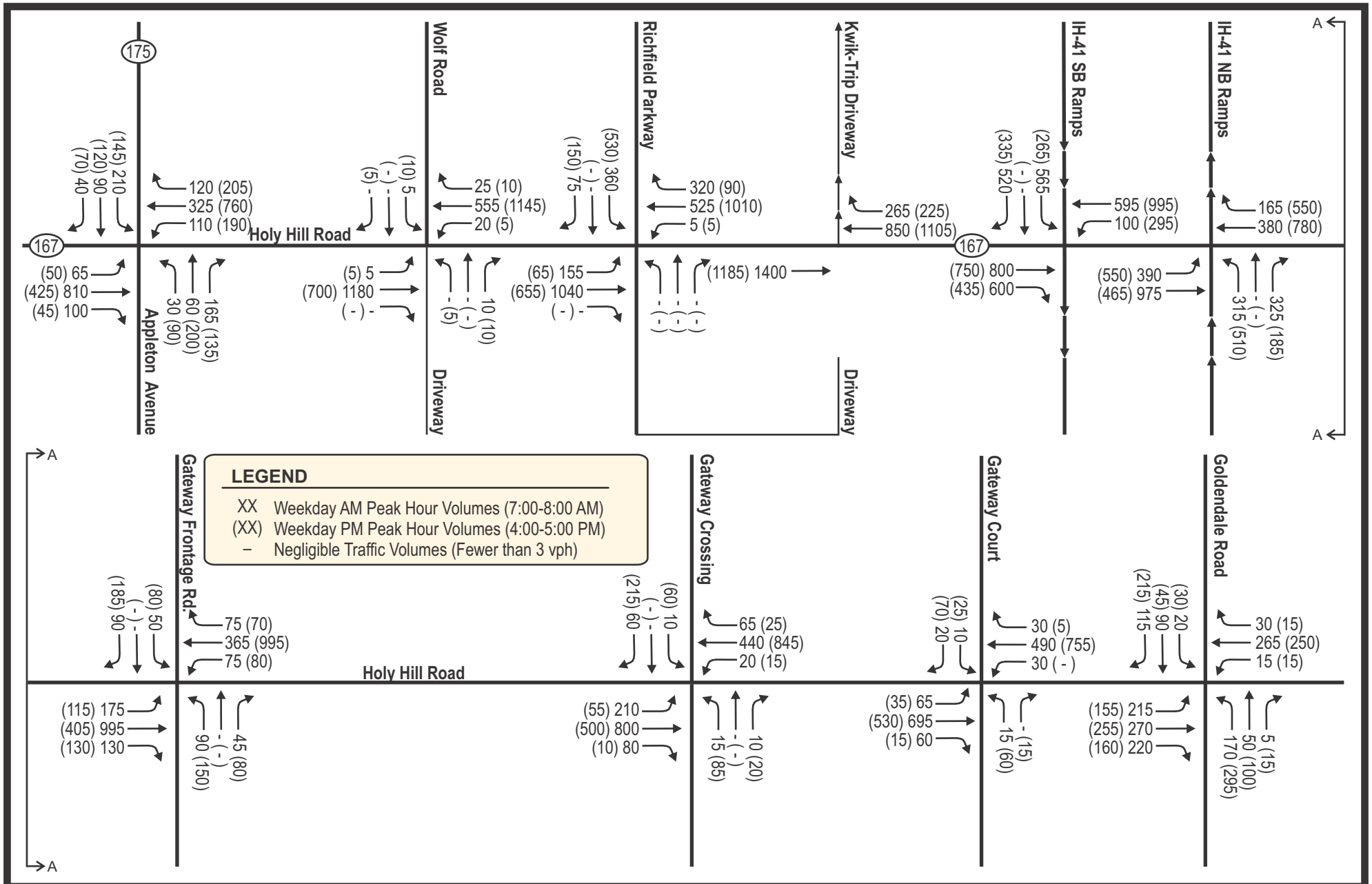
NOT TO SCALE

EXHIBIT 4-11
2025 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 4-13
2040 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

CHAPTER V – TRAFFIC AND IMPROVEMENT ANALYSIS

PART A – SITE ACCESS

This study assumes that access for the West Development Area be through an extension of Richfield Parkway north past Pleasant Hill Road, plus additional access connections to both Pleasant Hill Road and STH 175. Access for the East Development Area would be through extensions of the Gateway Frontage Road (both north and south of Holy Hill Road), an extension of Gateway Crossing (south of Holy Hill Road), an extension of Gateway Court, one or more new driveways/roadways to Holy Hill Road east of Goldendale Road, and new driveways/roadways to Goldendale Road. Access for the South Development Area would remain as existing at both Goldendale Road and CTH F.

PART B – CAPACITY/LEVEL OF SERVICE ANALYSIS

This study evaluates base year 2025 and horizon year 2040 traffic volumes for the background condition (pre-development) and build condition (estimated 2025 and 2035 buildout of area developments).

B1. Traffic Operating Conditions – *Existing Transportation System*

The analyses for background traffic (pre-development) and build traffic (with buildout of area developments) were completed using the existing geometrics and traffic control at the study intersections. The peak hour LOS and queue tables for each analysis condition are shown on the following exhibits. The corresponding appendix location for the Synchro analysis files is also listed below.

- Exhibit 5-2 (Appendix B): 2040 Background Traffic LOS & Queues
- Exhibit 5-3 (Appendix C): 2025 Build Traffic LOS & Queues
- Exhibit 5-5 (Appendix C): 2040 Build Traffic LOS & Queues

As shown, the 2040 Background traffic operations are expected to be similar to the 2025 Background traffic operations. With additional traffic from the 2025 and 2040 Buildout of area developments, many movements at the study intersections are expected to operate with increased delays at unacceptable levels (LOS E and F) during the peak hours.

B2. Traffic Operating Conditions – *Modified Transportation System*

The recommended modifications, outlined in Chapter VI, are expected to result in LOS D or better operations at the study area intersections, with some exceptions for stop-controlled intersections that do not meet warrants for signal control and are relatively reasonably over the delay thresholds for LOS D. The peak hour LOS and queue tables with the intersection modifications are shown on the following exhibits. The corresponding appendix location for the Synchro analysis files is also listed below.

- Exhibit 5-9 (Appendix E): 2025 Background Traffic LOS & Queues
- Exhibit 5-11 (Appendix E): 2040 Background Traffic LOS & Queues
- Exhibit 5-12 (Appendix F): 2025 Build Traffic LOS & Queues
- Exhibit 5-14 (Appendix F): 2040 Build Traffic LOS & Queues

PART C – QUEUEING ANALYSIS

The 95th percentile queues shown on the LOS tables are also shown for each traffic movement on the following exhibits. The exhibits reflect the queues with the recommended modifications and proposed transportation system discussed previously in Part B.

- Exhibit 5-18: 2025 Background Traffic 95th Percentile Queues
- Exhibit 5-20: 2040 Background Traffic 95th Percentile Queues
- Exhibit 5-21: 2025 Build Traffic 95th Percentile Queues
- Exhibit 5-23: 2040 Build Traffic 95th Percentile Queues

The queues shown on these exhibits were used to evaluate the sufficiency of the existing storage lane lengths and the requirements for future storage lanes created due to modification recommended at the study intersections.

Turn lane storage recommendations on minor streets accommodate the weekday peak hour 95th percentile queues. Where feasible, turn lane storage recommendations on STH 175, STH 167, and the IH-41/45 ramps accommodate the 95th percentile queue plus deceleration (determined from WisDOT "desirable" values) within the turn lane. Turn lane storage recommendations on Holy Hill Road and Goldendale Road accommodate the 95th percentile queue plus deceleration (determined from WisDOT "minimum" values) within the turn lane. Where constraints exist, turn lane storage recommendations are maximized within the available space.

Note that with the existing two-lane cross-section on STH 167, the westbound through queues from Richfield Parkway are expected to extend past the IH-41/45 Southbound Ramp intersection during the PM peak hour. This is due to the high through volumes (800 vph) and is not shortened by adjusting the offsets or cycle lengths for the corridor. Widening STH 167, which is recommended for the 2040 Build traffic volumes, would reduce these peak hour queues to acceptable levels.

Beginning with the 2025 Background traffic volumes, the eastbound through queues from Richfield Parkway are expected to back up through the Wolf Road intersection during the AM peak hour. Widening STH 167 to a four-lane cross-section is expected to shorten these queues to no longer block the Wolf Road intersection.

PART D – PEDESTRIAN, BICYCLE AND MULTI-USE TRAIL CONSIDERATIONS

If STH 167 and Holy Hill Road are widened in the future, it is expected that the plans will include sidewalks, multi-use trails, or on-pavement bicycle lengths for non-motorized travel through the study area.

PART E – SPEED CONSIDERATIONS/SIGHT DISTANCE

Speed limit changes were not investigated in this study. All study intersections (excluding extensions across Holy Hill Road) are currently existing, and therefore, intersection sight distance was not evaluated in this study.

PART F – TRAFFIC CONTROL NEEDS

WisDOT requires an Intersection Control Evaluation (ICE) to be completed for intersections where new traffic control, a change in traffic control, or a new intersection type is proposed on State Trunk Highways. Phase I ICE reports (Appendix J) were prepared for the STH 167 intersections with the IH-41/45 Southbound Ramps and the IH-41/45 Northbound Ramps to evaluate possible traffic control alternatives to mitigate the LOS E and LOS F delays expected with the Build traffic volumes.

F1. STH 167 & IH-41/45 Southbound Ramps Phase I ICE

The STH 167 and IH-41/45 Southbound Ramp intersection has a high number of rear-end crashes from the southbound ramp right-turn lane that could be mitigated by traffic signal control. Projected traffic volumes are expected to result in unacceptable delays for all movements, which could further increase crashes for that movement. All-way stop control and roundabout control (two circulating lanes or less) are not expected to mitigate delays with the 2040 Build traffic volumes at the STH 167 & IH-41/45 Southbound Ramp intersection. Traffic signal control, along with widening the cross-section of STH 167 and providing additional turn lanes at each approach, is expected to provide enough capacity to accommodate the projected traffic volumes through the year 2040. Traffic signals are expected to be warranted with the 2025 Build traffic condition.

F2. STH 167 & IH-41/45 Northbound Ramps Phase I ICE

While no crash patterns emerged (other than failure to yield) that could justify a traffic signal, current peak hour volumes result in unacceptable delays and queues during the PM peak hour with the existing all-way stop control. Alternative traffic control, such as two-way stop control or roundabout control (with two circulating lanes or less) are not expected to mitigate delays with the 2040 Build traffic volumes at the STH 167 & IH-41/45 Northbound Ramp intersection. Traffic signal control, along with widening the cross-section of STH 167 and providing additional turn lanes at each approach, is expected to provide enough capacity to accommodate the projected traffic volumes. Although traffic signals are not expected to be fully warranted until the 2025 Build traffic condition, traffic signals are recommended to mitigate the delays and queues expected with the 2025 Background traffic condition.

PART G – TRAFFIC SIGNAL WARRANT STUDY

Traffic signal warrant studies are based on traffic volume warrants from the 2009 *Manual on Uniform Traffic Control Devices* (MUTCD). Chapter 4C of the MUTCD outlines the standards for determining the need for traffic signals at a particular location. Warrant 1, Eight-Hour Vehicular Volume, Warrant 2, Four-Hour Vehicular Volume, and Warrant 3, Peak-Hour Volume was evaluated for the Mequon Road intersection with Weston Drive.

MUTCD Warrants 1, 2, and 3 were compared to hourly traffic volumes that include the base hourly traffic volume counts, plus additional hourly traffic expected from the 2025 or 2035 buildout of the area developments. The results of the warrant analysis studies completed for this project are discussed below. The 12-hour traffic volumes developed for each intersection and the warrant analysis worksheets are located in Appendix I, with the exception of the IH-41/45 ramp intersection warrant analyses, which are located in the Phase I ICE reports in Appendix J.

G1. STH 167 & IH-41/45 Southbound Ramps Warrant Study

The STH 167 intersection with the IH-41/45 Southbound Ramps has only three approach legs and the speed limit on STH 167 is posted at 45 mph. Therefore, the minor street volume thresholds were inflated to 150% of the MUTCD values, and then all volume thresholds were reduced to 70%. Signal warrants were evaluated for traffic volume scenarios beginning with the 2025 Background condition since the analysis showed unacceptable delays during the peak hours. With the 2025 Background traffic volumes, none of the warrants are expected to be met. With additional development buildout for the year 2025 (2025 Build traffic), Warrants 1 and 2 are expected to be met.

G2. STH 167 & IH-41/45 Northbound Ramps Warrant Study

The STH 167 intersection with the IH-41/45 Northbound Ramps has only three approach legs and the speed limit on STH 167 is posted at 45 mph. Therefore, the minor street volume thresholds were inflated to 150% of the MUTCD values, and then all volume thresholds were reduced to 70%. Signal warrants were evaluated for traffic volume scenarios beginning with the 2025 Background condition since the analysis showed unacceptable delays during the peak hours. With the 2025 Background traffic volumes, only Warrant 3, Peak Hour Volume is expected to be met. With additional development buildout for the year 2025 (2025 Build traffic), Warrants 1, 2, and 3 are expected to be met.

G3. Holy Hill Road & Gateway Frontage Road Warrant Study

The Holy Hill Road/Gateway Frontage Road intersection is expected to operate with unacceptable delays with the year 2035 buildout of area developments. With the 2040 Build traffic volumes and recommended approach geometrics for the 2040 Build condition, the Holy Hill Road/Gateway Frontage Road intersection is expected to meet signal Warrants 1, 2, and 3.

G4. Holy Hill Road & Gateway Crossing Warrant Study

The Holy Hill Road/Gateway Crossing intersection is expected to operate at LOS E for the southbound movement during the PM peak hour with the 2025 Build traffic volumes. The delays for this movement (40 seconds/vehicle) are just over the threshold for LOS D (35 seconds/vehicle) and traffic volumes do not meet any of the warrants for traffic signal control. When Gateway Crossing extends to the south of Holy Hill Road for the 2035 buildout of the area developments, the intersection converts from a three-leg to four-leg intersection and is expected to operate with significantly higher delays during the peak hours. With the 2040 Build traffic volumes and recommended approach geometrics for the 2040 Build condition, the Holy Hill Road/Gateway Crossing intersection is expected to meet signal Warrants 2 and 3.

G5. Holy Hill Road & Goldendale Road Warrant Study

The Holy Hill Road/CTHY Street intersection is expected to operate with unacceptable delays with the year 2025 buildout of area developments. With the 2025 Build traffic volumes and existing approach geometrics, signal Warrants 2 and 3 are expected to be met. As the approach geometrics are expected to be relatively balanced, all-way stop control is recommended as an interim measure to traffic signals at the intersection (all-way stop control warrants are met). All-way stop control is expected to provide acceptable traffic operations with the 2025 Build traffic volumes, but traffic signal control is recommended to provide acceptable traffic operations with the 2040 Build traffic volumes.

Year 2040 Background Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	C			A			A			A			C
		Delay	23			7			9			7			
		Queue	255			45			25			25			
	PM	LOS	A			D			B			A			C
		Delay	9			25			10			9			
		Queue	70			275			65			30			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		C			**E**			A
		Delay	8	*		10	*		23			39			
		Queue	0	*		5	*		5			5			
	PM	LOS	A	*		A	*		C			D			A
		Delay	9	*		8	*		22			31			
		Queue	0	*		0	*		5			10			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	A	B		B	B		B	B		C	B		B
		Delay	7	14		19	12		17	16		20	17		
		Queue	30	670		10	275		5	5		150	40		
	PM	LOS	B	A		A	B		C	B		C	C		B
		Delay	10	5		8	16		21	20		22	21		
		Queue	15	185		5	555		5	5		95	60		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	B	*	-	-			**E**	B		A
		Delay	-	*	*	10	*	-	-			47	13		
		Queue	-	*	*	5	*	-	-			115	60		
	PM	LOS	-	*	*	A	*	-	-			**E**	D		A
		Delay	-	*	*	9	*	-	-			47	28		
		Queue	-	*	*	5	*	-	-			70	130		
#600 STH 167 & IH-41/45 Northbound Ramps (Stop Signs - All-way)	AM	LOS	B	B	-	-	A	A	B		A	-			B
		Delay	14	12	-	-	9	8	12		8	-			
		Queue	70	60	-	-	15	10	30		5	-			
	PM	LOS	**E**	B	-	-	C	B	**F**		A	-			**F**
		Delay	42	13	-	-	15	14	102		10	-			
		Queue	210	30	-	-	45	50	430		10	-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			B			B			A
		Delay	7		0	8			12			10			
		Queue	0		0	0			0			5			
	PM	LOS	A		A	A			B			B			A
		Delay	8		0	7			14			12			
		Queue	5		0	0			5			10			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	7		-	-	*		-			10			
		Queue	0		-	-	*		-			0			
	PM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			10			
		Queue	0		-	-	*		-			5			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			B			B			A
		Delay	7			7			14			13			
		Queue	0			0			15			20			
	PM	LOS	A			A			C			B			B
		Delay	7			7			24			11			
		Queue	5			0			120			10			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

N

NOT TO SCALE

EXHIBIT 5-2
2040 BACKGROUND TRAFFIC CAPACITY/LOS ANALYSIS
EXISTING TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2025 Build Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	E			A			B			A			C
		Delay	40			7			12			7			
		Queue	405			50			45			30			
	PM	LOS	B			F			B			B			D
		Delay	11			50			11			11			
		Queue	85			480			75			35			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		D			F			A
		Delay	8	*		11	*		29			53			
		Queue	0	*		5	*		10			10			
	PM	LOS	B	*		A	*		D			E			A
		Delay	10	*		8	*		28			41			
		Queue	0	*		0	*		10			15			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	B	C		C	C		C	B		C	C		C
		Delay	13	29		31	22		21	19		27	20		
		Queue	55	810		10	505		5	5		265	55		
	PM	LOS	B	B		B	F		C	C		C	C		D
		Delay	19	10		14	54		27	22		31	25		
		Queue	30	310		10	875		5	5		265	100		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	B	*	-	-			F	C		F
		Delay	-	*	*	12	*	-	-			628	17		
		Queue	-	*	*	10	*	-	-			690	105		
	PM	LOS	-	*	*	B	*	-	-			F	F		E
		Delay	-	*	*	11	*	-	-			744	53		
		Queue	-	*	*	20	*	-	-			350	215		
#600 STH 167 & IH-41/45 Northbound Ramps (Stop Signs - All-way)	AM	LOS	C	F	-	-	B	B	C		B	-			E
		Delay	19	67	-	-	14	10	17		12	-			
		Queue	100	385	-	-	45	20	60		30	-			
	PM	LOS	F	C	-	-	F	D	F		B	-			E
		Delay	98	22	-	-	60	33	181		12	-			
		Queue	360	90	-	-	270	175	590		20	-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			C			B			A
		Delay	7		0	9			20			13			
		Queue	5		0	0			0			5			
	PM	LOS	A		A	A			D			C			A
		Delay	10		0	8			31			21			
		Queue	5		0	0			5			20			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			C			A
		Delay	8		-	-	*		-			21			
		Queue	20		-	-	*		-			25			
	PM	LOS	A		-	-	*		-			E			B
		Delay	9		-	-	*		-			40			
		Queue	5		-	-	*		-			175			
#850 Holy Hill Road & Gateway Court (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			13			
		Queue	5		-	-	*		-			5			
	PM	LOS	A		-	-	*		-			C			A
		Delay	8		-	-	*		-			15			
		Queue	5		-	-	*		-			25			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			F			C			B
		Delay	7			8			63			21			
		Queue	10			0			125			60			
	PM	LOS	A			A			F			C			F
		Delay	7			7			197			15			
		Queue	10			0			470			45			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

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NOT TO SCALE

EXHIBIT 5-3
2025 BUILD TRAFFIC CAPACITY/LOS ANALYSIS
EXISTING TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2040 Build Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	F			B			C			B			F
		Delay	152			11			24			12			
		Queue	990			105			110			75			
	PM	LOS	C			F			C			D			F
		Delay	18			167			16			28			
		Queue	145			1175			115			150			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		E			F			A
		Delay	9	*		13	*		49			119			
		Queue	0	*		5	*		15			20			
	PM	LOS	B	*		A	*		F			F			A
		Delay	11	*		9	*		50			86			
		Queue	0	*		0	*		15			25			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	C	F		D	F		C	C		D	C		F
		Delay	24	108		47	185		24	21		52	23		
		Queue	120	1105		10	1070		5	5		495	80		
	PM	LOS	C	B		C	F		C	C		F	C		F
		Delay	21	18		26	254		26	20		127	24		
		Queue	35	435		10	1255		5	5		670	135		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	C	*	-	-			F	F		F
		Delay	-	*	*	15	*	-	-			5169	116		
		Queue	-	*	*	25	*	-	-			1785	485		
	PM	LOS	-	*	*	D	*	-	-			F	F		F
		Delay	-	*	*	26	*	-	-			28K	327		
		Queue	-	*	*	130	*	-	-			1005	605		
#600 STH 167 & IH-41/45 Northbound Ramps (Stop Signs - All-way)	AM	LOS	F	F	-	-	F	C	E	D		-			F
		Delay	54	544	-	-	53	16	38	27		-			
		Queue	255	1760	-	-	220	40	160	125		-			
	PM	LOS	F	F	-	-	F	F	F	D		-			F
		Delay	295	164	-	-	514	194	305	28		-			
		Queue	750	485	-	-	1345	615	585	65		-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			F			F			F
		Delay	9		0	12			2715			1710			
		Queue	15		0	15			455			440			
	PM	LOS	B		A	A			n/a			F			F
		Delay	14		0	9			n/a			5236			
		Queue	30		0	10			n/a			1005			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	B			B			F			F			B
		Delay	10			10			292			140			
		Queue	25			5			75			120			
	PM	LOS	B			A			F			F			F
		Delay	11			8			10099			682			
		Queue	10			5			440			695			
#850 Holy Hill Road & Gateway Court (Stop Signs)	AM	LOS	A	*		B	*		F			D			A
		Delay	8	*		10	*		65			29			
		Queue	5	*		5	*		20			20			
	PM	LOS	B	*		A	*		F			F			C
		Delay	10	*		8	*		313			56			
		Queue	5	*		0	*		180			90			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			n/a			F			E
		Delay	8			8			n/a			404			
		Queue	20			5			n/a			470			
	PM	LOS	A			A			F			F			F
		Delay	8			8			3833			477			
		Queue	15			5			1490			665			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

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EXHIBIT 5-5
2040 BUILD TRAFFIC CAPACITY/LOS ANALYSIS
EXISTING TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2025 Background Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	C			A			A			A			B
		Delay	21			6			9			7			
		Queue	240			45			25			25			
	PM	LOS	A			C			B			A			C
		Delay	9			22			10			9			
		Queue	65			250			65			25			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		C			E			A
		Delay	8	*		10	*		22			37			
		Queue	0	*		5	*		5			5			
	PM	LOS	A	*		A	*		C			D			A
		Delay	9	*		8	*		21			30			
		Queue	0	*		0	*		5			10			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	A	B		B	B		B	B		C	B		B
		Delay	7	13		18	12		17	15		20	16		
		Queue	30	640		10	260		5	5		150	40		
	PM	LOS	A	A		A	B		C	B		C	C		B
		Delay	9	6		8	15		21	19		21	20		
		Queue	15	180		5	525		5	5		95	60		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	B	*	-	-			E	B		A
		Delay	-	*	*	10	*	-	-			37	12		
		Queue	-	*	*	5	*	-	-			80	55		
	PM	LOS	-	*	*	A	*	-	-			E	D		A
		Delay	-	*	*	9	*	-	-			36	25		
		Queue	-	*	*	5	*	-	-			45	115		
#600 STH 167 & IH-41/45 Northbound Ramps (Traffic Signals)	AM	LOS	A	A	-	-	B	B	B	B		-			A
		Delay	7	5	-	-	11	11	18	15		-			
		Queue	80	85	-	-	65	35	85	10		-			
	PM	LOS	B	A	-	-	C	C	C	B		-			C
		Delay	14	9	-	-	22	22	28	14		-			
		Queue	170	60	-	-	125	105	375	20		-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			B			B			A
		Delay	7		0	7			11			10			
		Queue	0		0	0			0			5			
	PM	LOS	A		A	A			B			B			A
		Delay	8		0	7			13			11			
		Queue	5		0	0			5			10			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	7		-	-	*		-			10			
		Queue	0		-	-	*		-			0			
	PM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			10			
		Queue	0		-	-	*		-			5			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			B			B			A
		Delay	7			7			14			12			
		Queue	0			0			15			20			
	PM	LOS	A			A			C			B			B
		Delay	7			7			19			11			
		Queue	5			0			85			5			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

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EXHIBIT 5-9
2025 BACKGROUND TRAFFIC CAPACITY/LOS ANALYSIS
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2040 Background Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	C			A			A			A			C
		Delay	23			7			9			7			
		Queue	255			45			25			25			
	PM	LOS	A			D			B			A			C
		Delay	9			25			10			9			
		Queue	70			275			65			30			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		C			E			A
		Delay	8	*		10	*		23			39			
		Queue	0	*		5	*		5			5			
	PM	LOS	A	*		A	*		C			D			A
		Delay	9	*		8	*		22			31			
		Queue	0	*		0	*		5			10			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	A	B		B	B		B	B		C	B		B
		Delay	7	14		19	12		17	16		20	17		
		Queue	30	670		10	275		5	5		150	40		
	PM	LOS	B	A		A	B		C	B		C	C		B
		Delay	10	5		8	16		21	20		22	21		
		Queue	15	185		5	555		5	5		95	60		
#500 STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	LOS	-	*	*	B	*	-	-			E	B		A
		Delay	-	*	*	10	*	-	-			47	13		
		Queue	-	*	*	5	*	-	-			115	60		
	PM	LOS	-	*	*	A	*	-	-			E	D		A
		Delay	-	*	*	9	*	-	-			47	28		
		Queue	-	*	*	5	*	-	-			70	130		
#600 STH 167 & IH-41/45 Northbound Ramps (Traffic Signals)	AM	LOS	A	A	-	-	B	B	B	B		-			A
		Delay	7	5	-	-	11	11	18	16		-			
		Queue	85	90	-	-	65	35	90	10		-			
	PM	LOS	B	A	-	-	C	C	C	B		-			C
		Delay	15	9	-	-	23	23	29	15		-			
		Queue	180	70	-	-	135	110	395	20		-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			B			B			A
		Delay	7		0	8			12			10			
		Queue	0		0	0			0			5			
	PM	LOS	A		A	A			B			B			A
		Delay	8		0	7			14			12			
		Queue	5		0	0			5			10			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	7		-	-	*		-			10			
		Queue	0		-	-	*		-			0			
	PM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			10			
		Queue	0		-	-	*		-			5			
#900 Holy Hill Road & Goldendale Road (Stop Signs)	AM	LOS	A			A			B			B			A
		Delay	7			7			14			13			
		Queue	0			0			15			20			
	PM	LOS	A			A			C			B			B
		Delay	7			7			24			11			
		Queue	5			0			120			10			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

N

NOT TO SCALE

EXHIBIT 5-11
2040 BACKGROUND TRAFFIC CAPACITY/LOS ANALYSIS
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2025 Build Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	C		A	A	A		B			A			B
		Delay	22		4	4	6		12			7			
		Queue	245		10	10	35		45			30			
	PM	LOS	A		A	A	C		B			B			B
		Delay	9		4	5	23		11			10			
		Queue	65		5	15	250		75			35			
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		D			F			A
		Delay	8	*		11	*		29			53			
		Queue	0	*		5	*		10			10			
	PM	LOS	B	*		A	*		D			E			A
		Delay	10	*		8	*		28			41			
		Queue	0	*		0	*		10			15			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	A	C		B	A		C	C		D	C		B
		Delay	8	24		11	7		24	22		35	23		
		Queue	45	665		5	325		5	5		270	50		
	PM	LOS	A	B		A	B		C	C		D	C		B
		Delay	7	10		1	18		31	25		40	28		
		Queue	25	245		5	760		5	5		315	110		
#500 STH 167 & IH-41/45 Southbound Ramps (Traffic Signal)	AM	LOS	-	A	A	A	B	-	-			D	C		B
		Delay	-	3	1	7	17	-	-			42	27		
		Queue	-	245	110	25	85	-	-			250	105		
	PM	LOS	-	A	A	A	A	-	-			D	D		A
		Delay	-	1	1	3	5	-	-			44	42		
		Queue	-	210	75	25	65	-	-			130	105		
#600 STH 167 & IH-41/45 Northbound Ramps (Traffic Signal)	AM	LOS	A	B	-	-	B	A	D	C		-			B
		Delay	6	18	-	-	10	9	38	30		-			
		Queue	1	170	-	-	120	50	150	50		-			
	PM	LOS	D	C	-	-	D	C	D	C		-			D
		Delay	46	22	-	-	43	32	53	20		-			
		Queue	375	55	-	-	375	190	460	30		-			
#700 Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	LOS	A		A	A			C			B			A
		Delay	7		0	9			20			13			
		Queue	5		0	0			0			5			
	PM	LOS	A		A	A			D			C			A
		Delay	10		0	8			31			21			
		Queue	5		0	0			5			20			
#800 Holy Hill Road & Gateway Crossing (Stop Signs)	AM	LOS	A		-	-	*		-			C			A
		Delay	8		-	-	*		-			21			
		Queue	20		-	-	*		-			25			
	PM	LOS	A		-	-	*		-			E			B
		Delay	9		-	-	*		-			40			
		Queue	5		-	-	*		-			175			
#850 Holy Hill Road & Gateway Court (Stop Signs)	AM	LOS	A		-	-	*		-			B			A
		Delay	8		-	-	*		-			13			
		Queue	5		-	-	*		-			5			
	PM	LOS	A		-	-	*		-			C			A
		Delay	8		-	-	*		-			15			
		Queue	5		-	-	*		-			25			
#900 Holy Hill Road & Goldendale Road (AWSC)	AM	LOS	C			B			B			B			C
		Delay	20			10			11			11			
		Queue	160			25			25			30			
	PM	LOS	C			B			C			B			C
		Delay	18			12			20			12			
		Queue	100			30			120			40			

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

N

NOT TO SCALE

EXHIBIT 5-12
2025 BUILD TRAFFIC CAPACITY/LOS ANALYSIS
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Year 2040 Build Traffic Operations & Queues

Intersection	Peak Hour		Level of Service per Movement by Approach												Overall Level of Service
			Eastbound			Westbound			Northbound			Southbound			
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
#100 STH 167 & STH 175 (Roundabout)	AM	LOS	B	C		A	A		B		B	A	A		B
		Delay	12	15		6	6		10		14	8	6		
		Queue	100	130		30	35		20		45	35	25		
	PM	LOS	A	A		B	B		B		A	B	B		B
		Delay	8	8		12	15		10		7	11	13		
		Queue	35	40		110	145		55		20	30	45		
#200 STH 167 & Wolf Road (Stop Signs)	AM	LOS	A	*		B	*		C			C			A
		Delay	9	*		13	*		21			23			
		Queue	0	*		5	*		5			5			
	PM	LOS	B	*		A	*		C			D			A
		Delay	11	*		9	*		16			25			
		Queue	0	*		0	*		5			10			
#300 STH 167 & Richfield Parkway (Traffic Signal)	AM	LOS	B	B		A	B		C	C		C	B		B
		Delay	13	16		8	17		27	27		24	17		
		Queue	70	300		5	295		5	5		115	55		
	PM	LOS	B	B		A	C		C	C		C	B		C
		Delay	14	12		6	25		26	26		26	18		
		Queue	35	145		5	405		5	5		155	100		
#500 STH 167 & IH-41/45 Southbound Ramps (Traffic Signal)	AM	LOS	-	C	*	B	B	-	-			C		C	C
		Delay	-	22	*	12	15	-	-			30		26	
		Queue	-	295	*	10	25	-	-			230		125	
	PM	LOS	-	C	*	B	A	-	-			C		C	B
		Delay	-	25	*	17	5	-	-			29		30	
		Queue	-	405	*	20	0	-	-			115		100	
#600 STH 167 & IH-41/45 Northbound Ramps (Traffic Signal)	AM	LOS	A	A	-	-	A	*	C		C	-			A
		Delay	5	5	-	-	1	*	30		29	-			
		Queue	0	45	-	-	115	*	125		85	-			
	PM	LOS	D	B	-	-	B	*	D		C	-			C
		Delay	41	13	-	-	17	*	35		24	-			
		Queue	125	5	-	-	380	*	250		55	-			
#700 Holy Hill Road & Gateway Frontage Road (Traffic Signal)	AM	LOS	A	A	A	A	B	B	C	C		C	C		A
		Delay	6	1	1	7	17	15	31	24		26	26		
		Queue	20	190	35	25	40	10	90	45		50	80		
	PM	LOS	B	C	B	A	B	A	D	C		C	C		B
		Delay	13	21	19	9	12	3	53	21		24	25		
		Queue	70	115	60	20	135	15	185	65		65	135		
#800 Holy Hill Road & Gateway Crossing (Traffic Signal)	AM	LOS	A	A	A	A	A	A	C	C		C	D		A
		Delay	5	1	1	7	8	7	33	27		27	41		
		Queue	5	10	5	15	100	25	20	15		15	60		
	PM	LOS	B	B	B	B	B	B	C	B		C	C		B
		Delay	10	17	12	12	16	10	33	19		21	29		
		Queue	35	110	5	10	205	10	75	25		50	180		
#850 Holy Hill Road & Gateway Court (Stop Signs)	AM	LOS	A	*	*	B	*		C			B			A
		Delay	8	*	*	10	*		20			11			
		Queue	5	*	*	5	*		5			5			
	PM	LOS	A	*	*	A	*		C			B			A
		Delay	8	*	*	8	*		18			12			
		Queue	5	*	*	0	*		25			20			
#900 Holy Hill Road & Goldendale Road (Traffic Signal)	AM	LOS	B	A	A	A	A		C	C		C	C	C	B
		Delay	13	7	7	8	8		29	21		22	21	21	
		Queue	15	5	5	10	115		140	45		25	65	55	
	PM	LOS	C	B	B	B	B		C	B		B	B	B	B
		Delay	21	13	11	15	13		26	15		17	14	16	
		Queue	110	135	25	15	140		180	65		25	30	75	

(-) movement that isn't available or allowed; (*) Free-flow movement. Delay value shown in seconds, Queue value shown in feet.

TADI TRAFFIC ANALYSIS & DESIGN, INC.

2521: 03-16-21

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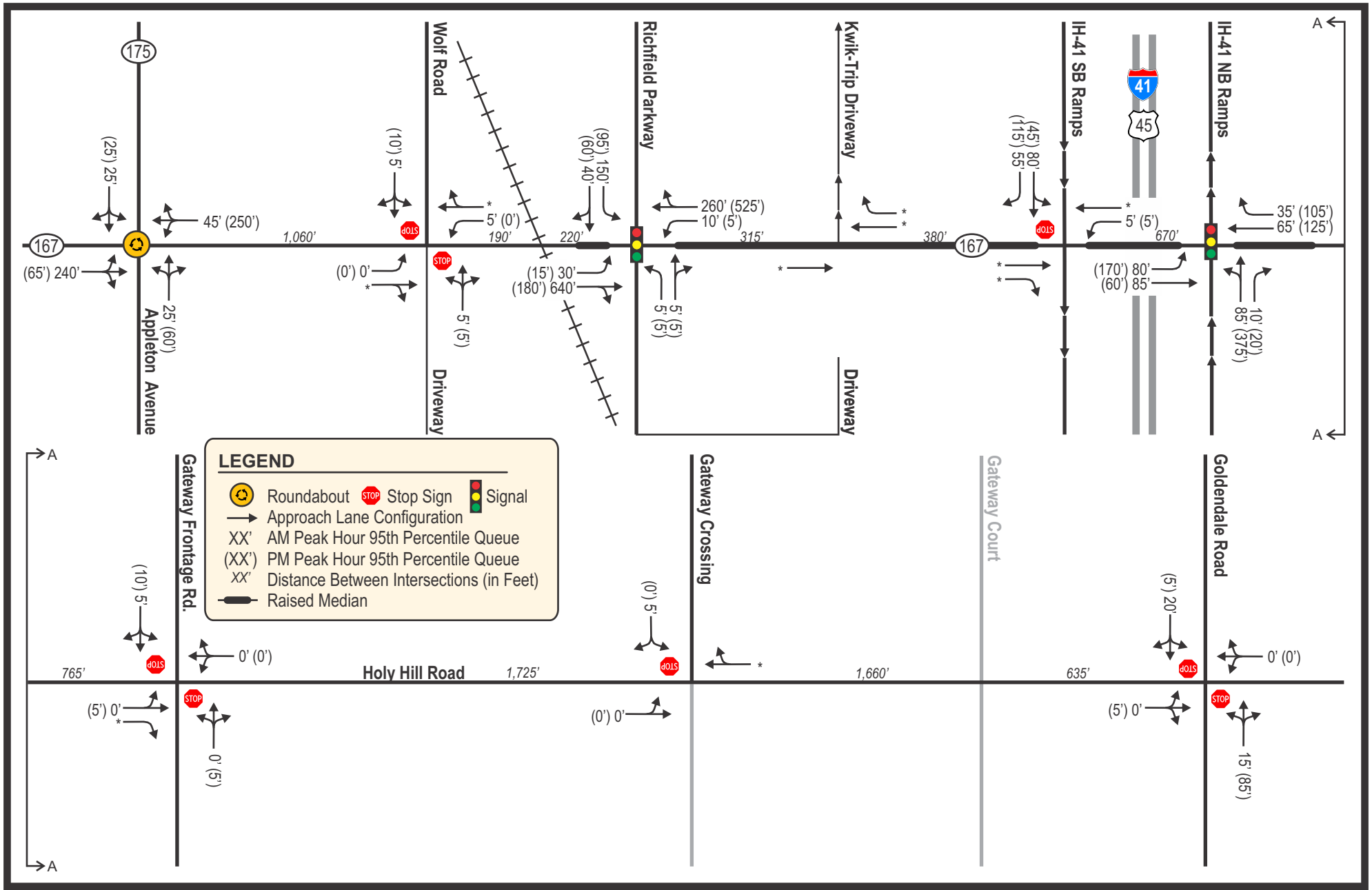
NOT TO SCALE

EXHIBIT 5-14
2040 BUILD TRAFFIC CAPACITY/LOS ANALYSIS
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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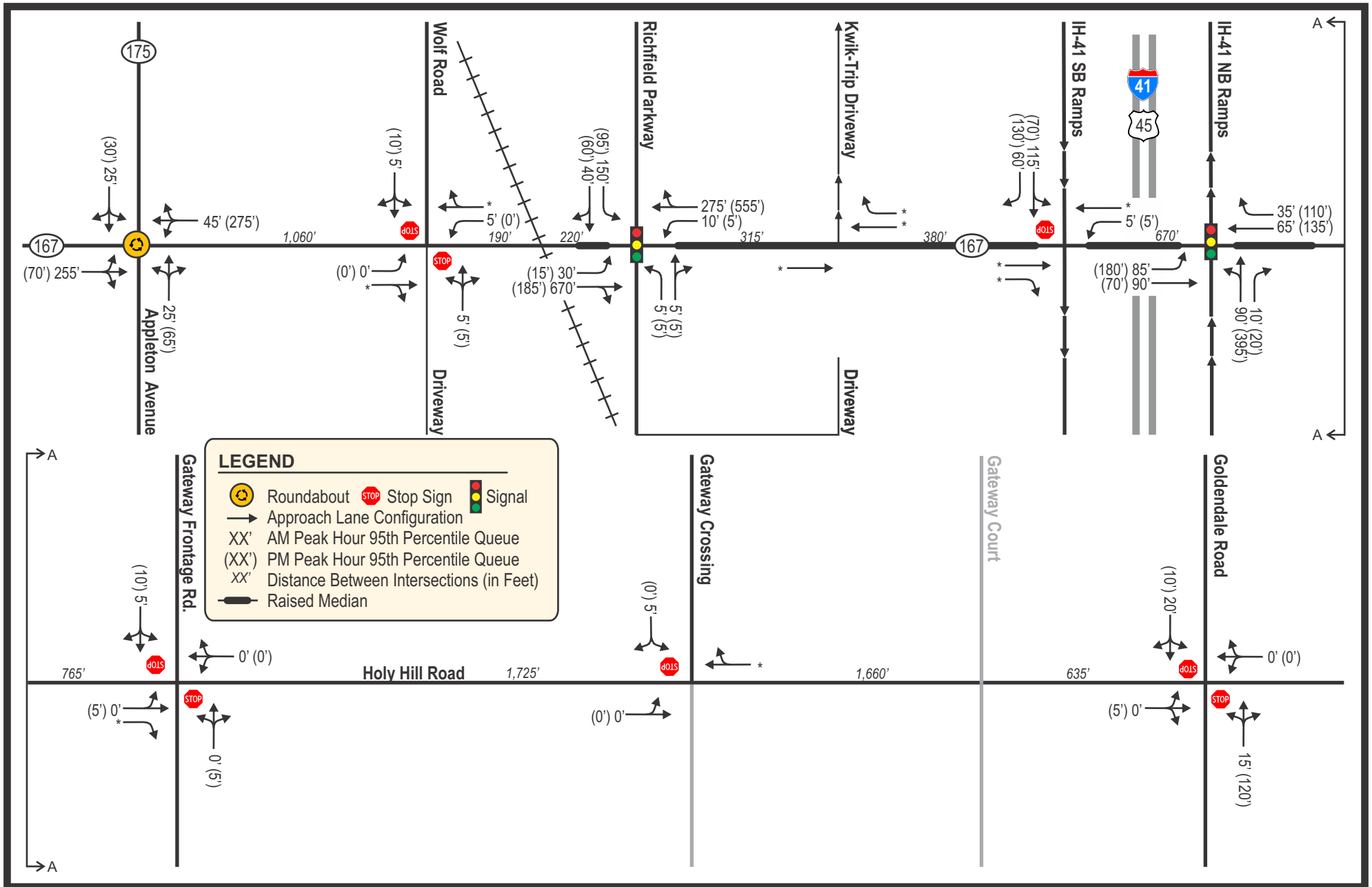
EXHIBIT 5-18
2025 BACKGROUND TRAFFIC 95TH PERCENTILE QUEUES
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

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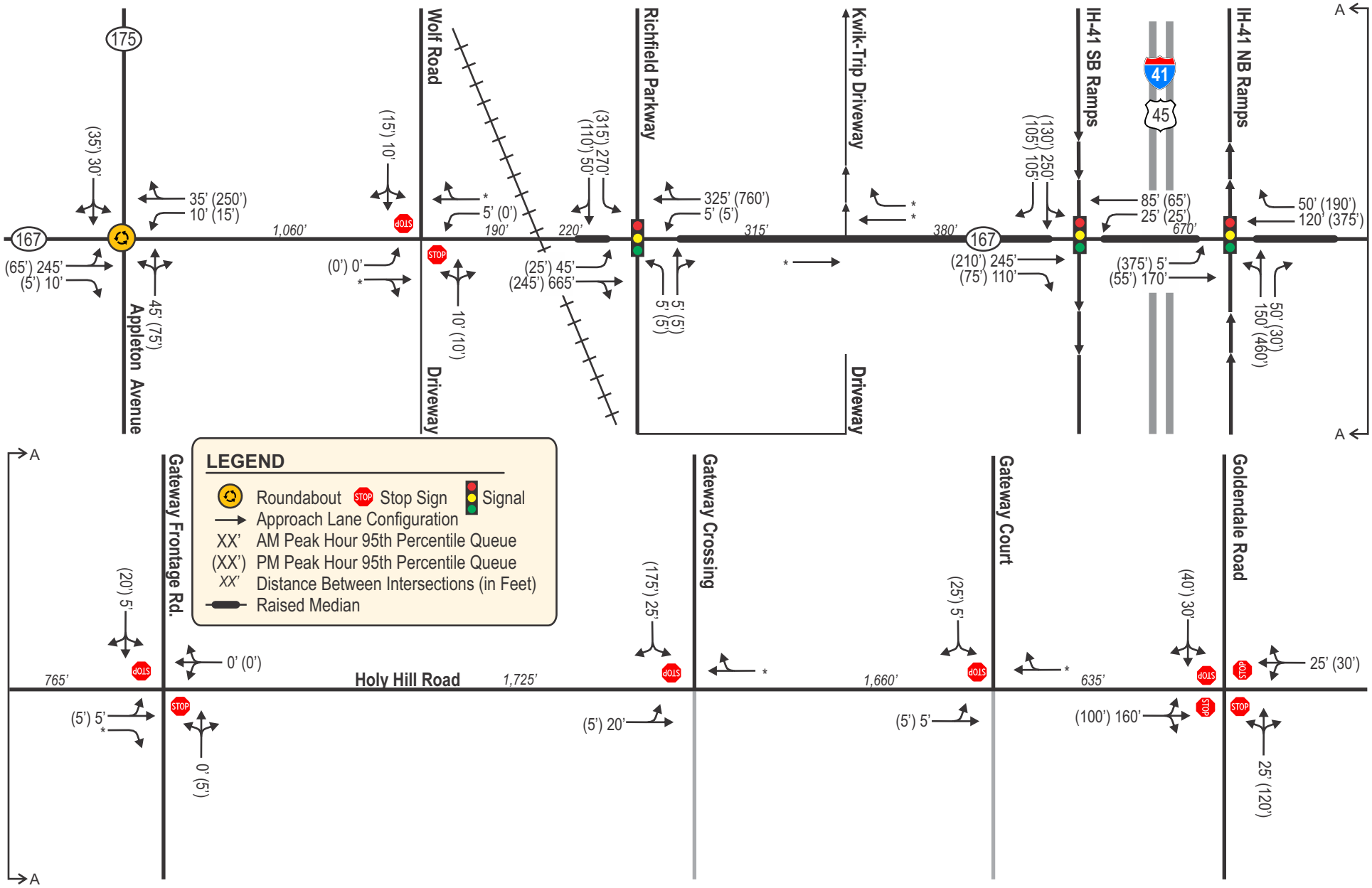
NOT TO SCALE

EXHIBIT 5-20
2040 BACKGROUND TRAFFIC 95TH PERCENTILE QUEUES
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

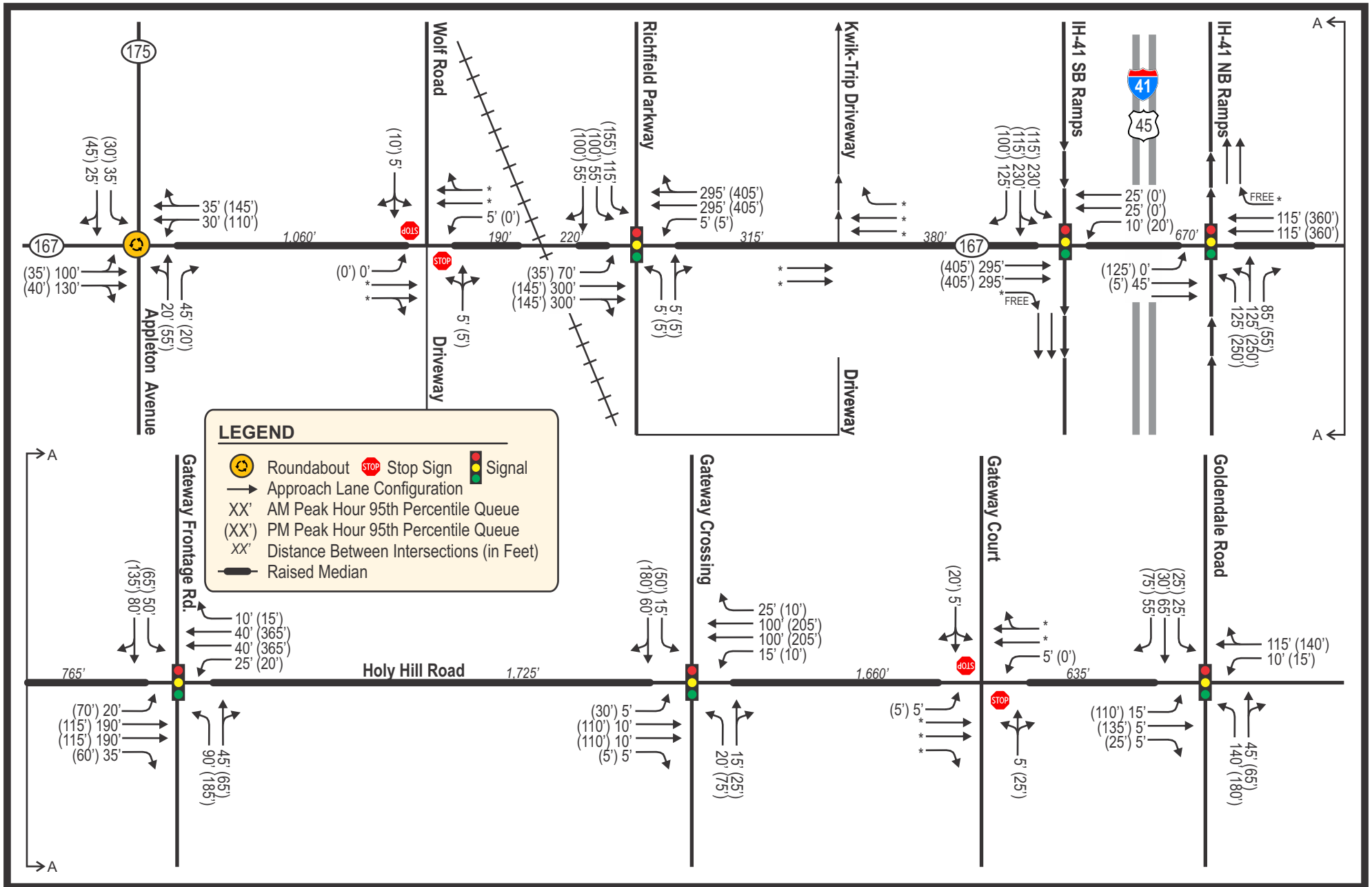


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 5-21
2025 BUILD TRAFFIC 95TH PERCENTILE QUEUES
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 5-23
2040 BUILD TRAFFIC 95TH PERCENTILE QUEUES
MODIFIED TRANSPORTATION SYSTEM

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

CHAPTER VI – RECOMMENDATIONS AND CONCLUSION

PART A – RECOMMENDATIONS

The study area intersections were analyzed based on the procedures set forth in the *Highway Capacity Manual* (HCM) 6th Edition. Intersection operation is defined by "Level of Service". Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A', to very poor, represented by LOS 'F'. For the purpose of this study, LOS D or better was used to define desirable peak hour operating conditions.

The following modifications are recommended to accommodate future traffic based on the assumptions outlined in the TIA. As this study evaluates the future potential development of vacant lands with no current development plans, the Build recommended modifications (particularly the 2040 Build scenarios) are listed here for planning purposes only. It is recommended that future studies be conducted as properties are developed to determine if and when the recommended modifications should be implemented.

Modifications are split into two categories:

- "Background Traffic" – These modifications are recommended to mitigate a Background (pre-development) traffic impact and are *not* driven by the full buildout of the area developments.
- "Build Traffic" – These modifications are recommended in addition to the Background traffic modifications to mitigate an impact created by the 2025 and 2035 buildouts of the area developments.

Improvements are for jurisdictional consideration and are not legally binding. WisDOT, the Village of Richfield, and the Village of Germantown reserve the right to determine alternative solutions.

Conceptual drawings of the 2040 Build recommendations at each study intersection are shown on Exhibits 6-1 through 6-5.

A1. Background Traffic Recommendations

<u>*STH 167 & STH 175*</u>

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

<u>*STH 167 & Wolf Road*</u>

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

<u>*STH 167 & Richfield Parkway*</u>

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

<u>*STH 167 & IH-41/45 Southbound Ramps*</u>

- *2025 Background Traffic:* Extend the southbound right-turn lane.
- *2040 Background Traffic:* No additional modifications

STH 167 & IH-41/45 Northbound Ramps

- *2025 Background Traffic:*
  - Install traffic signal control with an eastbound protected/permitted left-turn phase.
  - Extend the eastbound left-turn lane as much as feasible on the bridge over IH-41/45.
- *2040 Background Traffic:* No additional modifications

STH 167 & Gateway Frontage Road

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Gateway Crossing

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

STH 167 & Goldendale Road

- *2025 Background Traffic:* No modifications
- *2040 Background Traffic:* No modifications

A2. Build Traffic Recommendations

General corridor recommendations include widening STH 167/Holy Hill Road from a two-lane cross-section to a four-lane divided cross-section from STH 175 through the Gateway Court intersection (transitioning back to a two-lane cross-section at Goldendale Road). Widening STH 167 through the IH-41/45 interchange would require reconstructing the bridge over IH-41/45.

When the road is widened, it is recommended to provide left-turn lanes at all study intersections on Holy Hill Road. Right-turn lanes are recommended based on right-turn "warrant" criteria published in the WisDOT Facilities Development Manual (FDM). The "warrants" are included with the Synchro analysis worksheets in Appendix F. Build modifications in addition to those recommended for the Background traffic condition are listed below:

STH 167 & STH 175

- *2025 Build Traffic:* If feasible, widen the roundabout to provide an eastbound right-turn lane and a westbound left-turn lane. Maximize the turn lane storage to the adjacent driveways.
- *2040 Build Traffic:* If feasible, widen the roundabout with two lanes at each approach.
  - Configure the eastbound and westbound approaches with two through lanes (shared left and right turns).
  - Configure the northbound approach with a shared left-turn/through lane and right-turn lane.
  - Configure the southbound approach with a left-turn lane and shared through/right-turn lane.

STH 167 & Wolf Road

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:* No modifications

STH 167 & Richfield Parkway

- *2025 Build Traffic:* Extend the southbound left-turn lane.
- *2040 Build Traffic:* Provide a second southbound left-turn lane (dual lefts).

STH 167 & IH-41/45 Southbound Ramps

- *2025 Build Traffic:* Install traffic signal control with a westbound protected/permitted left-turn phase.
- *2040 Build Traffic:*
    - Provide a second southbound left-turn lane (dual lefts).
    - Provide a second southbound on-ramp lane to allow free right-turn movements from eastbound traffic on STH 167.

STH 167 & IH-41/45 Northbound Ramps

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Provide a second northbound left-turn lane (dual lefts).
    - Provide a second northbound on-ramp lane to allow free right-turn movements from westbound traffic on Holy Hill Road.

STH 167 & Gateway Frontage Road

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install traffic signal control with eastbound and westbound protected/permitted left-turn phases.
    - Provide left-turn lanes on all approaches.
    - Provide a right-turn lane on the westbound approach.

STH 167 & Gateway Crossing

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install traffic signal control with an eastbound protected/permitted left-turn phase.
    - Provide left-turn lanes on all approaches.
    - Provide eastbound and westbound right-turn lanes.

STH 167 & Gateway Court

- *2025 Build Traffic:* No modifications
- *2040 Build Traffic:*
    - Install stop sign control and a single lane on the northbound approach.
    - Provide eastbound and westbound left-turn lanes.
    - Provide an eastbound right-turn lane.

STH 167 & Goldendale Road

- *2025 Build Traffic:* Install stop signs on Holy Hill Road for all-way stop control.
- *2040 Build Traffic:*
    - Install traffic signal control with two-phased signal operation.
    - Provide left-turn lanes on all approaches.
    - Provide right-turn lanes on the eastbound and southbound approaches.

PART B – CONCLUSION

This study evaluates the STH 167/Holy Hill Road corridor with projected traffic volumes from potential developments on nearly all vacant land along the corridor from STH 175 through

Goldendale Road. This study assumes buildout of those lands by 2035 (14 years from now), although actual buildout will depend on market forces and other factors. If buildout density evaluated in this study is realized, then the STH 167/Holy Hill Road corridor will need to be widened to at least a four-lane cross-section, requiring reconstruction of the bridge over IH-41/45. Traffic signals will also need to be installed at many of the study intersections, and the roundabout at STH 167/STH 175 will need to be widened (if feasible). It is recommended that future studies be conducted as properties are developed to determine if and when the recommended modifications should be implemented.

TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 6-1
STH 167 CONCEPTUAL MODIFICATIONS
STH 175 to WOLF ROAD

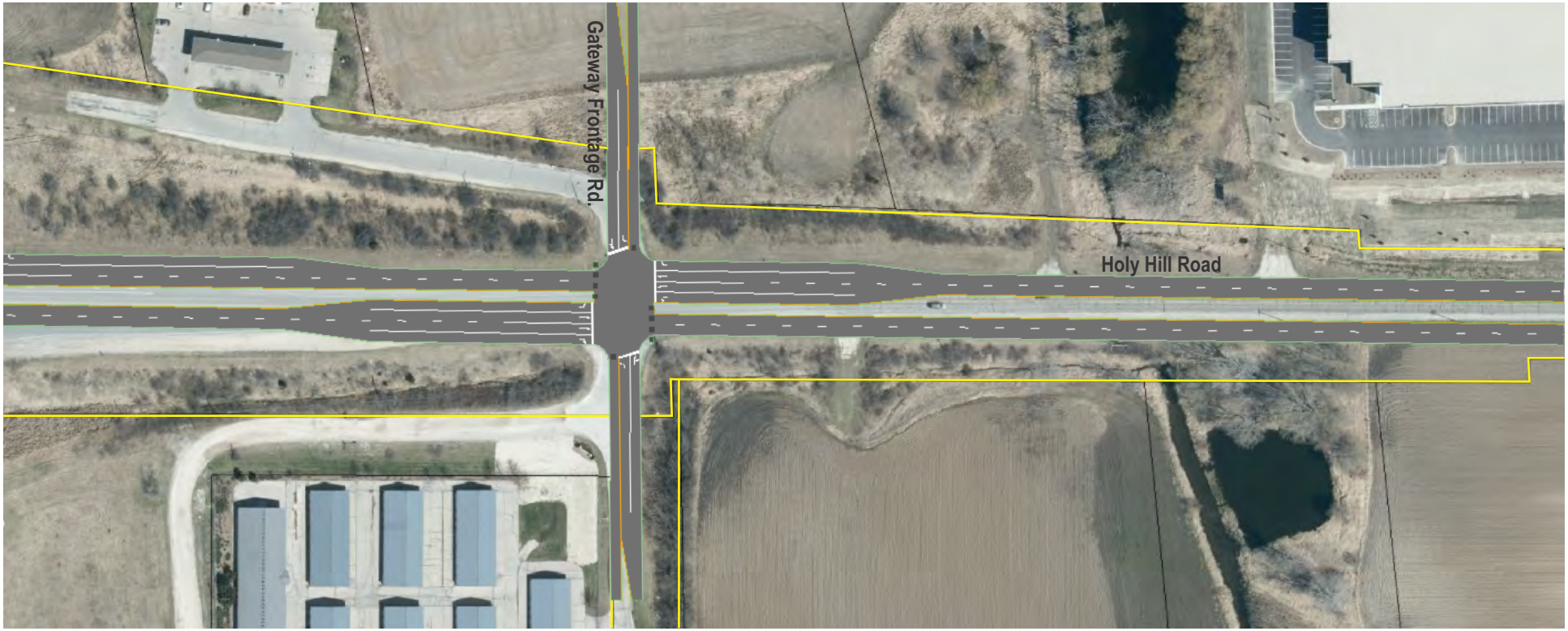
STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 6-2
STH 167 CONCEPTUAL MODIFICATIONS
RICHFIELD PARKWAY TO IH-41/45 NORTHBOUND RAMPS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

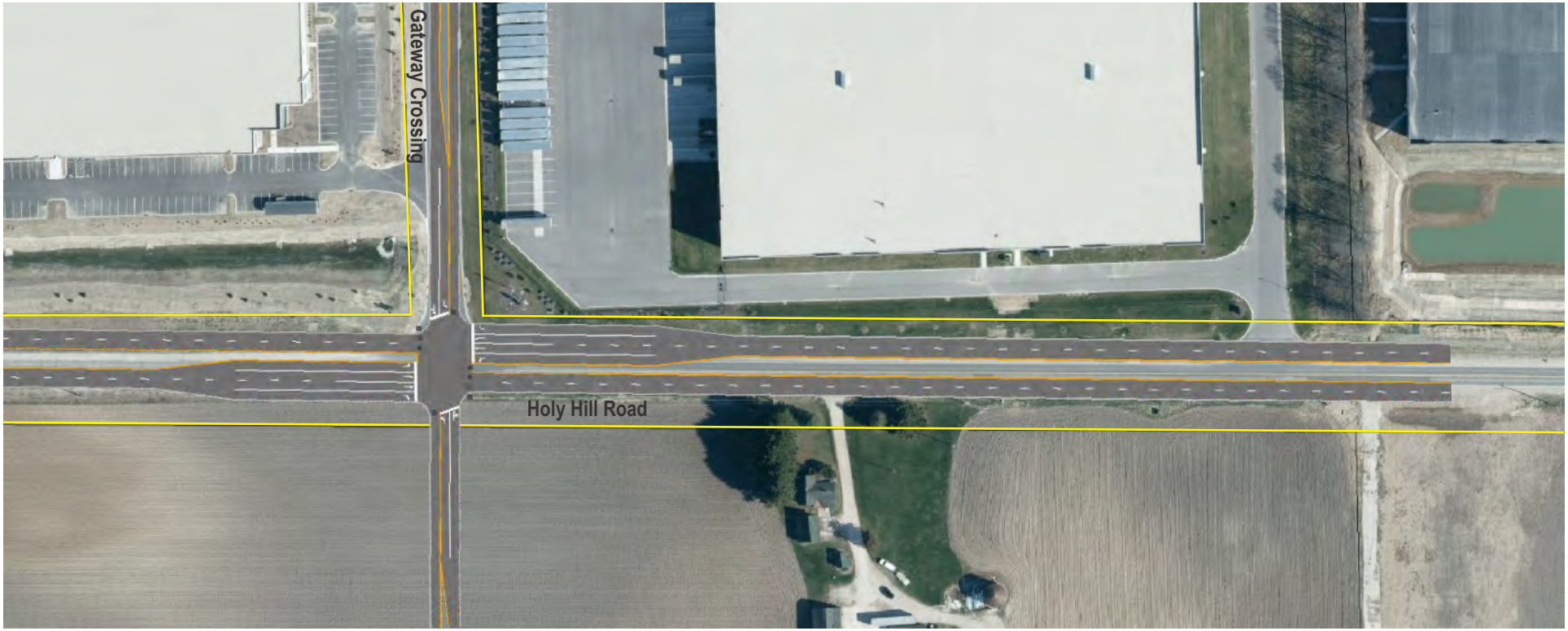


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 6-3
STH 167 CONCEPTUAL MODIFICATIONS
48TH STREET

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

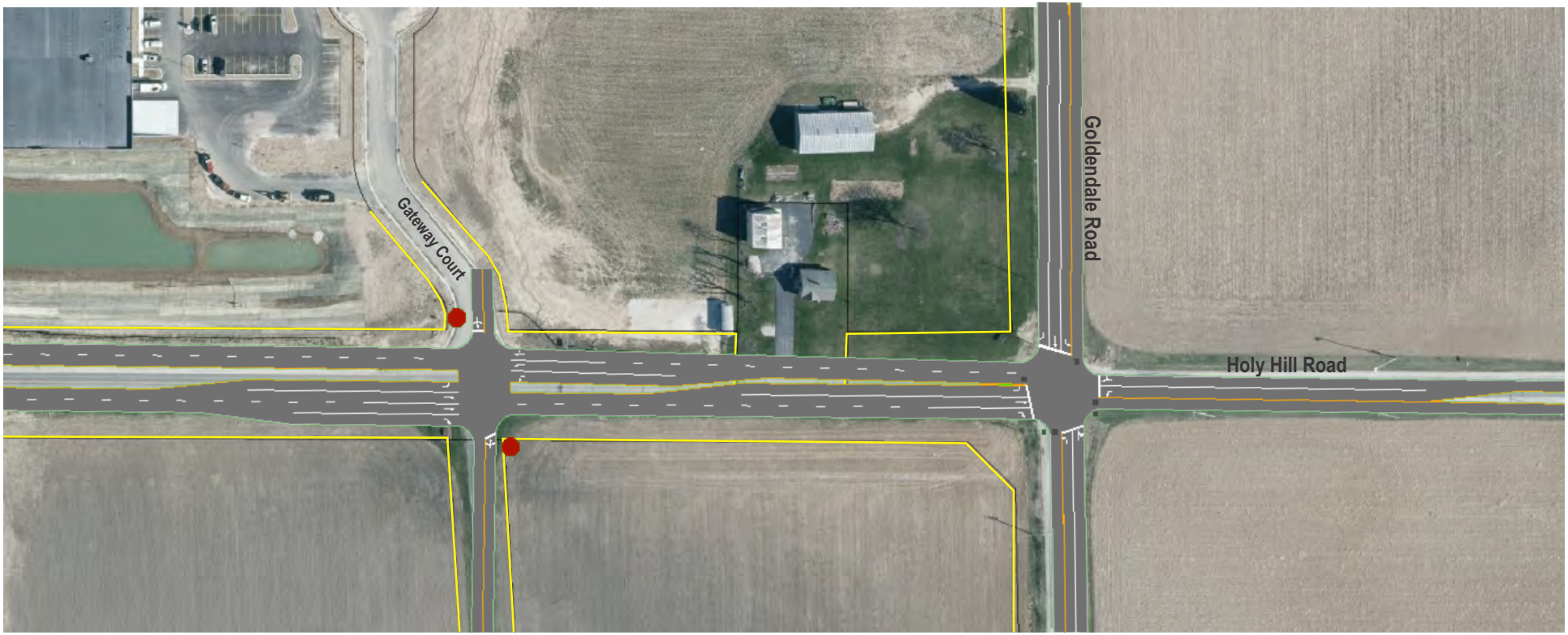


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 6-4
STH 167 CONCEPTUAL MODIFICATIONS
GATEWAY CROSSING

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 03-16-21

N
NOT TO SCALE

EXHIBIT 6-5
STH 167 CONCEPTUAL MODIFICATIONS
LIGHT INDUSTRIAL DRIVEWAY TO GOLDENDALE ROAD

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

APPENDIX A
Traffic

Traffic Counts
Summary of PHF & Percent Heavy Vehicles
Saturation Flow Rate Calculations

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 11
Start Date:	Thursday, December 7, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: STH 175 and STH 167

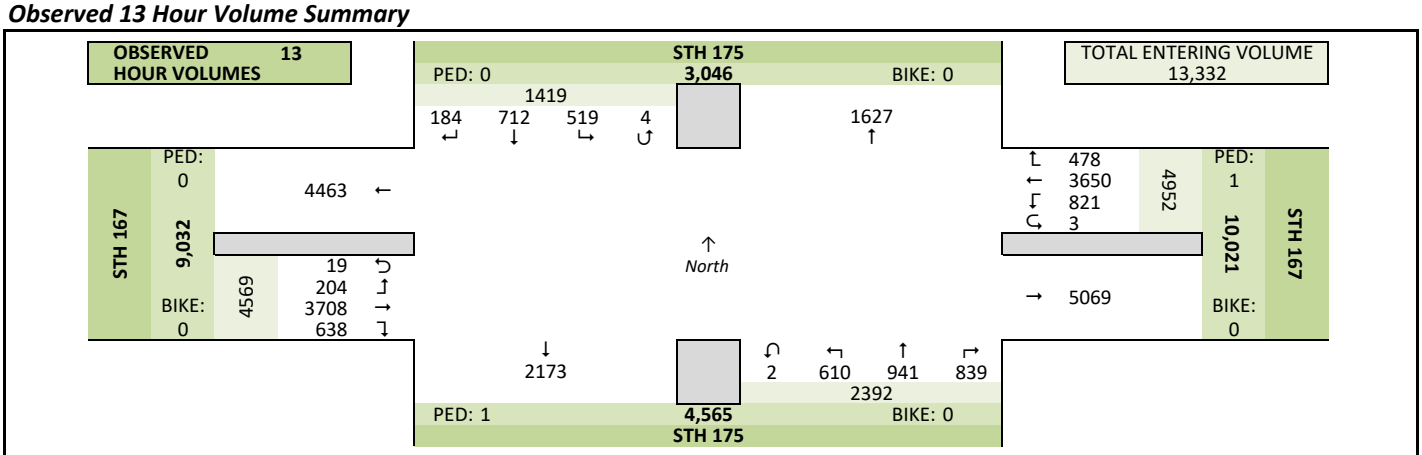
Site Information

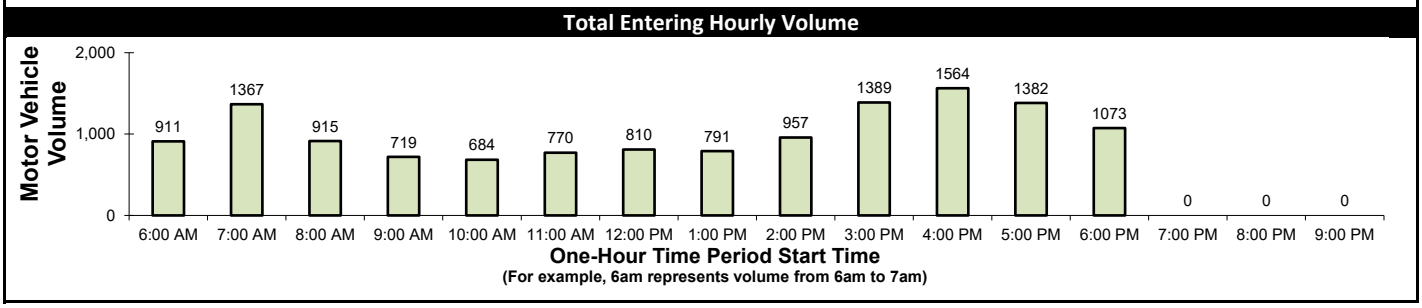
Municipality	Richfield		
County	Washington	WisDOT Region	SE
Traffic Control	Roundabout		
Roadway Names		North Direction	↑
North Leg	STH 175		
East Leg	STH 167		
South Leg	STH 175		
West Leg	STH 167		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children		None	
Elementry school age children		None	
Visually impaired (white cane/helper dog)		None	
Elderly/disabled (except wheelchairs)		None	
Wheelchairs/electric scooters		None	
Other (describe)	None	None	

Count Information

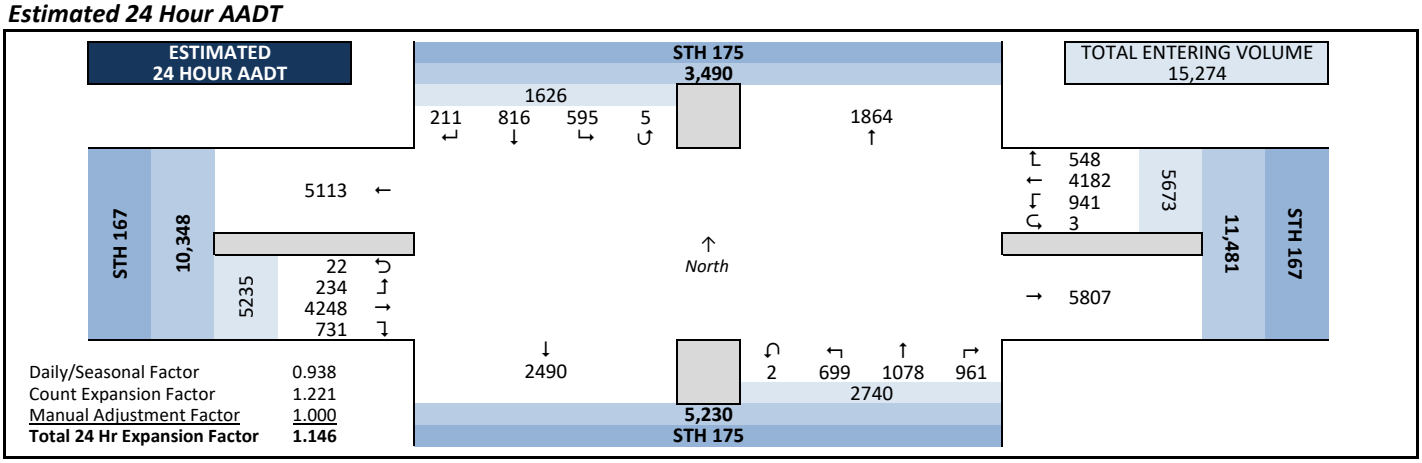
Hrs Counted:	6:00 AM-7:00 PM				
1st Day of Count	Thursday, December 7, 2017			Weather	
AM Peak Period	Thursday, December 7, 2017			Partly Cloudy & Dry	
Midday Peak Period	Thursday, December 7, 2017			Partly Cloudy & Dry	
PM Peak Period	Thursday, December 7, 2017			Partly Cloudy & Dry	
Calculated Peak Hours					
AM	7:00-8:00am	MD	12:00-1:00pm	PM	3:45-4:45pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	12:00-1:00pm	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.938		Count Expansion Factor	1.221	
Company Name	TADi			Manual Adj.	1.000
Observers	AM Peak Period	Amy Scheuerlein, Lee Oestreich			
	Midday Peak Period	Jack & Karlyn Bieberitz			
	PM Peak Period	Jeff Shleif, Ted Atwell			
Comments	2016 DOT Seasonal Factors				

Observed 13 Hour Volume Summary





Estimated 24 Hour AADT



Intersection Traffic Volume Report

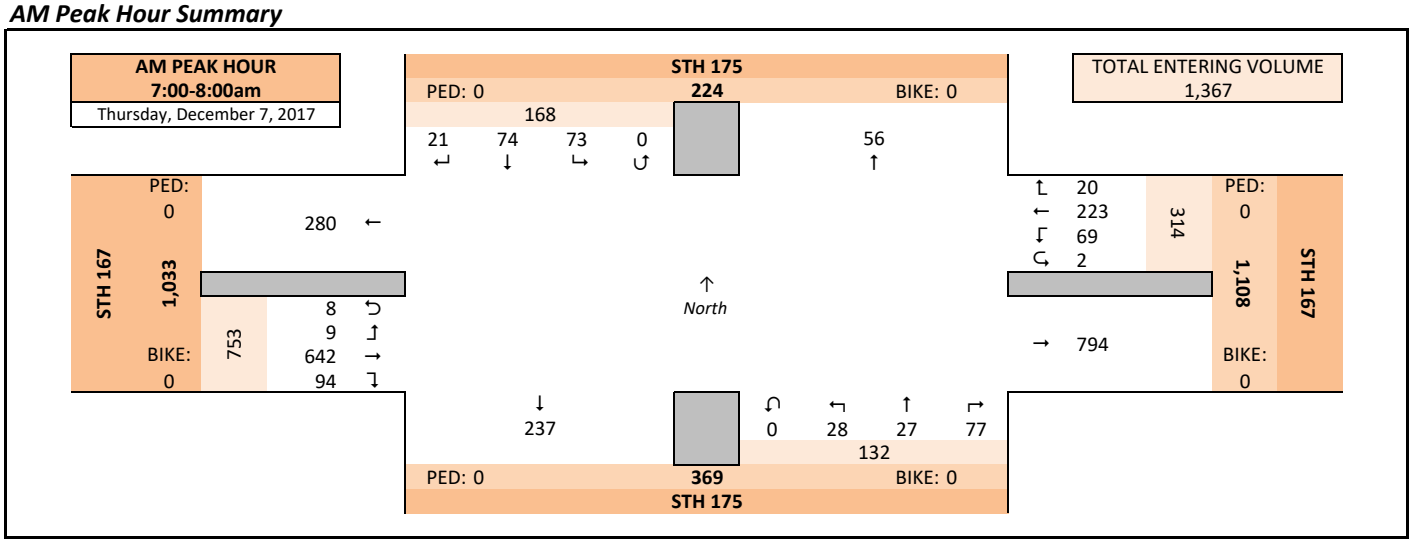
Count Basics			Page 2 of 11
Start Date:	Thursday, December 7, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

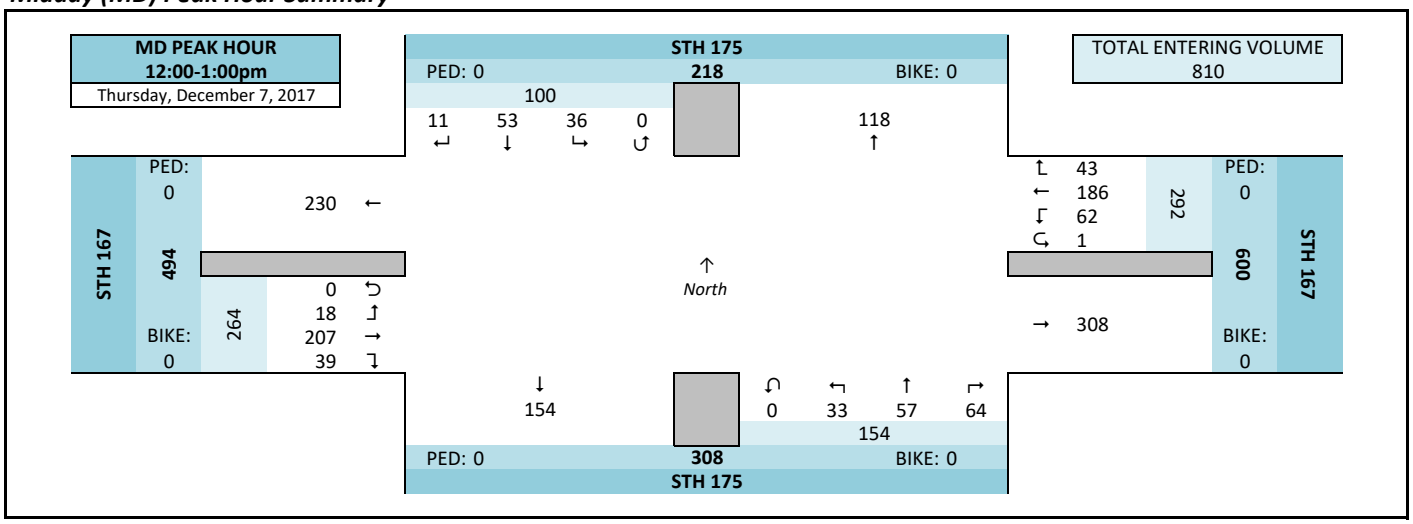
All Motor Vehicles

STH 175 and STH 167

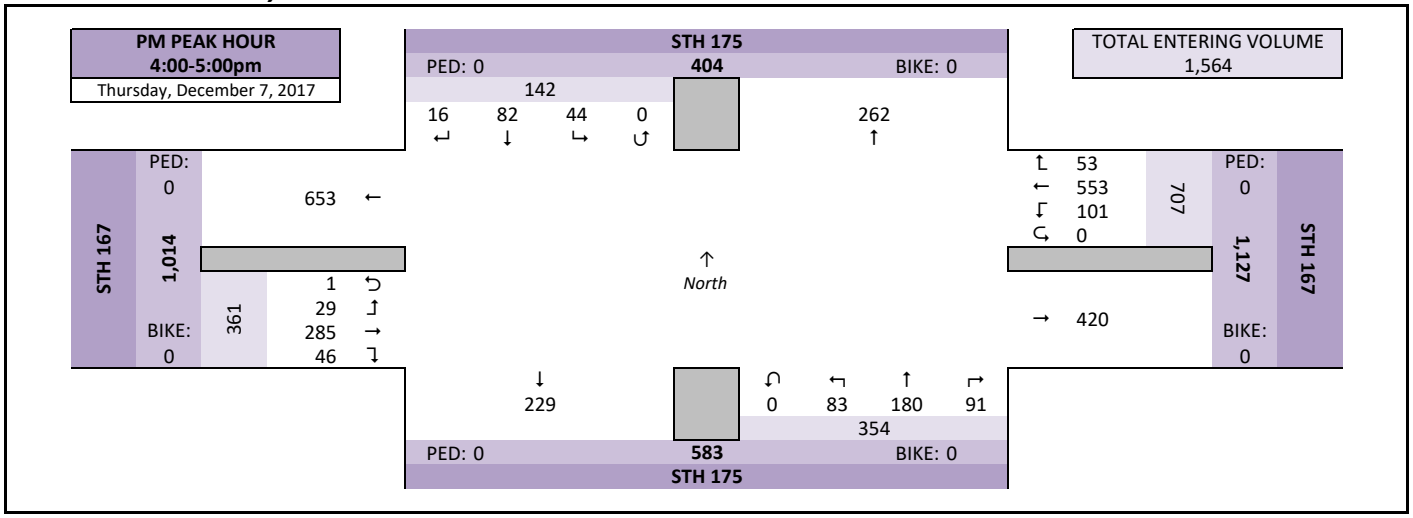
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Thursday, December 7, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

STH 175 and STH 167

Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, December 7, 2017		From North					From East					From South					From West					
	AM Peak Hour	STH 175					STH 167					STH 175					STH 167					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	2	16	22	0	40	6	44	11	0	61	13	9	5	0	27	19	167	0	0	186	314
	7:15 AM	6	22	13	0	41	3	66	11	0	80	20	2	8	0	30	20	159	1	0	180	331
	7:30 AM	8	19	22	0	49	6	59	23	0	88	26	7	8	0	41	25	168	2	3	198	376
	7:45 AM	5	17	16	0	38	5	54	24	2	85	18	9	7	0	34	30	148	6	5	189	346
	Peak Hour Volume	21	74	73	0	168	20	223	69	2	314	77	27	28	0	132	94	642	9	8	753	1367
	Rounded Hourly Volume	20	75	75	0	170	20	225	70	0	315	75	25	30	0	130	95	640	10	10	755	1370
	% Single Unit Trucks	23.8	5.4	11.0	0.0	10.1	5.0	8.5	14.5	0.0	9.6	7.8	0.0	17.9	0.0	8.3	6.4	2.6	0.0	0.0	3.1	5.9
	% Heavy Trucks	4.8	1.4	1.4	0.0	1.8	0.0	0.0	1.4	0.0	0.3	0.0	0.0	3.6	0.0	0.8	2.1	0.5	0.0	0.0	0.7	0.7
	% Trucks (Total)	28.6	6.8	12.3	0.0	11.9	5.0	8.5	15.9	0.0	9.9	7.8	0.0	21.4	0.0	9.1	8.5	3.1	0.0	0.0	3.7	6.7
	Peak Hour Factor (PHF)	0.66	0.84	0.83	0.00	0.86	0.83	0.84	0.72	0.25	0.89	0.74	0.75	0.87	0.00	0.80	0.78	0.96	0.37	0.40	0.95	0.91

Thursday, December 7, 2017		From North					From East					From South					From West					
	MD Peak Hour	STH 175					STH 167					STH 175					STH 167					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:00 PM	3	15	10	0	28	14	47	15	0	76	18	17	8	0	43	13	48	4	0	65	212
	12:15 PM	3	13	12	0	28	11	44	17	0	72	12	14	10	0	36	10	62	6	0	78	214
	12:30 PM	3	18	6	0	27	8	44	6	1	59	17	16	7	0	40	8	56	1	0	65	191
	12:45 PM	2	7	8	0	17	10	51	24	0	85	17	10	8	0	35	8	41	7	0	56	193
	Peak Hour Volume	11	53	36	0	100	43	186	62	1	292	64	57	33	0	154	39	207	18	0	264	810
	Rounded Hourly Volume	10	55	35	0	100	45	185	60	0	290	65	55	35	0	155	40	205	20	0	265	810
	% Single Unit Trucks	0.0	1.9	13.9	0.0	6.0	7.0	4.8	4.8	0.0	5.1	10.9	5.3	12.1	0.0	9.1	2.6	5.3	22.2	0.0	6.1	6.3
	% Heavy Trucks	18.2	0.0	11.1	0.0	6.0	4.7	2.7	0.0	0.0	2.4	1.6	3.5	0.0	0.0	1.9	0.0	3.9	5.6	0.0	3.4	3.1
	% Trucks (Total)	18.2	1.9	25.0	0.0	12.0	11.6	7.5	4.8	0.0	7.5	12.5	8.8	12.1	0.0	11.0	2.6	9.2	27.8	0.0	9.5	9.4
	Peak Hour Factor (PHF)	0.92	0.74	0.75	0.00	0.89	0.77	0.91	0.65	0.25	0.86	0.89	0.84	0.82	0.00	0.90	0.75	0.83	0.64	0.00	0.85	0.95

Thursday, December 7, 2017		From North					From East					From South					From West					
	PM Peak Hour	STH 175					STH 167					STH 175					STH 167					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	6	21	14	0	41	24	141	18	0	183	16	36	20	0	72	15	58	7	1	81	377
	4:15 PM	6	18	10	0	34	14	139	35	0	188	29	45	19	0	93	14	83	5	0	102	417
	4:30 PM	1	15	8	0	24	11	140	32	0	183	20	49	18	0	87	9	73	9	0	91	385
	4:45 PM	3	28	12	0	43	4	133	16	0	153	26	50	26	0	102	8	71	8	0	87	385
	Peak Hour Volume	16	82	44	0	142	53	553	101	0	707	91	180	83	0	354	46	285	29	1	361	1564
	Rounded Hourly Volume	15	80	45	0	140	55	555	100	0	710	90	180	85	0	355	45	285	30	0	360	1565
	% Single Unit Trucks	6.2	4.9	9.1	0.0	6.3	1.9	2.2	1.0	0.0	2.0	4.4	2.2	1.2	0.0	2.5	6.5	8.1	13.8	0.0	8.3	4.0
	% Heavy Trucks	0.0	2.4	4.5	0.0	2.8	3.8	0.5	0.0	0.0	0.7	1.1	0.0	1.2	0.0	0.6	0.0	1.4	0.0	0.0	1.1	1.0
	% Trucks (Total)	6.2	7.3	13.6	0.0	9.2	5.7	2.7	1.0	0.0	2.7	5.5	2.2	2.4	0.0	3.1	6.5	9.5	13.8	0.0	9.4	4.9
	Peak Hour Factor (PHF)	0.67	0.73	0.79	0.00	0.83	0.55	0.98	0.72	0.00	0.94	0.78	0.90	0.80	0.00	0.87	0.77	0.86	0.81	0.25	0.88	0.94

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		STH 175			STH 167			STH 175			STH 167			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics			*Page 5 of 11*
Start Date:	Thursday, December 7, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

STH 175 and STH 167

15-Minute Motor Vehicle Data

15-Minute Time Period		From North (STH 175)					From East (STH 167)					From South (STH 175)					From West (STH 167)					15-Min Totals	Hourly Sum	PHF
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	2	11	11	0	24	4	28	4	0	36	12	1	3	0	16	12	79	0	0	91	167	911	0.78
	6:15 AM	2	9	6	0	17	1	36	12	0	49	17	2	2	0	21	11	99	1	0	111	198	1058	0.84
	6:30 AM	3	15	14	0	32	8	50	13	0	71	17	5	8	1	31	19	100	1	0	120	254	1191	0.90
	6:45 AM	4	23	21	0	48	9	54	14	0	77	20	5	8	0	33	20	114	0	0	134	292	1313	0.87
	7:00 AM	2	16	22	0	40	6	44	11	0	61	13	9	5	0	27	19	167	0	0	186	314	1367	0.91
	7:15 AM	6	22	13	0	41	3	66	11	0	80	20	2	8	0	30	20	159	1	0	180	331	1335	0.89
	7:30 AM	8	19	22	0	49	6	59	23	0	88	26	7	8	0	41	25	168	2	3	198	376	1249	0.83
	7:45 AM	5	17	16	0	38	5	54	24	2	85	18	9	7	0	34	30	148	6	5	189	346	1090	0.79
	8:00 AM	0	14	12	0	26	4	46	16	0	66	19	7	6	0	32	15	141	2	0	158	282	915	0.81
	8:15 AM	4	16	12	0	32	6	47	14	0	67	21	7	4	0	32	14	100	0	0	114	245	833	0.85
	8:30 AM	2	6	5	0	13	5	46	18	0	69	19	7	5	0	31	12	91	1	0	104	217	747	0.86
	8:45 AM	1	6	8	0	15	8	30	19	0	57	12	6	3	0	21	11	64	3	0	78	171	689	0.86
	9:00 AM	1	10	8	0	19	8	54	14	0	76	14	6	2	0	22	16	65	2	0	83	200	719	0.89
	9:15 AM	2	11	9	0	22	3	34	15	0	52	7	7	5	0	19	12	52	2	0	66	159	685	0.85
	9:30 AM	1	15	7	0	23	11	20	14	0	45	15	9	6	0	30	16	45	0	0	61	159	693	0.86
	9:45 AM	1	14	10	0	25	8	35	15	0	58	17	16	9	0	42	11	62	3	0	76	201	711	0.88
Midday Peak Period	10:00 AM	5	10	4	0	19	8	36	12	0	56	11	10	12	0	33	7	50	1	0	58	166	684	0.97
	10:15 AM	3	13	6	0	22	3	29	10	0	42	13	15	12	0	40	4	56	3	0	63	167	717	0.90
	10:30 AM	0	11	6	0	17	5	46	16	0	67	10	14	9	0	33	10	46	4	0	60	177	742	0.93
	10:45 AM	1	15	6	0	22	5	41	16	0	62	19	8	4	0	31	10	48	1	0	59	174	768	0.95
	11:00 AM	2	17	11	0	30	6	52	15	0	73	13	15	7	0	35	11	48	2	0	61	199	770	0.95
	11:15 AM	6	12	13	0	31	10	43	14	0	67	13	8	13	1	35	15	42	1	1	59	192	783	0.92
	11:30 AM	5	12	12	0	29	6	40	15	0	61	20	16	16	0	52	12	46	3	0	61	203	805	0.94
	11:45 AM	3	16	10	0	29	7	27	15	0	49	10	18	8	0	36	9	47	6	0	62	176	793	0.93
	12:00 PM	3	15	10	0	28	14	47	15	0	76	18	17	8	0	43	13	48	4	0	65	212	810	0.95
	12:15 PM	3	13	12	0	28	11	44	17	0	72	12	14	10	0	36	10	62	6	0	78	214	793	0.93
	12:30 PM	3	18	6	0	27	8	44	6	1	59	17	16	7	0	40	8	56	1	0	65	191	761	0.98
	12:45 PM	2	7	8	0	17	10	51	24	0	85	17	10	8	0	35	8	41	7	0	56	193	784	0.92
	1:00 PM	6	16	8	0	30	5	42	6	0	53	13	19	13	0	45	14	50	3	0	67	195	791	0.92
	1:15 PM	1	8	6	0	15	8	55	10	0	73	15	15	10	0	40	9	42	3	0	54	182	800	0.93
	1:30 PM	7	15	4	0	26	12	59	16	0	87	13	13	10	0	36	8	56	1	0	65	214	831	0.97
	1:45 PM	0	8	8	0	16	13	49	13	0	75	8	21	13	0	42	12	49	6	0	67	200	877	0.84
PM Peak Period	2:00 PM	1	9	10	0	20	6	54	14	0	74	20	18	14	0	52	4	52	2	0	58	204	957	0.85
	2:15 PM	3	12	7	1	23	10	63	13	0	86	13	23	13	0	49	8	44	3	0	55	213	1035	0.92
	2:30 PM	3	21	13	0	37	14	61	12	0	87	11	17	17	0	45	13	74	4	0	91	260	1173	0.84
	2:45 PM	1	13	16	0	30	21	69	16	0	106	15	28	21	0	64	12	64	4	0	80	280	1259	0.90
	3:00 PM	3	12	11	0	26	13	98	21	0	132	23	29	15	0	67	13	39	5	0	57	282	1389	0.85
	3:15 PM	9	14	11	0	34	19	99	14	0	132	18	33	28	0	79	22	69	14	1	106	351	1484	0.90
	3:30 PM	7	15	14	0	36	15	101	13	0	129	18	35	23	0	76	17	79	5	4	105	346	1550	0.93
	3:45 PM	2	20	15	0	37	11	146	27	0	184	32	33	19	0	84	15	80	10	0	105	410	1589	0.95
	4:00 PM	6	21	14	0	41	24	141	18	0	183	16	36	20	0	72	15	58	7	1	81	377	1564	0.94
	4:15 PM	6	18	10	0	34	14	139	35	0	188	29	45	19	0	93	14	83	5	0	102	417	1561	0.94
	4:30 PM	1	15	8	0	24	11	140	32	0	183	20	49	18	0	87	9	73	9	0	91	385	1488	0.97
	4:45 PM	3	28	12	0	43	4	133	16	0	153	26	50	26	0	102	8	71	8	0	87	385	1430	0.93
	5:00 PM	9	19	7	0	35	10	146	15	0	171	8	43	13	0	64	11	84	9	0	104	374	1382	0.92
	5:15 PM	7	10	5	0	22	7	136	20	0	163	21	30	24	0	75	10	71	3	0	84	344	1264	0.92
	5:30 PM	5	14	13	1	33	7	131	19	0	157	16	29	18	0	63	11	61	2	0	74	327	1214	0.90
	5:45 PM	7	10	9	1	27	6	142	21	0	169	22	34	17	0	73	6	56	6	0	68	337	1193	0.89
	6:00 PM	5	8	7	0	20	9	84	14	0	107	11	22	16	0	49	8	65	7	0	80	256	1073	0.88
	6:15 PM	2	8	5	1	16	8	123	14	0	145	11	26	27	0	64	9	52	5	3	69	294		
	6:30 PM	6	8	3	0	17	28	139	12	0	179	16	14	7	0	37	7	54	11	1	73	306		
	6:45 PM	4	7	3	0	14	15	97	18	0	130	4	13	6	0	23	3	38	9	0	50	217		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		184	712	519	4	1419	478	3650	821	3	4952	839	941	610	2	2392	638	3708	204	19	4569	13332		

Peak Hour All Vehicle Volume Summary

Hourly Time Period		From North (STH 175)					From East (STH 167)					From South (STH 175)					From West (STH 167)					Total Hourly Volume	PHF
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	21	74	73	0	168	20	223	69	2	314	77	27	28	0	132	94	642	9	8	753	1367	0.91
MD	12:00 PM	11	53	36	0	100	43	186	62	1	292	64	57	33	0	154	39	207	18	0	264	810	0.95
PM	4:00 PM	16	82	44	0	142	53	553	101	0	707	91	180	83	0	354	46	285	29	1	361	1564	0.94

Intersection Traffic Volume Report

Count Basics			*Page 9 of 11*
Start Date:	Thursday, December 7, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

STH 175 and STH 167

15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time		From North (STH 175) Right	Thru	Left	U-Tn	Total	From East (STH 167) Right	Thru	Left	U-Tn	Total	From South (STH 175) Right	Thru	Left	U-Tn	Total	From West (STH 167) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum
AM Peak Period	6:00 AM	0	0	0	0	0	0	8	0	0	8	0	1	0	0	1	0	3	0	0	3	12	52
	6:15 AM	0	1	1	0	2	0	0	3	0	3	0	0	0	0	0	0	3	0	0	3	8	58
	6:30 AM	1	0	0	0	1	1	3	4	0	8	1	1	1	0	3	0	1	0	0	1	13	66
	6:45 AM	1	2	2	0	5	0	6	2	0	8	2	0	1	0	3	2	1	0	0	3	19	83
	7:00 AM	1	1	0	0	2	0	1	2	0	3	2	0	2	0	4	2	7	0	0	9	18	91
	7:15 AM	1	0	4	0	5	0	6	1	0	7	1	0	1	0	2	0	2	0	0	2	16	102
	7:30 AM	3	2	3	0	8	1	7	5	0	13	2	0	2	0	4	2	3	0	0	5	30	111
	7:45 AM	1	2	2	0	5	0	5	3	0	8	1	0	1	0	2	4	8	0	0	12	27	101
	8:00 AM	0	2	2	0	4	1	7	2	0	10	7	1	0	0	8	0	7	0	0	7	29	91
	8:15 AM	0	3	2	0	5	0	4	3	0	7	6	1	0	0	7	1	5	0	0	6	25	85
	8:30 AM	1	1	0	0	2	1	5	3	0	9	5	1	0	0	6	1	2	0	0	3	20	83
	8:45 AM	0	0	0	0	0	1	4	3	0	8	2	1	0	0	3	0	5	1	0	6	17	82
	9:00 AM	0	2	0	0	2	1	7	3	0	11	2	2	0	0	4	2	4	0	0	6	23	91
	9:15 AM	0	1	1	0	2	1	3	4	0	8	5	0	2	0	7	0	5	1	0	6	23	82
	9:30 AM	1	1	2	0	4	7	1	2	0	10	1	1	0	0	2	1	2	0	0	3	19	82
	9:45 AM	0	3	1	0	4	1	4	3	0	8	4	2	1	0	7	3	3	1	0	7	26	85
Midday Peak Period	10:00 AM	0	2	2	0	4	1	1	2	0	4	1	2	0	0	3	0	3	0	0	3	14	77
	10:15 AM	2	0	0	0	2	1	4	0	0	5	4	3	3	0	10	0	3	3	0	6	23	87
	10:30 AM	0	0	0	0	0	0	9	3	0	12	1	2	2	0	5	0	4	1	0	5	22	84
	10:45 AM	1	0	1	0	2	1	6	1	0	8	2	0	0	0	2	1	4	1	0	6	18	91
	11:00 AM	0	1	2	0	3	2	7	2	0	11	2	1	0	0	3	1	5	1	0	7	24	86
	11:15 AM	1	1	1	0	3	0	6	1	0	7	3	0	2	0	5	2	3	0	0	5	20	80
	11:30 AM	3	0	2	0	5	1	7	2	0	10	1	4	1	0	6	1	6	1	0	8	29	81
	11:45 AM	1	1	0	0	2	1	2	1	0	4	1	0	1	0	2	0	3	2	0	5	13	70
	12:00 PM	0	0	2	0	2	1	4	0	0	5	1	3	1	0	5	0	4	2	0	6	18	76
	12:15 PM	1	0	3	0	4	1	3	1	0	5	2	2	0	0	4	1	7	0	0	8	21	75
	12:30 PM	1	0	2	0	3	3	3	0	0	6	3	0	1	0	4	0	4	1	0	5	18	70
	12:45 PM	0	1	2	0	3	0	4	2	0	6	2	0	2	0	4	0	4	2	0	6	19	70
	1:00 PM	3	1	0	0	4	1	4	1	0	6	1	0	0	0	1	1	5	0	0	6	17	74
	1:15 PM	0	1	0	0	1	1	4	1	0	6	2	0	2	0	4	1	4	0	0	5	16	76
	1:30 PM	2	0	0	0	2	3	4	2	0	9	0	1	0	0	1	0	6	0	0	6	18	73
	1:45 PM	0	1	0	0	1	6	5	0	0	11	1	1	0	0	2	0	9	0	0	9	23	70
PM Peak Period	2:00 PM	0	1	2	0	3	0	5	1	0	6	2	3	0	0	5	0	5	0	0	5	19	72
	2:15 PM	0	1	2	0	3	1	5	1	0	7	0	0	1	0	1	1	1	0	0	2	13	71
	2:30 PM	1	0	0	0	1	2	3	1	0	6	1	2	1	0	4	0	3	1	0	4	15	82
	2:45 PM	0	1	5	0	6	4	4	0	0	8	3	3	1	0	7	1	3	0	0	4	25	88
	3:00 PM	0	1	3	0	4	0	4	1	0	5	4	0	3	0	7	1	1	0	0	2	18	89
	3:15 PM	1	0	0	0	1	1	3	2	0	6	3	2	5	0	10	0	3	4	0	7	24	100
	3:30 PM	0	2	0	0	2	3	2	0	0	5	1	3	0	0	4	2	8	0	0	10	21	104
	3:45 PM	0	1	3	0	4	2	7	0	0	9	0	3	0	0	3	1	7	2	0	10	26	94
	4:00 PM	1	4	1	0	6	2	5	0	0	7	3	2	1	0	6	2	7	1	0	10	29	77
	4:15 PM	0	0	2	0	2	1	5	1	0	7	2	2	0	0	4	0	14	1	0	15	28	55
	4:30 PM	0	1	1	0	2	0	4	0	0	4	0	0	1	0	1	1	3	0	0	4	11	32
	4:45 PM	0	1	2	0	3	0	1	0	0	1	0	0	0	0	0	0	3	2	0	5	9	26
	5:00 PM	2	1	1	0	4	1	0	0	0	1	0	1	0	0	1	0	1	0	0	1	7	21
	5:15 PM	1	0	0	0	1	0	1	0	0	1	0	1	0	0	1	1	1	0	0	2	5	20
	5:30 PM	0	0	2	0	2	0	1	0	0	1	0	1	0	0	1	1	0	0	0	1	5	16
	5:45 PM	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	0	1	0	0	1	4	12
	6:00 PM	1	0	0	0	1	0	2	1	0	3	0	0	0	0	0	0	2	0	0	2	6	12
	6:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	
	6:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
	6:45 PM	0	0	0	0	0	1	1	1	0	3	0	0	0	0	0	0	1	0	0	1	4	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		32	44	61	0	137	56	200	72	0	328	88	53	39	0	180	37	199	28	0	264	909	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time		From North (STH 175) Right	Thru	Left	U-Tn	Total	From East (STH 167) Right	Thru	Left	U-Tn	Total	From South (STH 175) Right	Thru	Left	U-Tn	Total	From West (STH 167) Right	Thru	Left	U-Tn	Total	Total Hourly Volume
AM	7:00 AM	6	5	9	0	20	1	19	11	0	31	6	0	6	0	12	8	20	0	0	28	91
MD	12:00 PM	2	1	9	0	12	5	14	3	0	22	8	5	4	0	17	1	19	5	0	25	76
PM	4:00 PM	1	6	6	0	13	3	15	1	0	19	5	4	2	0	11	3	27	4	0	34	77

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Wolf Road and STH 167 - Holy Hill Road

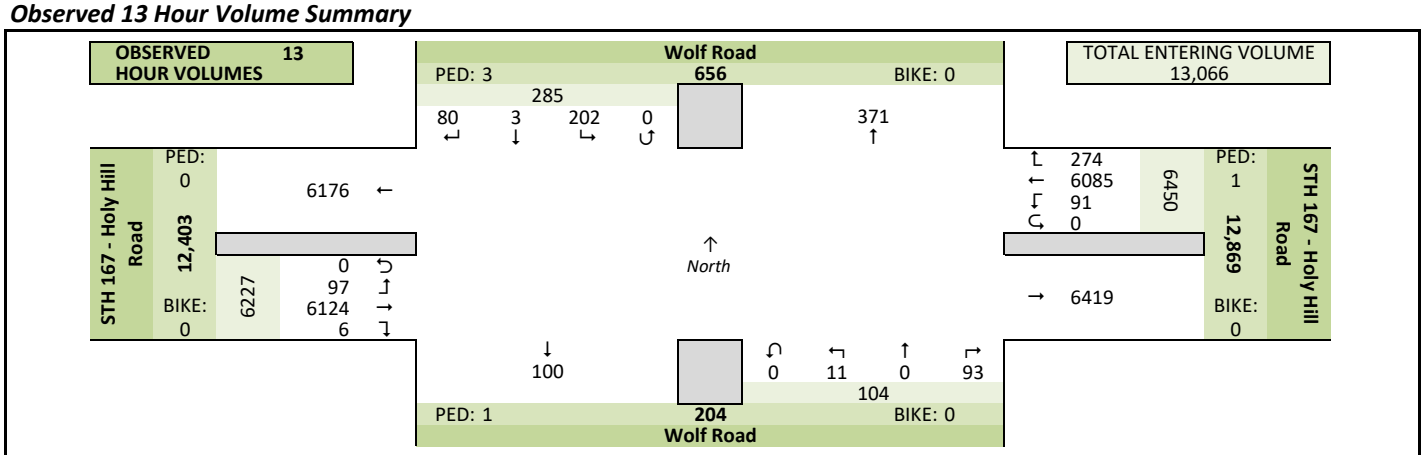
Site Information

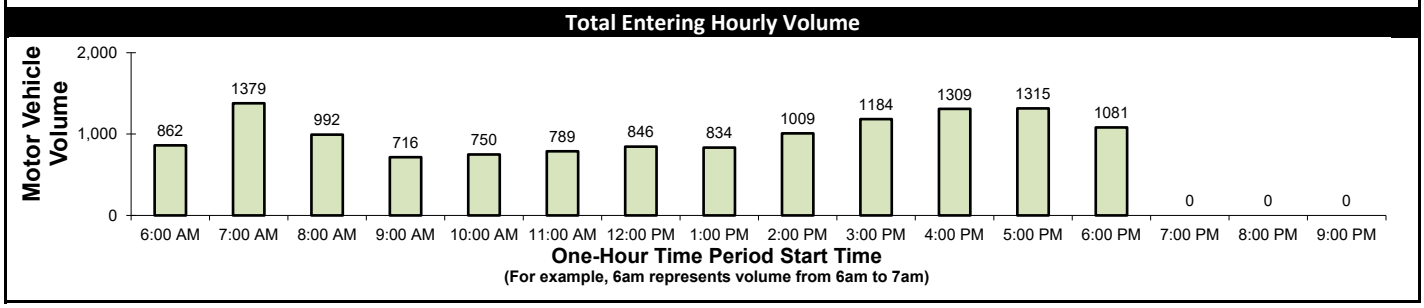
Municipality	Village of Richfield		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	Wolf Road		
East Leg	STH 167 - Holy Hill Road		
South Leg	Wolf Road		
West Leg	STH 167 - Holy Hill Road		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children		None	
Elementry school age children		None	
Visually impaired (white cane/helper dog)		None	
Elderly/disabled (except wheelchairs)		None	
Wheelchairs/electric scooters		None	
Other (describe)	None	None	

Count Information

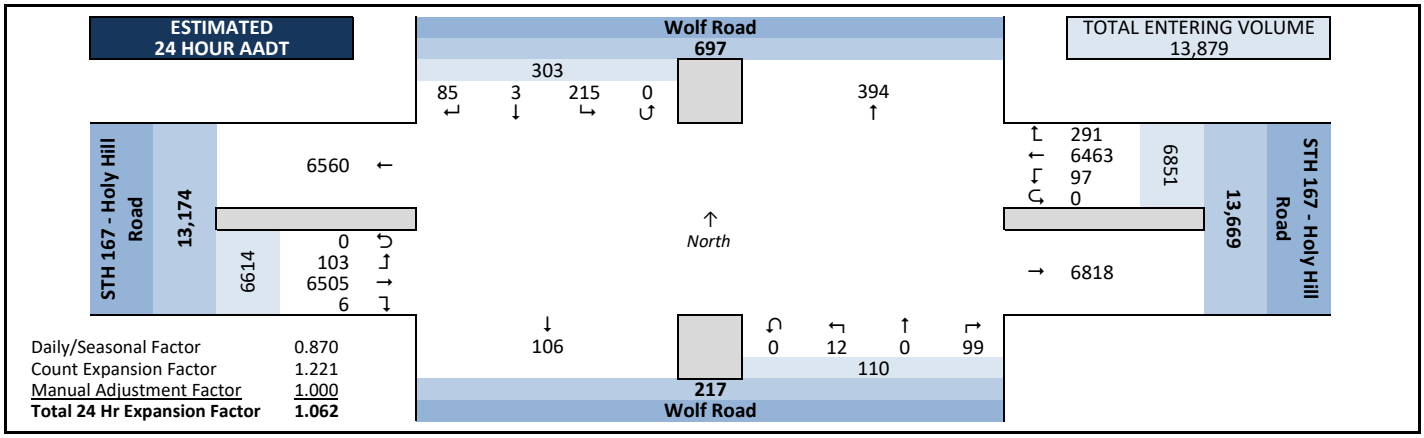
Hrs Counted:	6:00 AM-7:00 PM				
1st Day of Count	Thursday, October 26, 2017			Weather	
AM Peak Period	Thursday, October 26, 2017			Clear & Dry	
Midday Peak Period	Thursday, October 26, 2017			Clear & Dry	
PM Peak Period	Thursday, October 26, 2017			Clear & Dry	
Calculated Peak Hours					
AM	7:15-8:15am	MD	11:30-12:30am	PM	4:30-5:30pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	11:30-12:30am	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.870		Count Expansion Factor	1.221	
Company Name	TADI, Inc.			Manual Adj.	1.000
Observers	AM Peak Period	Amy Scheuerlein			
	Midday Peak Period	JK Bieberitz			
	PM Peak Period	Ted Atwell			
Comments	2016 DOT Seasonal Factors				

Observed 13 Hour Volume Summary





Estimated 24 Hour AADT



Intersection Traffic Volume Report

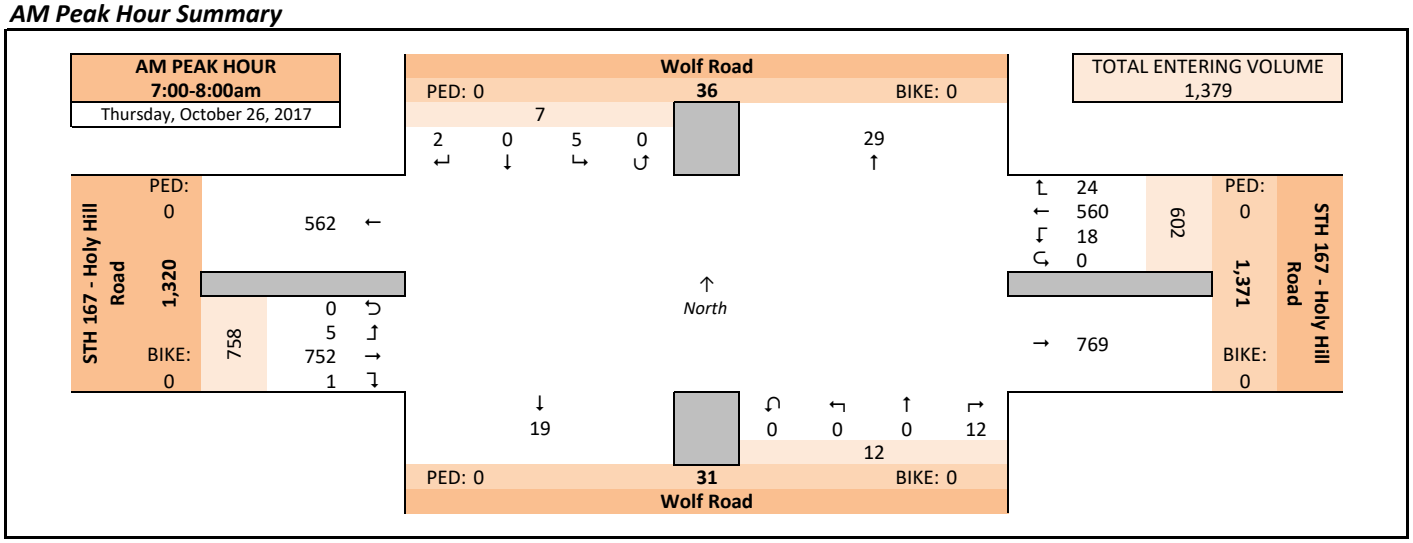
Count Basics			Page 2 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

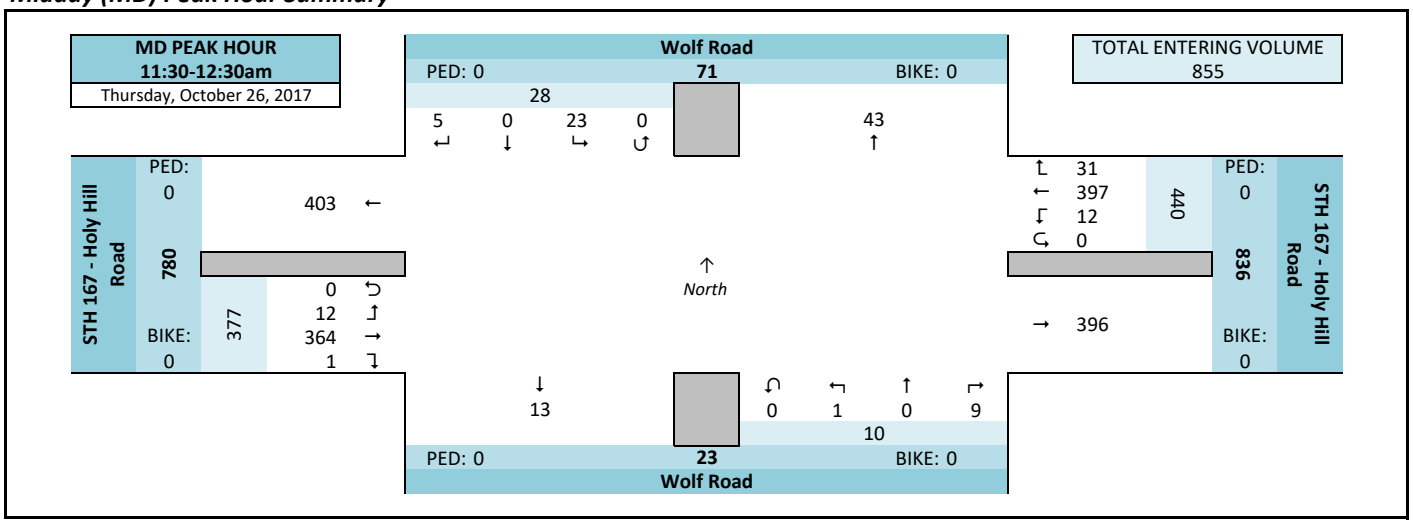
All Motor Vehicles

Wolf Road and STH 167 - Holy Hill Road

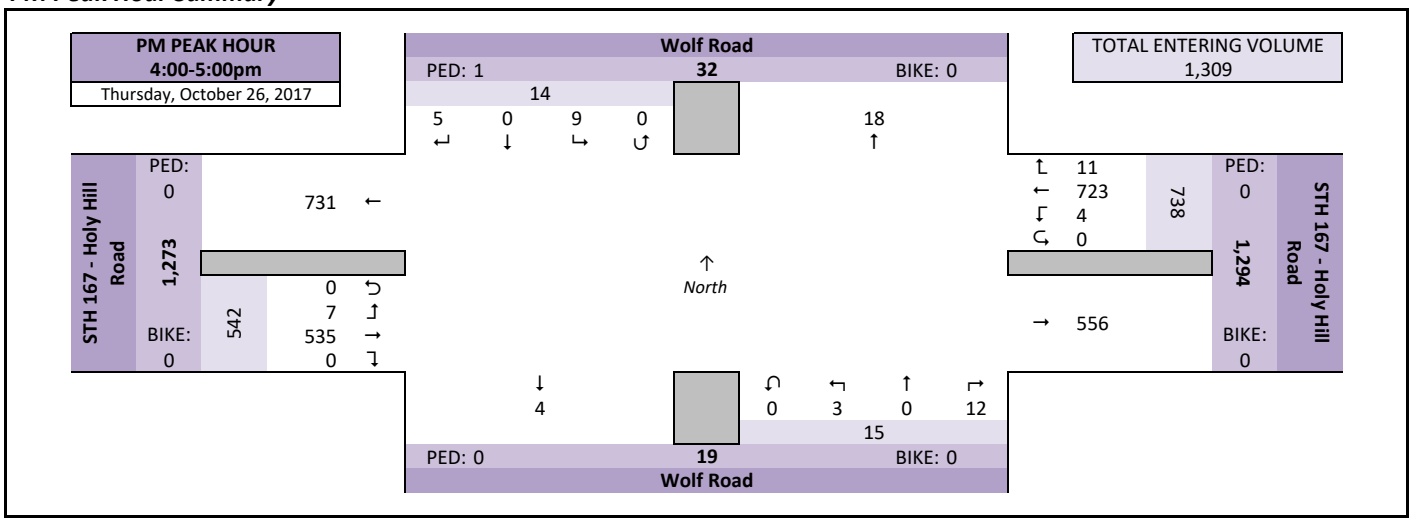
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Wolf Road and STH 167 - Holy Hill Road

Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, October 26, 2017	From North					From East					From South					From West					
AM Peak Hour	Wolf Road					STH 167 - Holy Hill Road					Wolf Road					STH 167 - Holy Hill Road					
Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
7:00 AM	0	0	2	0	2	8	70	5	0	83	1	0	0	0	1	0	182	1	0	183	269
7:15 AM	1	0	2	0	3	2	134	5	0	141	2	0	0	0	2	0	174	1	0	175	321
7:30 AM	0	0	1	0	1	7	167	3	0	177	3	0	0	0	3	1	215	0	0	216	397
7:45 AM	1	0	0	0	1	7	189	5	0	201	6	0	0	0	6	0	181	3	0	184	392
Peak Hour Volume	2	0	5	0	7	24	560	18	0	602	12	0	0	0	12	1	752	5	0	758	1379
Rounded Hourly Volume	0	0	5	0	5	25	560	20	0	605	10	0	0	0	10	0	750	5	0	755	1375
% Single Unit Trucks	50.0	0.0	0.0	0.0	14.3	8.3	10.2	5.6	0.0	10.0	8.3	0.0	0.0	0.0	8.3	0.0	4.8	20.0	0.0	4.9	7.2
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	2.3	11.1	0.0	2.5	33.3	0.0	0.0	0.0	33.3	0.0	0.8	0.0	0.0	0.8	1.8
% Trucks (Total)	50.0	0.0	0.0	0.0	14.3	8.3	12.5	16.7	0.0	12.5	41.7	0.0	0.0	0.0	41.7	0.0	5.6	20.0	0.0	5.7	9.0
Peak Hour Factor (PHF)	0.50	0.00	0.62	0.00	0.58	0.75	0.74	0.90	0.00	0.75	0.50	0.00	0.00	0.00	0.50	0.25	0.87	0.42	0.00	0.88	0.87

Thursday, October 26, 2017	From North					From East					From South					From West					
MD Peak Hour	Wolf Road					STH 167 - Holy Hill Road					Wolf Road					STH 167 - Holy Hill Road					
Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
11:30 AM	0	0	4	0	4	5	102	1	0	108	1	0	0	0	1	0	96	2	0	98	211
11:45 AM	0	0	4	0	4	10	102	2	0	114	4	0	1	0	5	0	89	3	0	92	215
12:00 PM	0	0	7	0	7	4	88	7	0	99	3	0	0	0	3	1	98	3	0	102	211
12:15 PM	5	0	8	0	13	12	105	2	0	119	1	0	0	0	1	0	81	4	0	85	218
Peak Hour Volume	5	0	23	0	28	31	397	12	0	440	9	0	1	0	10	1	364	12	0	377	855
Rounded Hourly Volume	5	0	25	0	30	30	395	10	0	435	10	0	0	0	10	0	365	10	0	375	850
% Single Unit Trucks	20.0	0.0	0.0	0.0	3.6	9.7	8.3	8.3	0.0	8.4	11.1	0.0	0.0	0.0	10.0	0.0	12.1	16.7	0.0	12.2	9.9
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	2.5	50.0	0.0	3.6	33.3	0.0	0.0	0.0	30.0	0.0	2.2	0.0	0.0	2.1	3.2
% Trucks (Total)	20.0	0.0	0.0	0.0	3.6	9.7	10.8	58.3	0.0	12.0	44.4	0.0	0.0	0.0	40.0	0.0	14.3	16.7	0.0	14.3	13.1
Peak Hour Factor (PHF)	0.25	0.00	0.72	0.00	0.54	0.65	0.95	0.43	0.00	0.92	0.56	0.00	0.25	0.00	0.50	0.25	0.93	0.75	0.00	0.92	0.98

Thursday, October 26, 2017	From North					From East					From South					From West					
PM Peak Hour	Wolf Road					STH 167 - Holy Hill Road					Wolf Road					STH 167 - Holy Hill Road					
Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
4:00 PM	1	0	3	0	4	1	162	1	0	164	5	0	2	0	7	0	136	2	0	138	313
4:15 PM	2	0	3	0	5	3	184	1	0	188	3	0	1	0	4	0	123	0	0	123	320
4:30 PM	2	0	1	0	3	2	189	0	0	191	3	0	0	0	3	0	146	2	0	148	345
4:45 PM	0	0	2	0	2	5	188	2	0	195	1	0	0	0	1	0	130	3	0	133	331
Peak Hour Volume	5	0	9	0	14	11	723	4	0	738	12	0	3	0	15	0	535	7	0	542	1309
Rounded Hourly Volume	5	0	10	0	15	10	725	5	0	740	10	0	5	0	15	0	535	5	0	540	1310
% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	9.1	3.3	50.0	0.0	3.7	8.3	0.0	0.0	0.0	6.7	0.0	6.7	0.0	0.0	6.6	4.9
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.6	50.0	0.0	0.8	16.7	0.0	0.0	0.0	13.3	0.0	0.7	0.0	0.0	0.7	0.9
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	9.1	3.9	100.0	0.0	4.5	25.0	0.0	0.0	0.0	20.0	0.0	7.5	0.0	0.0	7.4	5.8
Peak Hour Factor (PHF)	0.62	0.00	0.75	0.00	0.70	0.55	0.96	0.50	0.00	0.95	0.60	0.00	0.37	0.00	0.54	0.00	0.92	0.58	0.00	0.92	0.95

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists	Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
	Wolf Road			STH 167 - Holy Hill Road			Wolf Road			STH 167 - Holy Hill Road			
15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM: 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM: 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM: 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM: 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM: Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD: 11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
MD: 11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
MD: 12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
MD: 12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
MD: Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM: 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM: 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM: 4:30 PM	1	0	1	0	0	0	0	0	0	0	0	0	1
PM: 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM: Total	1	0	1	0	0	0	0	0	0	0	0	0	1

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Wolf Road and STH 167 - Holy Hill Road

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Wolf Road) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Wolf Road) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum	PHF
AM Peak Period	6:00 AM	0	0	0	0	0	2	46	0	0	48	0	0	0	0	0	1	134	1	0	136	184	862	0.87
	6:15 AM	0	0	1	0	1	2	51	2	0	55	2	0	0	0	2	0	138	0	0	138	196	947	0.88
	6:30 AM	0	0	0	0	0	1	89	1	0	91	0	0	0	0	0	0	155	1	0	156	247	1072	0.83
	6:45 AM	0	0	1	0	1	3	70	1	0	74	1	0	0	0	1	0	159	0	0	159	235	1222	0.77
	7:00 AM	0	0	2	0	2	8	70	5	0	83	1	0	0	0	1	0	182	1	0	183	269	1379	0.87
	7:15 AM	1	0	2	0	3	2	134	5	0	141	2	0	0	0	2	0	174	1	0	175	321	1429	0.90
	7:30 AM	0	0	1	0	1	7	167	3	0	177	3	0	0	0	3	1	215	0	0	216	397	1360	0.86
	7:45 AM	1	0	0	0	1	7	189	5	0	201	6	0	0	0	6	0	181	3	0	184	392	1180	0.75
	8:00 AM	1	0	1	0	2	7	149	2	0	158	3	0	0	0	3	0	154	2	0	156	319	992	0.78
	8:15 AM	2	0	1	0	3	2	112	1	0	115	1	0	1	0	2	0	130	2	0	132	252	858	0.85
	8:30 AM	1	0	2	0	3	3	86	3	0	92	0	0	0	0	0	0	119	3	0	122	217	791	0.91
	8:45 AM	1	0	1	0	2	6	82	0	0	88	2	0	0	0	2	0	109	3	0	112	204	760	0.93
	9:00 AM	1	0	6	0	7	6	72	0	0	78	2	0	0	0	2	0	97	1	0	98	185	716	0.96
	9:15 AM	1	0	2	0	3	5	78	0	0	83	3	0	0	0	3	0	96	0	0	96	185	717	0.96
	9:30 AM	1	0	10	0	11	8	62	2	0	72	5	0	0	0	5	0	91	7	0	98	186	736	0.90
	9:45 AM	0	1	2	0	3	2	52	0	0	54	0	0	1	0	1	0	99	3	0	102	160	704	0.86
Midday Peak Period	10:00 AM	3	0	7	0	10	8	66	0	0	74	0	0	0	0	0	0	101	1	0	102	186	750	0.91
	10:15 AM	2	0	6	0	8	4	87	3	0	94	0	0	1	0	1	0	100	1	0	101	204	734	0.89
	10:30 AM	1	0	1	0	2	6	51	2	0	59	2	0	0	0	2	0	91	0	0	91	154	723	0.88
	10:45 AM	1	0	1	0	2	10	90	4	0	104	0	0	0	0	0	0	100	0	0	100	206	780	0.92
	11:00 AM	5	1	6	0	12	5	82	0	0	87	1	0	0	0	1	0	68	2	0	70	170	789	0.92
	11:15 AM	0	0	3	0	3	11	90	0	0	101	1	0	1	0	2	0	83	4	0	87	193	830	0.97
	11:30 AM	0	0	4	0	4	5	102	1	0	108	1	0	0	0	1	0	96	2	0	98	211	855	0.98
	11:45 AM	0	0	4	0	4	10	102	2	0	114	4	0	1	0	5	0	89	3	0	92	215	840	0.96
	12:00 PM	0	0	7	0	7	4	88	7	0	99	3	0	0	0	3	1	98	3	0	102	211	846	0.96
	12:15 PM	5	0	8	0	13	12	105	2	0	119	1	0	0	0	1	0	81	4	0	85	218	843	0.95
	12:30 PM	4	0	5	0	9	7	85	0	0	92	4	0	1	0	5	1	89	0	0	90	196	819	0.93
	12:45 PM	1	0	7	0	8	10	106	1	0	117	2	0	0	0	2	0	92	2	0	94	221	838	0.95
	1:00 PM	4	0	11	0	15	5	87	1	0	93	1	0	0	0	1	0	96	3	0	99	208	834	0.96
	1:15 PM	6	0	3	0	9	3	86	0	0	89	1	0	0	0	1	0	91	4	0	95	194	850	0.95
	1:30 PM	0	0	3	0	3	3	97	2	0	102	1	0	0	0	1	0	109	0	0	109	215	890	0.95
	1:45 PM	2	0	9	0	11	9	100	1	0	110	0	0	0	0	0	1	93	2	0	96	217	962	0.84
PM Peak Period	2:00 PM	2	0	4	0	6	8	102	3	0	113	2	0	0	0	2	0	103	0	0	103	224	1009	0.88
	2:15 PM	5	0	6	0	11	6	102	2	0	110	4	0	0	0	4	0	107	2	0	109	234	1026	0.89
	2:30 PM	3	0	7	0	10	4	127	2	0	133	1	0	2	0	3	0	140	1	0	141	287	1120	0.85
	2:45 PM	1	0	2	0	3	5	136	1	0	142	0	0	0	0	0	0	118	1	0	119	264	1130	0.86
	3:00 PM	0	0	7	0	7	3	130	0	0	133	1	0	0	0	1	0	100	0	0	100	241	1184	0.90
	3:15 PM	2	1	7	0	10	4	162	4	0	170	2	0	0	0	2	0	145	1	0	146	328	1256	0.96
	3:30 PM	1	0	4	0	5	2	143	7	0	152	5	0	0	0	5	0	132	3	0	135	297	1248	0.98
	3:45 PM	1	0	2	0	3	4	171	3	0	178	2	0	0	0	2	1	132	2	0	135	318	1296	0.94
	4:00 PM	1	0	3	0	4	1	162	1	0	164	5	0	2	0	7	0	136	2	0	138	313	1309	0.95
	4:15 PM	2	0	3	0	5	3	184	1	0	188	3	0	1	0	4	0	123	0	0	123	320	1329	0.96
	4:30 PM	2	0	1	0	3	2	189	0	0	191	3	0	0	0	3	0	146	2	0	148	345	1358	0.97
	4:45 PM	0	0	2	0	2	5	188	2	0	195	1	0	0	0	1	0	130	3	0	133	331	1316	0.94
	5:00 PM	2	0	3	0	5	8	194	0	0	202	2	0	0	0	2	0	119	5	0	124	333	1315	0.94
	5:15 PM	1	0	5	0	6	9	197	1	0	207	0	0	0	0	0	0	134	2	0	136	349	1299	0.93
	5:30 PM	0	0	2	0	2	2	157	2	0	161	3	0	0	0	3	0	136	1	0	137	303	1245	0.94
	5:45 PM	2	0	7	0	9	7	188	0	0	195	1	0	0	0	1	0	119	6	0	125	330	1168	0.88
	6:00 PM	5	0	2	0	7	6	196	0	0	202	1	0	0	0	1	0	107	0	0	107	317	1081	0.85
	6:15 PM	3	0	8	0	11	2	174	2	0	178	2	0	0	0	2	0	103	1	0	104	295		
	6:30 PM	2	0	5	0	7	5	117	1	0	123	1	0	0	0	1	0	93	2	0	95	226		
	6:45 PM	1	0	5	0	6	5	133	3	0	141	1	0	0	0	1	0	91	4	0	95	243		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		80	3	202	0	285	274	6085	91	0	6450	93	0	11	0	104	6	6124	97	0	6227	13066		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Wolf Road) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Wolf Road) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	Total Hourly Volume	PHF
AM	7:00 AM	2	0	5	0	7	24	560	18	0	602	12	0	0	0	12	1	752	5	0	758	1379	0.87
MD	11:30 AM	5	0	23	0	28	31	397	12	0	440	9	0	1	0	10	1	364	12	0	377	855	0.98
PM	4:00 PM	5	0	9	0	14	11	723	4	0	738	12	0	3	0	15	0	535	7	0	542	1309	0.95

Intersection Traffic Volume Report

Count Basics			*Page 9 of 11*
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Wolf Road and STH 167 - Holy Hill Road

15-Minute Heavy Vehicle Data

15-Minute Time Period	Start Time	From North (Wolf Road) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Wolf Road) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum
AM Peak Period	6:00 AM	0	0	0	0	0	1	5	0	0	6	0	0	0	0	0	0	6	0	0	6	12	44
	6:15 AM	0	0	1	0	1	1	4	2	0	7	2	0	0	0	2	0	2	0	0	2	12	55
	6:30 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	1	0	5	7	65
	6:45 AM	0	0	1	0	1	1	5	0	0	6	1	0	0	0	1	0	5	0	0	5	13	88
	7:00 AM	0	0	0	0	0	1	16	1	0	18	1	0	0	0	1	0	4	0	0	4	23	124
	7:15 AM	0	0	0	0	0	0	15	0	0	15	2	0	0	0	2	0	5	0	0	5	22	128
	7:30 AM	0	0	0	0	0	1	15	1	0	17	1	0	0	0	1	0	12	0	0	12	30	128
	7:45 AM	1	0	0	0	1	0	24	1	0	25	1	0	0	0	1	0	21	1	0	22	49	121
	8:00 AM	0	0	0	0	0	1	14	0	0	15	1	0	0	0	1	0	11	0	0	11	27	99
	8:15 AM	0	0	0	0	0	0	13	0	0	13	1	0	0	0	1	0	8	0	0	8	22	96
	8:30 AM	0	0	0	0	0	0	12	3	0	15	0	0	0	0	0	0	8	0	0	8	23	99
	8:45 AM	0	0	0	0	0	0	13	0	0	13	2	0	0	0	2	0	12	0	0	12	27	102
	9:00 AM	1	0	1	0	2	2	8	0	0	10	2	0	0	0	2	0	10	0	0	10	24	100
	9:15 AM	0	0	1	0	1	2	7	0	0	9	2	0	0	0	2	0	13	0	0	13	25	106
	9:30 AM	0	0	3	0	3	1	13	0	0	14	2	0	0	0	2	0	7	0	0	7	26	106
	9:45 AM	0	0	0	0	0	1	9	0	0	10	0	0	0	0	0	0	15	0	0	15	25	107
Midday Peak Period	10:00 AM	0	0	1	0	1	0	10	0	0	10	0	0	0	0	0	0	19	0	0	19	30	119
	10:15 AM	0	0	0	0	0	0	14	1	0	15	0	0	0	0	0	0	10	0	0	10	25	117
	10:30 AM	0	0	1	0	1	3	10	1	0	14	0	0	0	0	0	0	12	0	0	12	27	119
	10:45 AM	0	0	0	0	0	1	13	1	0	15	0	0	0	0	0	0	22	0	0	22	37	131
	11:00 AM	1	1	1	0	3	0	14	0	0	14	1	0	0	0	1	0	10	0	0	10	28	118
	11:15 AM	0	0	0	0	0	0	11	0	0	11	1	0	0	0	1	0	15	0	0	15	27	109
	11:30 AM	0	0	0	0	0	0	21	0	0	21	1	0	0	0	1	0	16	1	0	17	39	112
	11:45 AM	0	0	0	0	0	0	10	2	0	12	3	0	0	0	3	0	9	0	0	9	24	107
	12:00 PM	0	0	0	0	0	0	2	3	0	5	0	0	0	0	0	0	14	0	0	14	19	117
	12:15 PM	1	0	0	0	1	3	10	2	0	15	0	0	0	0	0	0	13	1	0	14	30	127
	12:30 PM	0	0	3	0	3	1	16	0	0	17	3	0	0	0	3	0	11	0	0	11	34	127
	12:45 PM	0	0	1	0	1	0	18	1	0	19	1	0	0	0	1	0	13	0	0	13	34	122
	1:00 PM	0	0	0	0	0	1	10	1	0	12	1	0	0	0	1	0	16	0	0	16	29	118
	1:15 PM	0	0	0	0	0	1	11	0	0	12	1	0	0	0	1	0	17	0	0	17	30	108
	1:30 PM	0	0	1	0	1	0	9	1	0	10	1	0	0	0	1	0	17	0	0	17	29	106
	1:45 PM	1	0	0	0	1	1	13	1	0	15	0	0	0	0	0	1	13	0	0	14	30	106
PM Peak Period	2:00 PM	0	0	0	0	0	1	6	1	0	8	1	0	0	0	1	0	10	0	0	10	19	102
	2:15 PM	0	0	2	0	2	0	9	1	0	10	1	0	0	0	1	0	15	0	0	15	28	111
	2:30 PM	0	0	0	0	0	1	9	2	0	12	1	0	1	0	2	0	15	0	0	15	29	108
	2:45 PM	0	0	0	0	0	0	9	1	0	10	0	0	0	0	0	0	16	0	0	16	26	104
	3:00 PM	0	0	0	0	0	1	13	0	0	14	1	0	0	0	1	0	13	0	0	13	28	104
	3:15 PM	0	1	1	0	2	0	8	2	0	10	2	0	0	0	2	0	11	0	0	11	25	94
	3:30 PM	0	0	1	0	1	0	7	3	0	10	3	0	0	0	3	0	11	0	0	11	25	89
	3:45 PM	0	0	0	0	0	0	10	2	0	12	0	0	0	0	0	0	14	0	0	14	26	84
	4:00 PM	0	0	0	0	0	0	5	1	0	6	0	0	0	0	0	0	12	0	0	12	18	76
	4:15 PM	0	0	0	0	0	0	7	1	0	8	1	0	0	0	1	0	11	0	0	11	20	69
	4:30 PM	0	0	0	0	0	0	10	0	0	10	1	0	0	0	1	0	9	0	0	9	20	60
	4:45 PM	0	0	0	0	0	1	6	2	0	9	1	0	0	0	1	0	8	0	0	8	18	53
	5:00 PM	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	4	0	0	4	11	46
	5:15 PM	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	9	0	0	9	11	42
	5:30 PM	0	0	0	0	0	0	6	1	0	7	2	0	0	0	2	0	4	0	0	4	13	40
	5:45 PM	0	0	0	0	0	0	5	0	0	5	1	0	0	0	1	0	5	0	0	5	11	32
	6:00 PM	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	0	3	0	0	3	7	25
	6:15 PM	0	0	0	0	0	0	4	2	0	6	1	0	0	0	1	0	2	0	0	2	9	
	6:30 PM	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	0	2	0	0	2	5	
	6:45 PM	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	1	0	0	1	4	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		5	2	19	0	26	27	495	45	0	567	48	0	1	0	49	1	545	4	0	550	1192	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period	Start Time	From North (Wolf Road) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Wolf Road) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	Total Hourly Volume
AM	7:00 AM	1	0	0	0	1	2	70	3	0	75	5	0	0	0	5	0	42	1	0	43	124
MD	11:30 AM	1	0	0	0	1	3	43	7	0	53	4	0	0	0	4	0	52	2	0	54	112
PM	4:00 PM	0	0	0	0	0	1	28	4	0	33	3	0	0	0	3	0	40	0	0	40	76

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Base Information, Observed (6) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Richfield Parkway and STH 167 - Holy Hill Rd

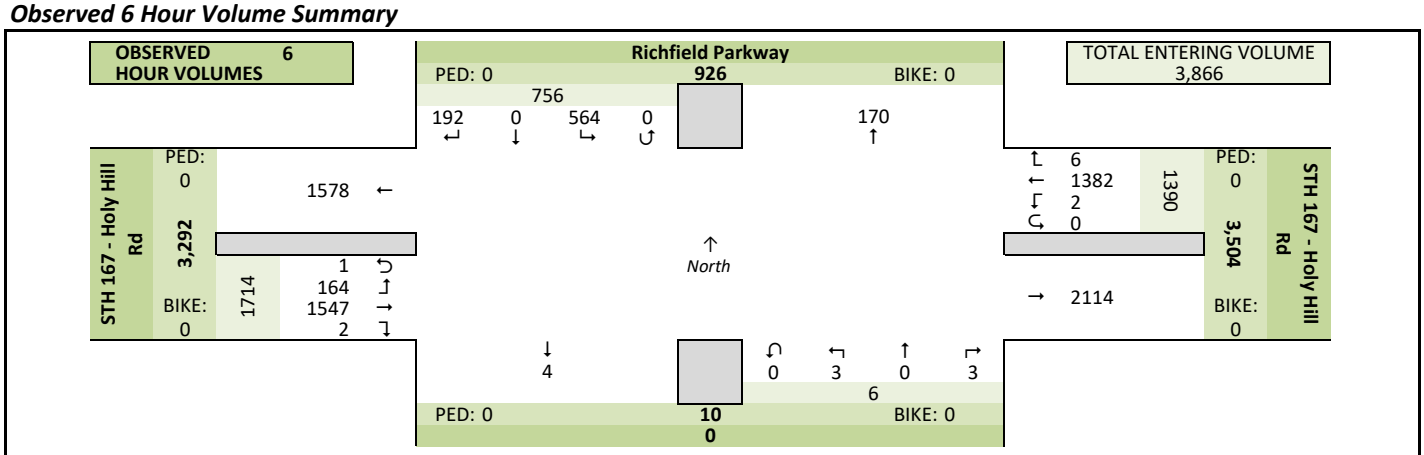
Site Information

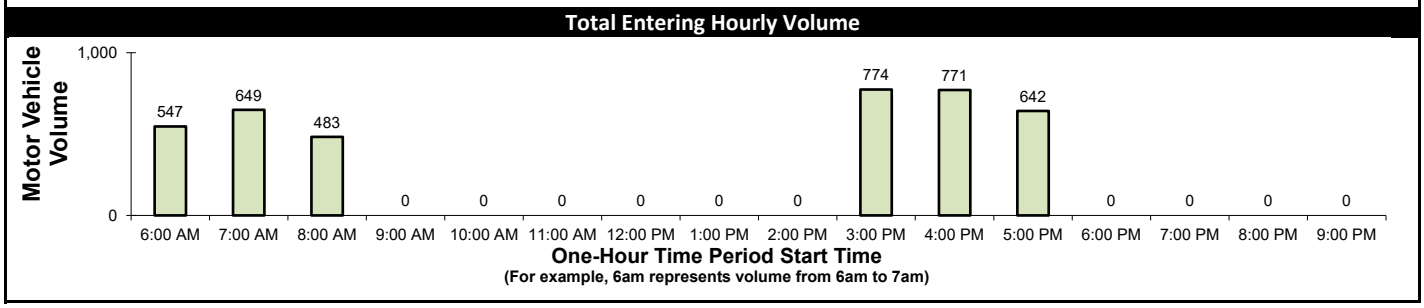
Municipality	Richfield		
County	Washington	WisDOT Region	SE
Traffic Control	Traffic Signal		
Roadway Names		North Direction	↑
North Leg	Richfield Parkway		
East Leg	STH 167 - Holy Hill Rd		
South Leg			
West Leg	STH 167 - Holy Hill Rd		
Special Considerations			
Schools	Not in Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementry school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None	None	

Count Information

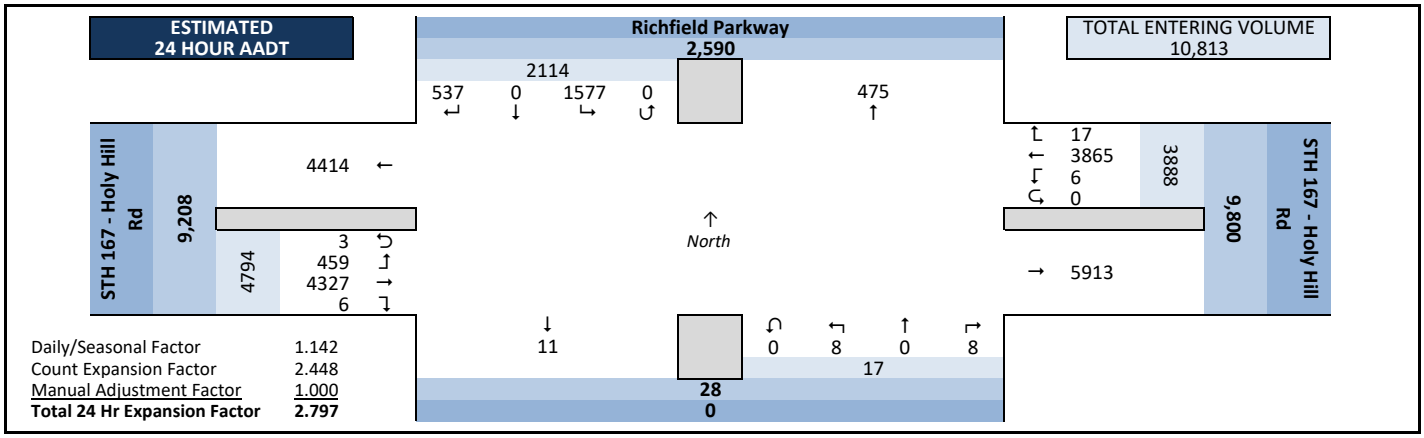
Hrs Counted:	6:00 AM-9:00 AM and 3:00 PM-6:00 PM				
1st Day of Count	Monday, March 23, 2020			Weather	
AM Peak Period	Tuesday, March 24, 2020			Clear & Dry	
Midday Peak Period					
PM Peak Period	Monday, March 23, 2020			Clear & Dry	
Calculated Peak Hours					
AM	7:00-8:00am	MD		PM	3:30-4:30pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD		PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(4) Rural Arterials & Collectors				
Count Expansion Group	(4) Rural Arterials & Collectors				
Daily/Seasonal Adjustment Factor	1.142	Count Expansion Factor	2.448		
Company Name	TADi			Manual Adj.	1.000
Observers	AM Peak Period	Amy Scheuerlein			
	Midday Peak Period				
	PM Peak Period	Amy Scheuerlein			
Comments	2018 DOT Seasonal Factors				

Observed 6 Hour Volume Summary





Estimated 24 Hour AADT



Daily/Seasonal Factor	1.142
Count Expansion Factor	2.448
Manual Adjustment Factor	1.000
Total 24 Hr Expansion Factor	**2.797**

Intersection Traffic Volume Report

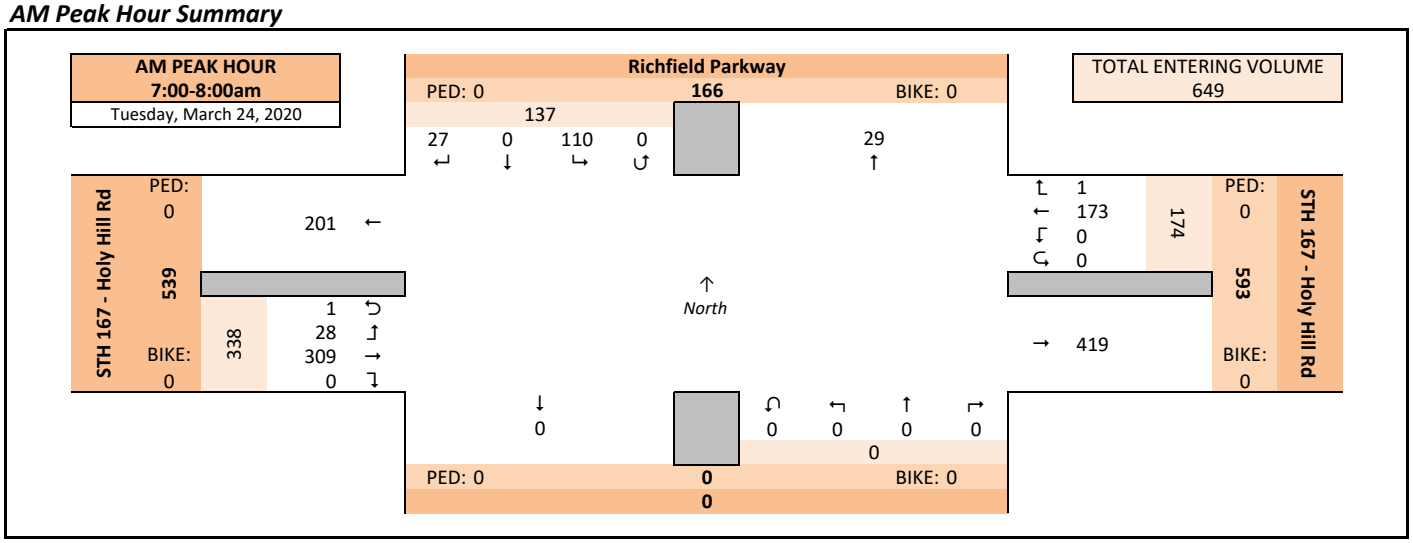
Count Basics			Page 2 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

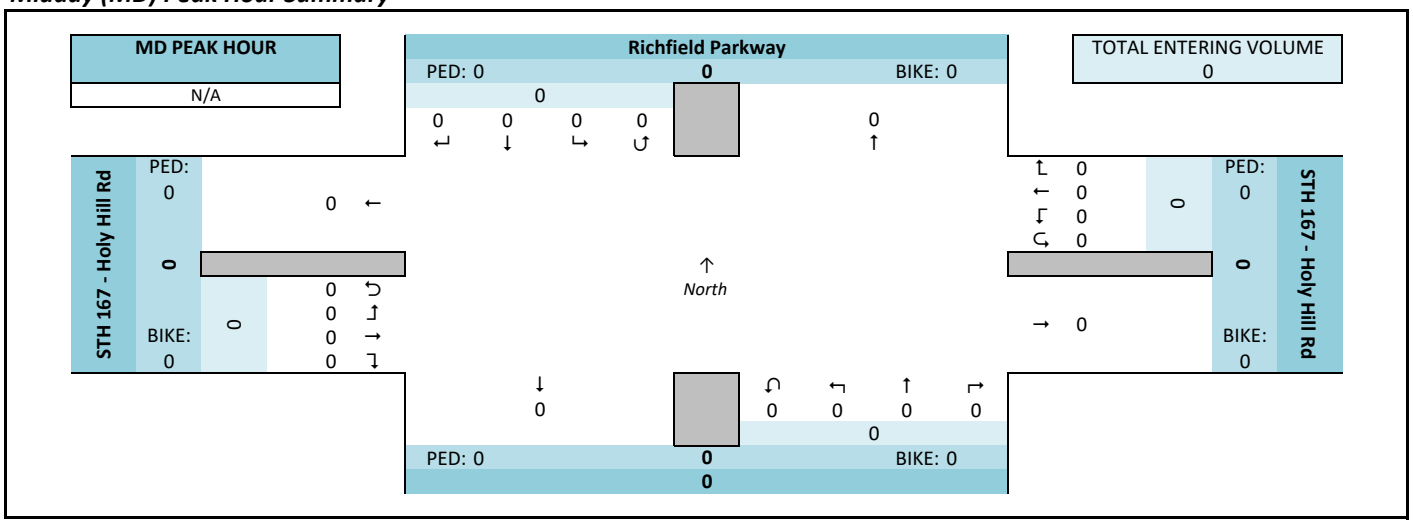
All Motor Vehicles

Richfield Parkway and STH 167 - Holy Hill Rd

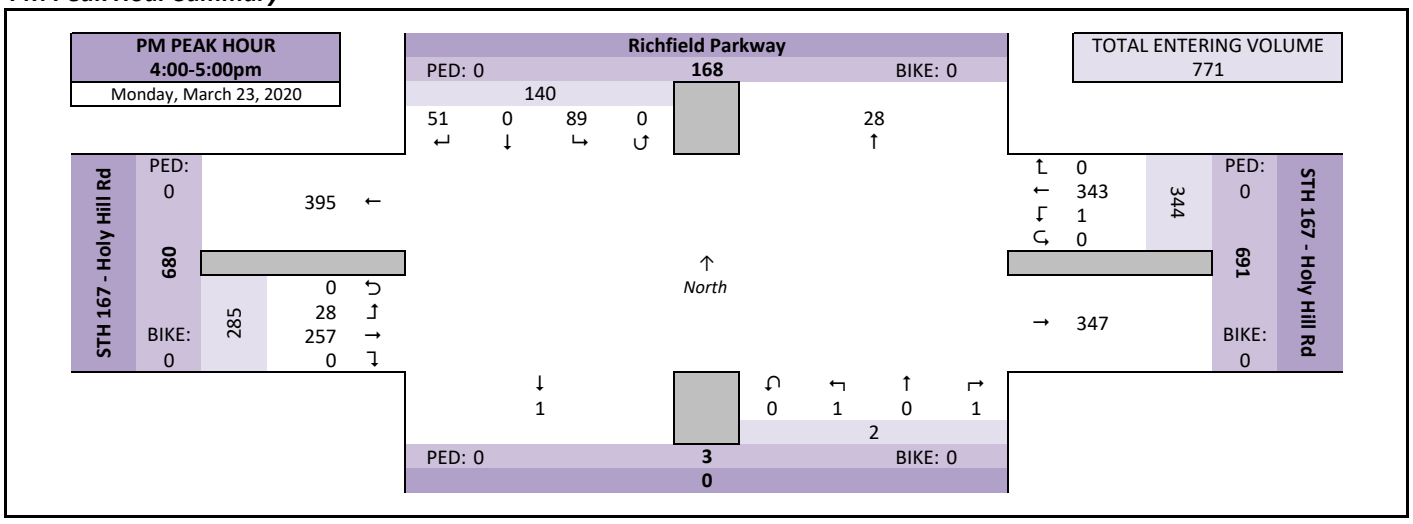
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			*Page 3 of 13*
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Richfield Parkway and STH 167 - Holy Hill Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Tuesday, March 24, 2020		From North					From East					From South					From West					
	AM Peak Hour	Richfield Parkway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	7	0	21	0	28	0	23	0	0	23	0	0	0	0	0	0	75	9	0	84	135
	7:15 AM	7	0	23	0	30	0	45	0	0	45	0	0	0	0	0	0	74	7	0	81	156
	7:30 AM	6	0	28	0	34	1	56	0	0	57	0	0	0	0	0	0	77	7	0	84	175
	7:45 AM	7	0	38	0	45	0	49	0	0	49	0	0	0	0	0	0	83	5	1	89	183
	Peak Hour Volume	27	0	110	0	137	1	173	0	0	174	0	0	0	0	0	0	309	28	1	338	649
	Rounded Hourly Volume	25	0	110	0	135	0	175	0	0	175	0	0	0	0	0	0	310	30	0	340	650
	% Single Unit Trucks	18.5	0.0	8.2	0.0	10.2	0.0	7.5	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	0.0	3.9	7.1	0.0	4.1	6.3
	% Heavy Trucks	3.7	0.0	16.4	0.0	13.9	0.0	1.2	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	2.3	3.6	0.0	2.4	4.5
	% Trucks (Total)	22.2	0.0	24.5	0.0	24.1	0.0	8.7	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0	6.1	10.7	0.0	6.5	10.8
	Peak Hour Factor (PHF)	0.96	0.00	0.72	0.00	0.76	0.25	0.77	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.78	0.25	0.95	0.89

N/A		From North					From East					From South					From West					
	MD Peak Hour	Richfield Parkway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monday, March 23, 2020		From North					From East					From South					From West					
	PM Peak Hour	Richfield Parkway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	14	0	18	0	32	0	74	0	0	74	0	0	0	0	0	0	54	8	0	62	168
	4:15 PM	13	0	29	0	42	0	92	0	0	92	1	0	0	0	1	0	64	10	0	74	209
	4:30 PM	11	0	18	0	29	0	90	1	0	91	0	0	1	0	1	0	75	3	0	78	199
	4:45 PM	13	0	24	0	37	0	87	0	0	87	0	0	0	0	0	0	64	7	0	71	195
	Peak Hour Volume	51	0	89	0	140	0	343	1	0	344	1	0	1	0	2	0	257	28	0	285	771
	Rounded Hourly Volume	50	0	90	0	140	0	345	0	0	345	0	0	0	0	0	0	255	30	0	285	770
	% Single Unit Trucks	2.0	0.0	1.1	0.0	1.4	0.0	2.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	4.7	3.6	0.0	4.6	3.2
	% Heavy Trucks	0.0	0.0	21.3	0.0	13.6	0.0	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.8	3.5
	% Trucks (Total)	2.0	0.0	22.5	0.0	15.0	0.0	3.8	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	6.6	3.6	0.0	6.3	6.7
	Peak Hour Factor (PHF)	0.91	0.00	0.77	0.00	0.83	0.00	0.93	0.25	0.00	0.93	0.25	0.00	0.25	0.00	0.50	0.00	0.86	0.70	0.00	0.91	0.92

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Richfield Parkway			STH 167 - Holy Hill Rd			0			STH 167 - Holy Hill Rd			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 13*
Start Date: Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Richfield Parkway and STH 167 - Holy Hill Rd

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Richfield Parkway)					From East (STH 167 - Holy Hill Rd)					From South (0)					From West (STH 167 - Holy Hill Rd)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	3	0	27	0	30	0	21	0	0	21	0	0	0	0	0	0	67	4	0	71	122	547	0.89
	6:15 AM	4	0	21	0	25	0	28	0	0	28	0	0	0	0	0	0	66	5	0	71	124	560	0.91
	6:30 AM	3	0	42	0	45	0	28	0	0	28	0	0	0	0	0	0	71	3	0	74	147	592	0.95
	6:45 AM	3	0	27	0	30	0	45	0	0	45	0	0	0	0	0	0	74	5	0	79	154	620	0.89
	7:00 AM	7	0	21	0	28	0	23	0	0	23	0	0	0	0	0	0	75	9	0	84	135	649	0.89
	7:15 AM	7	0	23	0	30	0	45	0	0	45	0	0	0	0	0	0	74	7	0	81	156	627	0.86
	7:30 AM	6	0	28	0	34	1	56	0	0	57	0	0	0	0	0	0	77	7	0	84	175	589	0.80
	7:45 AM	7	0	38	0	45	0	49	0	0	49	0	0	0	0	0	0	83	5	1	89	183	544	0.74
	8:00 AM	3	0	19	0	22	0	35	0	0	35	0	0	0	0	0	0	50	6	0	56	113	483	0.93
	8:15 AM	6	0	18	0	24	0	36	0	0	36	0	0	0	0	0	0	53	5	0	58	118		
	8:30 AM	3	0	18	0	21	0	44	0	0	44	0	0	0	0	0	0	62	3	0	65	130		
	8:45 AM	3	0	18	0	21	0	35	1	0	36	1	0	0	0	1	1	56	7	0	64	122		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	9	0	23	0	32	1	59	0	0	60	0	0	2	0	2	1	65	6	0	72	166	774	0.91
	3:15 PM	14	0	23	0	37	1	73	0	0	74	0	0	0	0	0	0	66	10	0	76	187	776	0.92
	3:30 PM	13	0	29	0	42	0	86	0	0	86	0	0	0	0	0	0	73	11	0	84	212	798	0.94
	3:45 PM	14	0	25	0	39	0	100	0	0	100	0	0	0	0	0	0	59	11	0	70	209	785	0.94
	4:00 PM	14	0	18	0	32	0	74	0	0	74	0	0	0	0	0	0	54	8	0	62	168	771	0.92
	4:15 PM	13	0	29	0	42	0	92	0	0	92	1	0	0	0	1	0	64	10	0	74	209	764	0.91
	4:30 PM	11	0	18	0	29	0	90	1	0	91	0	0	1	0	1	0	75	3	0	78	199	741	0.93
	4:45 PM	13	0	24	0	37	0	87	0	0	87	0	0	0	0	0	0	64	7	0	71	195	696	0.89
	5:00 PM	2	0	17	0	19	1	68	0	0	69	0	0	0	0	0	0	64	9	0	73	161	642	0.86
	5:15 PM	13	0	26	0	39	0	77	0	0	77	0	0	0	0	0	0	64	6	0	70	186		
	5:30 PM	11	0	18	0	29	0	65	0	0	65	0	0	0	0	0	0	47	13	0	60	154		
	5:45 PM	10	0	14	0	24	2	66	0	0	68	1	0	0	0	1	0	44	4	0	48	141		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		192	0	564	0	756	6	1382	2	0	1390	3	0	3	0	6	2	1547	164	1	1714	3866		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Richfield Parkway)					From East (STH 167 - Holy Hill Rd)					From South (0)					From West (STH 167 - Holy Hill Rd)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	27	0	110	0	137	1	173	0	0	174	0	0	0	0	0	0	309	28	1	338	649	0.89
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:00 PM	51	0	89	0	140	0	343	1	0	344	1	0	1	0	2	0	257	28	0	285	771	0.92

Intersection Traffic Volume Report

Count Basics			*Page 9 of 13*
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Richfield Parkway and STH 167 - Holy Hill Rd

15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time		↓ From North					← From East					↑ From South					→ From West					15-Min Totals	Hourly Sum
		Richfield Parkway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd						
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	0	8	0	8	0	2	0	0	2	0	0	0	0	0	0	1	1	0	2	12	57
	6:15 AM	0	0	4	0	4	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	10	63
	6:30 AM	1	0	11	0	12	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	18	65
	6:45 AM	0	0	8	0	8	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	17	67
	7:00 AM	3	0	8	0	11	0	1	0	0	1	0	0	0	0	0	0	4	2	0	6	18	70
	7:15 AM	1	0	4	0	5	0	5	0	0	5	0	0	0	0	0	0	2	0	0	2	12	65
	7:30 AM	2	0	7	0	9	0	4	0	0	4	0	0	0	0	0	0	6	1	0	7	20	78
	7:45 AM	0	0	8	0	8	0	5	0	0	5	0	0	0	0	0	0	7	0	0	7	20	81
	8:00 AM	0	0	3	0	3	0	6	0	0	6	0	0	0	0	0	0	4	0	0	4	13	81
	8:15 AM	2	0	9	0	11	0	8	0	0	8	0	0	0	0	0	0	6	0	0	6	25	
	8:30 AM	0	0	8	0	8	0	11	0	0	11	0	0	0	0	0	0	4	0	0	4	23	
	8:45 AM	1	0	7	0	8	0	4	0	0	4	0	0	0	0	0	0	6	2	0	8	20	
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3:00 PM	0	0	6	0	6	0	7	0	0	7	0	0	0	0	0	0	6	0	0	6	19	61
	3:15 PM	2	0	4	0	6	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	15	54
	3:30 PM	1	0	2	0	3	0	3	0	0	3	0	0	0	0	0	0	6	1	0	7	13	47
	3:45 PM	2	0	5	0	7	0	5	0	0	5	0	0	0	0	0	0	2	0	0	2	14	52
	4:00 PM	1	0	3	0	4	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	12	52
	4:15 PM	0	0	6	0	6	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	8	50
	4:30 PM	0	0	4	0	4	0	6	0	0	6	0	0	0	0	0	0	8	0	0	8	18	50
	4:45 PM	0	0	7	0	7	0	2	0	0	2	0	0	0	0	0	0	4	1	0	5	14	40
	5:00 PM	0	0	3	0	3	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	10	37
	5:15 PM	1	0	2	0	3	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	8	
	5:30 PM	1	0	1	0	2	0	3	0	0	3	0	0	0	0	0	0	2	1	0	3	8	
	5:45 PM	1	0	5	0	6	1	3	0	0	4	0	0	0	0	0	0	1	0	0	1	11	
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		19	0	133	0	152	1	101	0	0	102	0	0	0	0	0	0	95	9	0	104	358	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time		↓ From North					← From East					↑ From South					→ From West					Total Hourly Volume
		Richfield Parkway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	6	0	27	0	33	0	15	0	0	15	0	0	0	0	0	0	19	3	0	22	70
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	1	0	20	0	21	0	13	0	0	13	0	0	0	0	0	0	17	1	0	18	52

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Exxon Driveway and STH 167 - Holy Hill Road

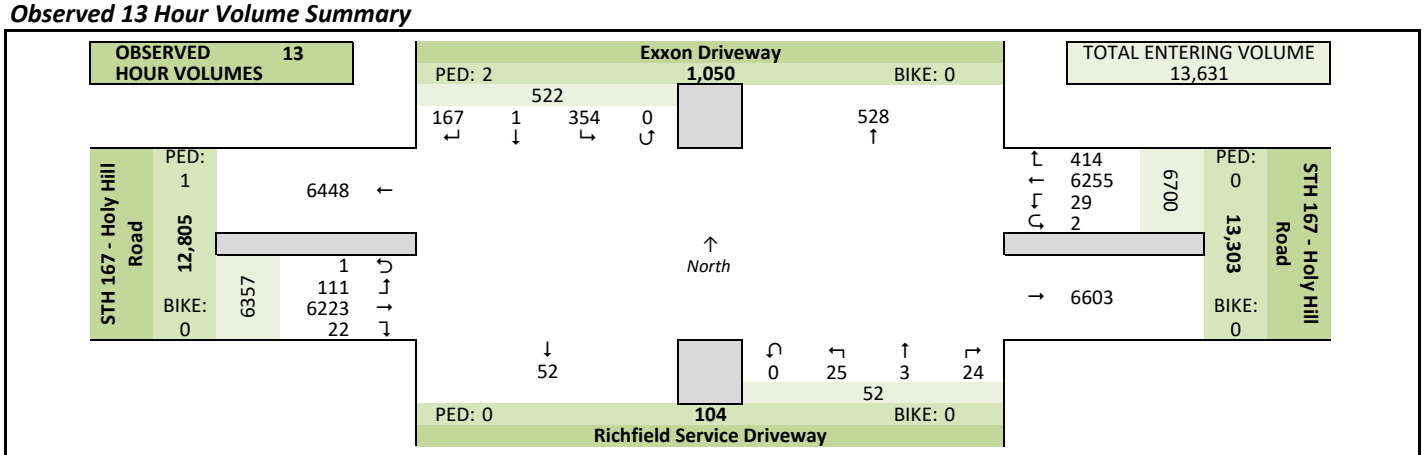
Site Information

Municipality	Village of Richfield		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	Exxon Driveway		
East Leg	STH 167 - Holy Hill Road		
South Leg	Richfield Service Driveway		
West Leg	STH 167 - Holy Hill Road		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children		None	
Elementry school age children		None	
Visually impaired (white cane/helper dog)		None	
Elderly/disabled (except wheelchairs)		None	
Wheelchairs/electric scooters		None	
Other (describe)	None	None	

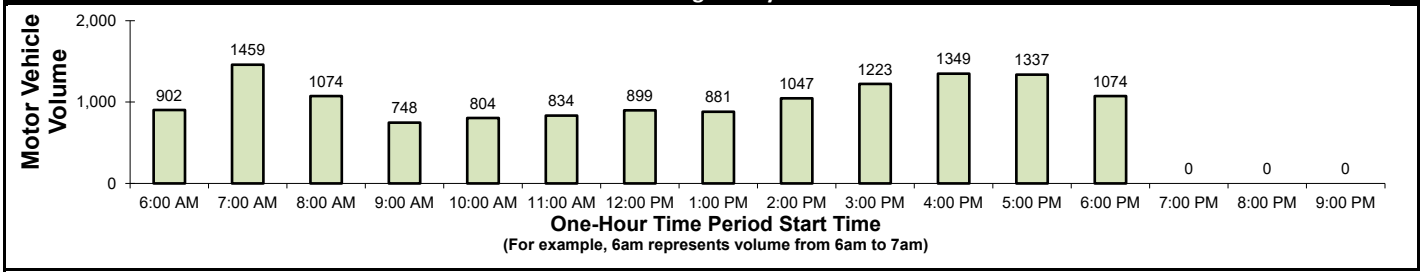
Count Information

Hrs Counted:	6:00 AM-7:00 PM				
1st Day of Count	Thursday, October 26, 2017			Weather	
AM Peak Period	Thursday, October 26, 2017			Clear & Dry	
Midday Peak Period	Thursday, October 26, 2017			Clear & Dry	
PM Peak Period	Thursday, October 26, 2017			Clear & Dry	
Calculated Peak Hours					
AM	7:15-8:15am	MD	11:30-12:30am	PM	4:30-5:30pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	11:30-12:30am	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.870		Count Expansion Factor	1.221	
Company Name	TADI, Inc.			Manual Adj.	1.000
Observers	AM Peak Period	Robert Lee			
	Midday Peak Period	Jeff Schleif			
	PM Peak Period	Larry Numerich			
Comments	2016 DOT Seasonal Factors				

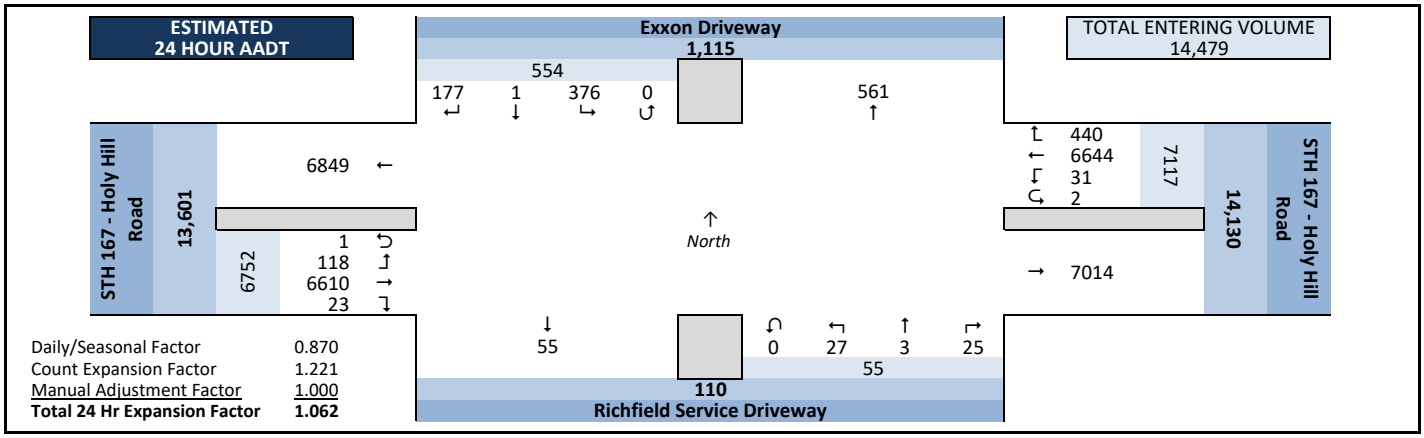
Observed 13 Hour Volume Summary



Total Entering Hourly Volume



Estimated 24 Hour AADT



Daily/Seasonal Factor	0.870
Count Expansion Factor	1.221
Manual Adjustment Factor	1.000
Total 24 Hr Expansion Factor	**1.062**

Intersection Traffic Volume Report

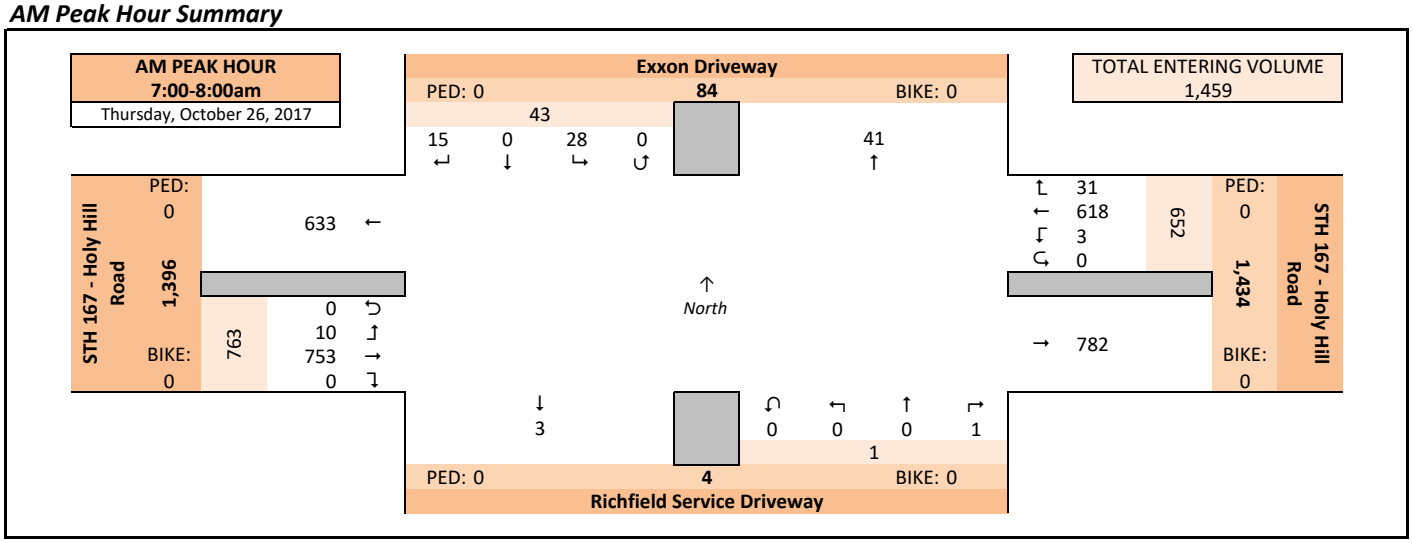
Count Basics			Page 2 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

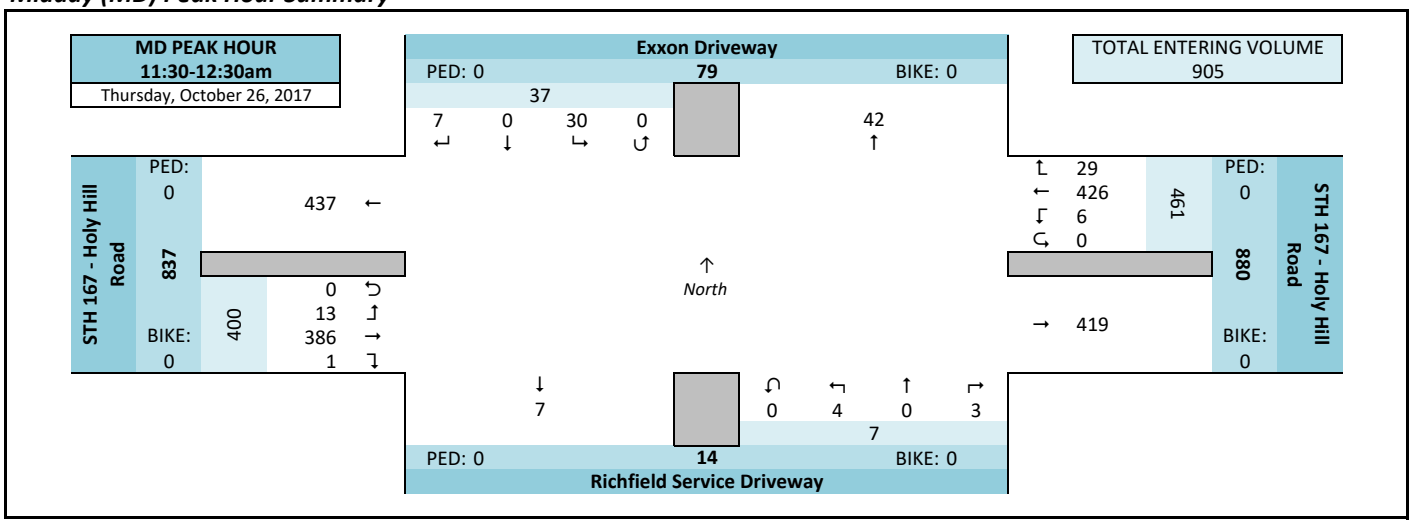
All Motor Vehicles

Exxon Driveway and STH 167 - Holy Hill Road

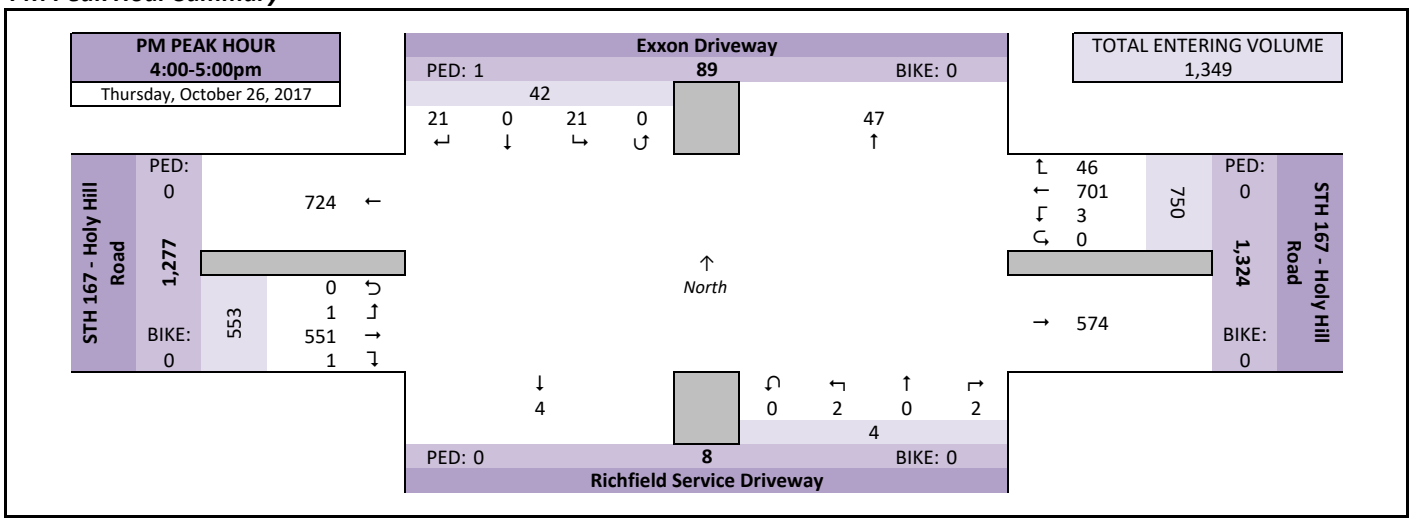
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Exxon Driveway and STH 167 - Holy Hill Road

Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, October 26, 2017		From North					From East					From South					From West					
	AM Peak Hour	Exxon Driveway					STH 167 - Holy Hill Road					Richfield Service Driveway					STH 167 - Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	3	0	10	0	13	5	83	0	0	88	0	0	0	0	0	0	180	2	0	182	283
	7:15 AM	7	0	5	0	12	10	135	0	0	145	0	0	0	0	0	0	173	2	0	175	332
	7:30 AM	1	0	7	0	8	8	184	0	0	192	0	0	0	0	0	0	218	2	0	220	420
	7:45 AM	4	0	6	0	10	8	216	3	0	227	1	0	0	0	1	0	182	4	0	186	424
	Peak Hour Volume	15	0	28	0	43	31	618	3	0	652	1	0	0	0	1	0	753	10	0	763	1459
	Rounded Hourly Volume	15	0	30	0	45	30	620	5	0	655	0	0	0	0	0	0	755	10	0	765	1465
	% Single Unit Trucks	26.7	0.0	28.6	0.0	27.9	22.6	10.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	3.7	10.0	0.0	3.8	7.5
	% Heavy Trucks	6.7	0.0	25.0	0.0	18.6	3.2	3.7	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8	2.6
	% Trucks (Total)	33.3	0.0	53.6	0.0	46.5	25.8	13.8	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	4.5	10.0	0.0	4.6	10.1
	Peak Hour Factor (PHF)	0.54	0.00	0.70	0.00	0.83	0.77	0.72	0.25	0.00	0.72	0.25	0.00	0.00	0.00	0.25	0.00	0.86	0.62	0.00	0.87	0.86

Thursday, October 26, 2017		From North					From East					From South					From West					
	MD Peak Hour	Exxon Driveway					STH 167 - Holy Hill Road					Richfield Service Driveway					STH 167 - Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	11:30 AM	2	0	5	0	7	9	103	0	0	112	1	0	0	0	1	0	97	6	0	103	223
	11:45 AM	2	0	11	0	13	6	112	2	0	120	1	0	0	0	1	0	93	4	0	97	231
	12:00 PM	1	0	6	0	7	7	97	3	0	107	1	0	1	0	2	0	106	2	0	108	224
	12:15 PM	2	0	8	0	10	7	114	1	0	122	0	0	3	0	3	1	90	1	0	92	227
	Peak Hour Volume	7	0	30	0	37	29	426	6	0	461	3	0	4	0	7	1	386	13	0	400	905
	Rounded Hourly Volume	5	0	30	0	35	30	425	5	0	460	5	0	5	0	10	0	385	15	0	400	905
	% Single Unit Trucks	42.9	0.0	16.7	0.0	21.6	13.8	8.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	10.9	38.5	0.0	11.7	10.3
	% Heavy Trucks	0.0	0.0	36.7	0.0	29.7	24.1	3.8	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	15.4	0.0	2.7	5.0
	% Trucks (Total)	42.9	0.0	53.3	0.0	51.4	37.9	11.7	0.0	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	13.2	53.8	0.0	14.5	15.2
	Peak Hour Factor (PHF)	0.87	0.00	0.68	0.00	0.71	0.81	0.93	0.50	0.00	0.94	0.75	0.00	0.33	0.00	0.58	0.25	0.91	0.54	0.00	0.93	0.98

Thursday, October 26, 2017		From North					From East					From South					From West					
	PM Peak Hour	Exxon Driveway					STH 167 - Holy Hill Road					Richfield Service Driveway					STH 167 - Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	3	0	5	0	8	15	159	1	0	175	0	0	2	0	2	1	141	0	0	142	327
	4:15 PM	10	0	4	0	14	19	169	1	0	189	1	0	0	0	1	0	129	0	0	129	333
	4:30 PM	5	0	7	0	12	6	182	0	0	188	0	0	0	0	0	0	146	1	0	147	347
	4:45 PM	3	0	5	0	8	6	191	1	0	198	1	0	0	0	1	0	135	0	0	135	342
	Peak Hour Volume	21	0	21	0	42	46	701	3	0	750	2	0	2	0	4	1	551	1	0	553	1349
	Rounded Hourly Volume	20	0	20	0	40	45	700	5	0	750	0	0	0	0	0	0	550	0	0	550	1340
	% Single Unit Trucks	23.8	0.0	9.5	0.0	16.7	13.0	3.6	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	7.1	5.7
	% Heavy Trucks	0.0	0.0	28.6	0.0	14.3	23.9	1.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.1	2.2
	% Trucks (Total)	23.8	0.0	38.1	0.0	31.0	37.0	4.6	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	8.1	7.9
	Peak Hour Factor (PHF)	0.52	0.00	0.75	0.00	0.75	0.61	0.92	0.75	0.00	0.95	0.50	0.00	0.25	0.00	0.50	0.25	0.94	0.25	0.00	0.94	0.97

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Exxon Driveway			STH 167 - Holy Hill Road			Richfield Service Driveway			STH 167 - Holy Hill Road			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	1	0	1	0	0	0	0	0	0	0	0	0	1
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	0	1	0	0	0	0	0	0	0	0	0	1

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Exxon Driveway and STH 167 - Holy Hill Road

15-Minute Motor Vehicle Data

	15-Minute Time Period Start Time	From North (Exxon Driveway) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Richfield Service Driveway) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum	PHF
AM Peak Period	6:00 AM	3	0	5	0	8	2	45	0	0	47	0	1	0	0	1	1	132	2	0	135	191	902	0.88
	6:15 AM	1	0	5	0	6	6	54	0	0	60	0	0	0	0	0	0	140	2	0	142	208	994	0.88
	6:30 AM	3	0	3	0	6	6	87	0	0	93	0	0	0	0	0	0	155	1	0	156	255	1118	0.84
	6:45 AM	5	0	2	0	7	14	70	0	0	84	0	0	0	0	0	0	154	3	0	157	248	1283	0.76
	7:00 AM	3	0	10	0	13	5	83	0	0	88	0	0	0	0	0	0	180	2	0	182	283	1459	0.86
	7:15 AM	7	0	5	0	12	10	135	0	0	145	0	0	0	0	0	0	173	2	0	175	332	1539	0.91
	7:30 AM	1	0	7	0	8	8	184	0	0	192	0	0	0	0	0	0	218	2	0	220	420	1483	0.87
	7:45 AM	4	0	6	0	10	8	216	3	0	227	1	0	0	0	1	0	182	4	0	186	424	1285	0.76
	8:00 AM	7	0	9	0	16	11	167	1	0	179	1	0	0	0	1	1	162	4	0	167	363	1074	0.74
	8:15 AM	2	1	11	0	14	9	118	1	0	128	1	0	0	0	1	0	132	1	0	133	276	918	0.83
	8:30 AM	5	0	4	0	9	8	84	0	0	92	0	2	0	0	2	0	117	2	0	119	222	831	0.94
	8:45 AM	3	0	9	0	12	5	84	1	0	90	1	0	0	0	1	0	109	1	0	110	213	796	0.93
	9:00 AM	1	0	9	0	10	11	79	0	0	90	0	0	0	0	0	0	106	1	0	107	207	748	0.90
	9:15 AM	1	0	7	0	8	6	80	0	0	86	0	0	0	0	0	0	92	3	0	95	189	736	0.94
	9:30 AM	8	0	9	0	17	4	64	1	0	69	0	0	0	0	0	0	94	7	0	101	187	760	0.89
	9:45 AM	1	0	6	0	7	9	51	0	0	60	0	0	0	0	0	0	95	3	0	98	165	746	0.88
Midday Peak Period	10:00 AM	5	0	5	0	10	7	69	1	0	77	0	0	0	0	0	1	106	1	0	108	195	804	0.90
	10:15 AM	0	0	4	0	4	7	92	0	0	99	1	0	1	0	2	0	105	2	1	108	213	787	0.88
	10:30 AM	1	0	13	0	14	7	58	0	0	65	0	0	3	0	3	1	87	3	0	91	173	776	0.87
	10:45 AM	4	0	9	0	13	8	97	1	0	106	0	0	0	0	0	0	101	3	0	104	223	826	0.93
	11:00 AM	2	0	7	0	9	8	84	1	0	93	0	0	0	0	0	0	74	2	0	76	178	834	0.90
	11:15 AM	2	0	9	0	11	5	100	1	0	106	0	0	1	0	1	0	82	2	0	84	202	880	0.95
	11:30 AM	2	0	5	0	7	9	103	0	0	112	1	0	0	0	1	0	97	6	0	103	223	905	0.98
	11:45 AM	2	0	11	0	13	6	112	2	0	120	1	0	0	0	1	0	93	4	0	97	231	895	0.97
	12:00 PM	1	0	6	0	7	7	97	3	0	107	1	0	1	0	2	0	106	2	0	108	224	899	0.96
	12:15 PM	2	0	8	0	10	7	114	1	0	122	0	0	3	0	3	1	90	1	0	92	227	899	0.96
	12:30 PM	2	0	10	0	12	12	88	0	0	100	2	0	1	0	3	3	93	2	0	98	213	871	0.93
	12:45 PM	8	0	6	0	14	9	111	1	0	121	1	0	0	0	1	0	97	2	0	99	235	894	0.95
	1:00 PM	1	0	13	0	14	7	91	2	0	100	1	0	0	0	1	1	103	5	0	109	224	881	0.93
	1:15 PM	2	0	3	0	5	8	89	2	0	99	1	0	0	0	1	2	90	2	0	94	199	880	0.93
	1:30 PM	4	0	13	0	17	8	92	1	0	101	1	0	3	0	4	0	112	2	0	114	236	923	0.95
	1:45 PM	3	0	6	0	9	3	105	0	0	108	2	0	1	0	3	0	101	1	0	102	222	994	0.81
PM Peak Period	2:00 PM	2	0	5	0	7	9	106	0	0	115	0	0	0	0	0	1	99	1	0	101	223	1047	0.85
	2:15 PM	2	0	12	0	14	12	101	0	0	113	0	0	2	0	2	1	109	3	0	113	242	1083	0.88
	2:30 PM	4	0	10	0	14	14	129	0	0	143	0	0	1	0	1	2	145	2	0	149	307	1176	0.88
	2:45 PM	3	0	9	0	12	8	135	0	0	143	0	0	2	0	2	1	116	1	0	118	275	1174	0.88
	3:00 PM	6	0	6	0	12	10	126	1	0	137	0	0	1	0	1	2	105	2	0	109	259	1223	0.91
	3:15 PM	4	0	7	0	11	7	166	0	0	173	0	0	0	0	0	0	151	0	0	151	335	1291	0.96
	3:30 PM	5	0	2	0	7	9	147	0	0	156	0	0	0	0	0	1	140	1	0	142	305	1289	0.97
	3:45 PM	4	0	4	0	8	5	174	1	1	181	3	0	0	0	3	1	128	3	0	132	324	1331	0.96
	4:00 PM	3	0	5	0	8	15	159	1	0	175	0	0	2	0	2	1	141	0	0	142	327	1349	0.97
	4:15 PM	10	0	4	0	14	19	169	1	0	189	1	0	0	0	1	0	129	0	0	129	333	1364	0.98
	4:30 PM	5	0	7	0	12	6	182	0	0	188	0	0	0	0	0	0	146	1	0	147	347	1388	0.97
	4:45 PM	3	0	5	0	8	6	191	1	0	198	1	0	0	0	1	0	135	0	0	135	342	1352	0.95
	5:00 PM	5	0	9	0	14	9	197	0	1	207	0	0	0	0	0	0	117	4	0	121	342	1337	0.94
	5:15 PM	2	0	6	0	8	6	204	0	0	210	1	0	0	0	1	0	136	2	0	138	357	1314	0.92
	5:30 PM	1	0	2	0	3	9	160	0	0	169	0	0	1	0	1	0	135	3	0	138	311	1257	0.96
	5:45 PM	3	0	8	0	11	9	187	0	0	196	0	0	1	0	1	0	116	3	0	119	327	1167	0.89
	6:00 PM	4	0	4	0	8	10	192	0	0	202	1	0	0	0	1	0	108	0	0	108	319	1074	0.84
	6:15 PM	2	0	8	0	10	7	174	0	0	181	0	0	0	0	0	0	106	3	0	109	300		
	6:30 PM	2	0	3	0	5	2	120	0	0	122	0	0	1	0	1	1	90	2	0	93	221		
	6:45 PM	1	0	3	0	4	2	133	1	0	136	1	0	0	0	1	0	93	0	0	93	234		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		167	1	354	0	522	414	6255	29	2	6700	24	3	25	0	52	22	6223	111	1	6357	13631		

Peak Hour All Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Exxon Driveway) Right	Thru	Left	U-Tn	Total	From East (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Richfield Service Driveway) Right	Thru	Left	U-Tn	Total	From West (STH 167 - Holy Hill Road) Right	Thru	Left	U-Tn	Total	Total Hourly Volume	PHF
AM	7:00 AM	15	0	28	0	43	31	618	3	0	652	1	0	0	0	1	0	753	10	0	763	1459	0.86
MD	11:30 AM	7	0	30	0	37	29	426	6	0	461	3	0	4	0	7	1	386	13	0	400	905	0.98
PM	4:00 PM	21	0	21	0	42	46	701	3	0	750	2	0	2	0	4	1	551	1	0	553	1349	0.97

Intersection Traffic Volume Report

Count Basics			*Page 9 of 11*
Start Date:	Thursday, October 26, 2017	Weekday	Schools in Session
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Exxon Driveway and STH 167 - Holy Hill Road

15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time		↓ From North: Exxon Driveway					← From East: STH 167 - Holy Hill Road					↑ From South: Richfield Service Driveway					→ From West: STH 167 - Holy Hill Road					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	1	0	1	0	2	0	5	0	0	5	0	0	0	0	0	1	7	0	0	8	15	62
	6:15 AM	0	0	0	0	0	1	8	0	0	9	0	0	0	0	0	0	6	0	0	6	15	72
	6:30 AM	0	0	1	0	1	1	6	0	0	7	0	0	0	0	0	0	5	0	0	5	13	88
	6:45 AM	0	0	1	0	1	7	4	0	0	11	0	0	0	0	0	0	6	1	0	7	19	117
	7:00 AM	2	0	6	0	8	0	14	0	0	14	0	0	0	0	0	0	3	0	0	3	25	148
	7:15 AM	2	0	5	0	7	4	12	0	0	16	0	0	0	0	0	0	8	0	0	8	31	161
	7:30 AM	0	0	4	0	4	3	22	0	0	25	0	0	0	0	0	0	13	0	0	13	42	158
	7:45 AM	1	0	0	0	1	1	37	0	0	38	0	0	0	0	0	0	10	1	0	11	50	149
	8:00 AM	1	0	2	0	3	2	25	0	0	27	0	0	0	0	0	0	8	0	0	8	38	130
	8:15 AM	0	0	2	0	2	1	14	1	0	16	0	0	0	0	0	0	10	0	0	10	28	121
	8:30 AM	0	0	4	0	4	3	16	0	0	19	0	2	0	0	2	0	7	1	0	8	33	117
	8:45 AM	0	0	5	0	5	1	12	0	0	13	0	0	0	0	0	0	13	0	0	13	31	113
	9:00 AM	1	0	4	0	5	4	9	0	0	13	0	0	0	0	0	0	11	0	0	11	29	93
	9:15 AM	0	0	4	0	4	2	7	0	0	9	0	0	0	0	0	0	11	0	0	11	24	100
	9:30 AM	1	0	5	0	6	0	12	0	0	12	0	0	0	0	0	0	11	0	0	11	29	108
	9:45 AM	0	0	1	0	1	2	4	0	0	6	0	0	0	0	0	0	4	0	0	4	11	117
Midday Peak Period	10:00 AM	2	0	2	0	4	4	8	0	0	12	0	0	0	0	0	1	19	0	0	20	36	148
	10:15 AM	0	0	1	0	1	5	15	0	0	20	0	0	0	0	0	0	11	0	0	11	32	145
	10:30 AM	0	0	7	0	7	3	12	0	0	15	0	0	3	0	3	0	12	1	0	13	38	143
	10:45 AM	0	0	4	0	4	3	14	0	0	17	0	0	0	0	0	0	20	1	0	21	42	151
	11:00 AM	0	0	4	0	4	2	14	0	0	16	0	0	0	0	0	0	13	0	0	13	33	141
	11:15 AM	1	0	3	0	4	1	10	0	0	11	0	0	0	0	0	0	13	2	0	15	30	132
	11:30 AM	0	0	3	0	3	4	21	0	0	25	0	0	0	0	0	0	15	3	0	18	46	138
	11:45 AM	1	0	6	0	7	1	12	0	0	13	0	0	0	0	0	0	9	3	0	12	32	136
	12:00 PM	0	0	3	0	3	2	5	0	0	7	0	0	0	0	0	0	14	0	0	14	24	144
	12:15 PM	2	0	4	0	6	4	12	0	0	16	0	0	0	0	0	0	13	1	0	14	36	156
	12:30 PM	0	0	5	0	5	4	16	0	0	20	1	0	1	0	2	2	14	1	0	17	44	157
	12:45 PM	3	0	2	0	5	6	15	0	0	21	0	0	0	0	0	0	12	2	0	14	40	153
	1:00 PM	0	0	5	0	5	1	11	0	0	12	0	0	0	0	0	0	19	0	0	19	36	142
	1:15 PM	0	0	3	0	3	6	12	0	0	18	0	0	0	0	0	1	14	1	0	16	37	132
	1:30 PM	0	0	7	0	7	3	7	0	0	10	0	0	3	0	3	0	19	1	0	20	40	128
	1:45 PM	0	0	1	0	1	0	15	0	0	15	0	0	0	0	0	0	13	0	0	13	29	126
PM Peak Period	2:00 PM	0	0	4	0	4	3	8	0	0	11	0	0	0	0	0	0	10	1	0	11	26	131
	2:15 PM	0	0	4	0	4	3	9	0	0	12	0	0	0	0	0	0	16	1	0	17	33	144
	2:30 PM	0	0	5	0	5	7	12	0	0	19	0	0	0	0	0	0	14	0	0	14	38	141
	2:45 PM	0	0	5	0	5	2	11	0	0	13	0	0	0	0	0	0	15	1	0	16	34	132
	3:00 PM	2	0	4	0	6	5	13	0	0	18	0	0	0	0	0	0	13	2	0	15	39	127
	3:15 PM	1	0	3	0	4	4	9	0	0	13	0	0	0	0	0	0	13	0	0	13	30	119
	3:30 PM	0	0	0	0	0	5	9	0	0	14	0	0	0	0	0	0	15	0	0	15	29	119
	3:45 PM	2	0	2	0	4	1	10	0	0	11	0	0	0	0	0	0	13	1	0	14	29	113
	4:00 PM	1	0	3	0	4	9	6	0	0	15	0	0	0	0	0	0	12	0	0	12	31	107
	4:15 PM	2	0	2	0	4	6	8	0	0	14	0	0	0	0	0	0	12	0	0	12	30	92
	4:30 PM	2	0	2	0	4	2	8	0	0	10	0	0	0	0	0	0	9	0	0	9	23	78
	4:45 PM	0	0	1	0	1	0	10	0	0	10	0	0	0	0	0	0	12	0	0	12	23	76
	5:00 PM	2	0	1	0	3	3	5	0	0	8	0	0	0	0	0	0	4	1	0	5	16	70
	5:15 PM	0	0	0	0	0	4	3	0	0	7	0	0	0	0	0	0	9	0	0	9	16	64
	5:30 PM	1	0	1	0	2	6	8	0	0	14	0	0	0	0	0	0	5	0	0	5	21	59
	5:45 PM	0	0	3	0	3	2	5	0	0	7	0	0	0	0	0	0	5	2	0	7	17	44
	6:00 PM	0	0	1	0	1	2	3	0	0	5	0	0	0	0	0	0	4	0	0	4	10	35
	6:15 PM	0	0	0	0	0	3	5	0	0	8	0	0	0	0	0	0	2	1	0	3	11	
	6:30 PM	0	0	2	0	2	1	1	0	0	2	0	0	0	0	0	0	2	0	0	2	6	
	6:45 PM	0	0	2	0	2	1	4	0	0	5	0	0	0	0	0	0	1	0	0	1	8	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		31	0	150	0	181	150	553	1	0	704	1	2	7	0	10	5	549	29	0	583	1478	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time		↓ From North: Exxon Driveway					← From East: STH 167 - Holy Hill Road					↑ From South: Richfield Service Driveway					→ From West: STH 167 - Holy Hill Road					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	5	0	15	0	20	8	85	0	0	93	0	0	0	0	0	0	34	1	0	35	148
MD	11:30 AM	3	0	16	0	19	11	50	0	0	61	0	0	0	0	0	0	51	7	0	58	138
PM	4:00 PM	5	0	8	0	13	17	32	0	0	49	0	0	0	0	0	0	45	0	0	45	107

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Base Information, Observed (6) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Kwik Trip Driveway and STH 167 - Holy Hill Rd

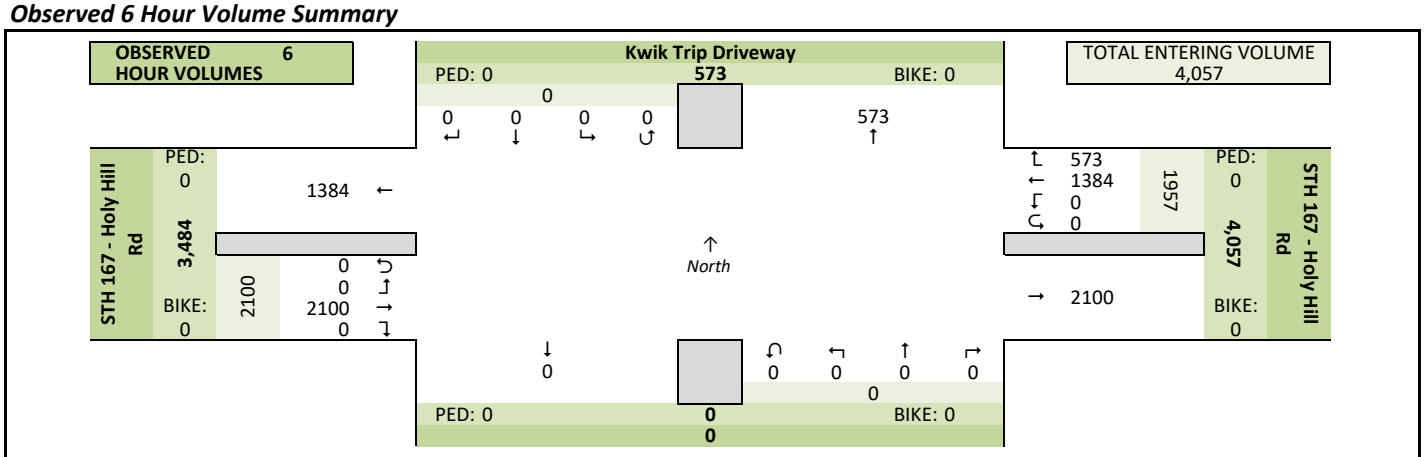
Site Information

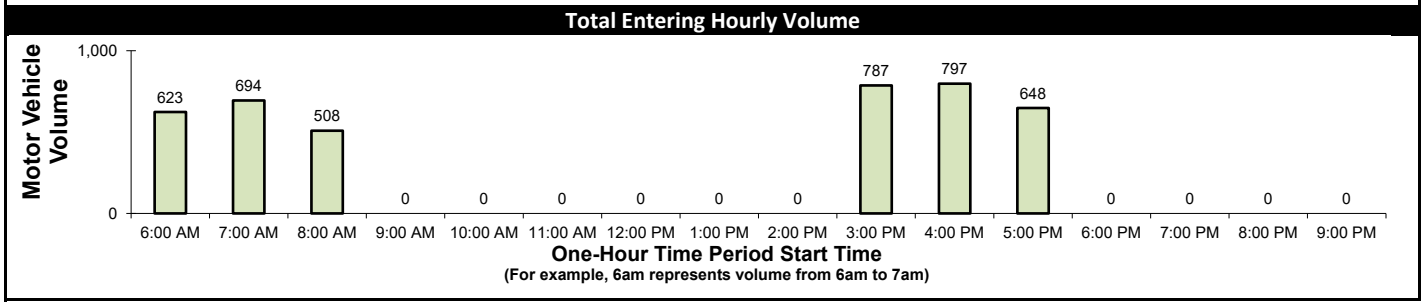
Municipality	Richfield		
County	Washington	WisDOT Region	SE
Traffic Control	Uncontrolled		
Roadway Names		North Direction	↑
North Leg	Kwik Trip Driveway		
East Leg	STH 167 - Holy Hill Rd		
South Leg			
West Leg	STH 167 - Holy Hill Rd		
Special Considerations			
Schools	Not in Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementry school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None	None	

Count Information

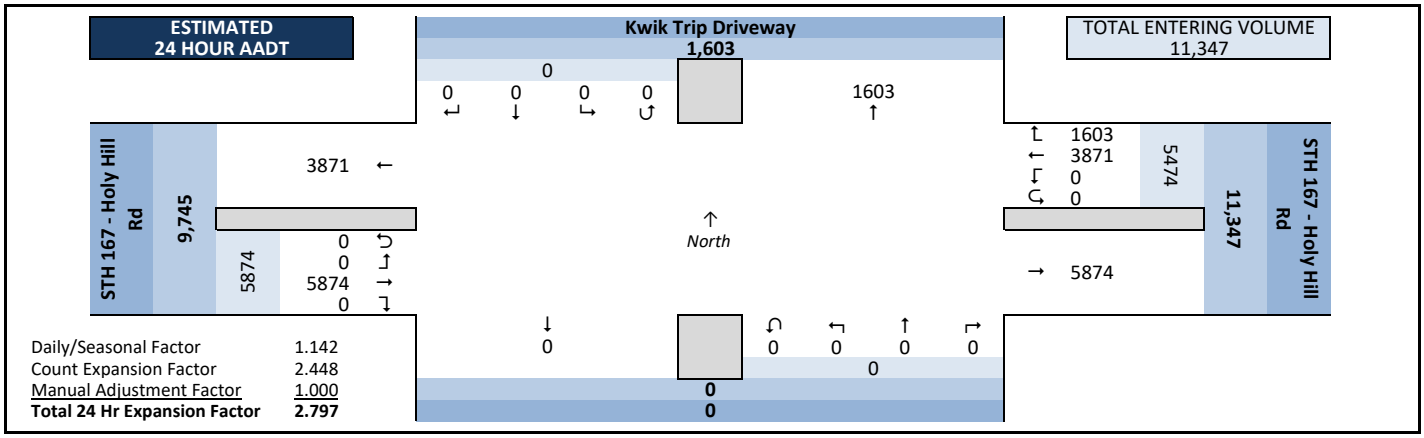
Hrs Counted:	6:00 AM-9:00 AM and 3:00 PM-6:00 PM				
1st Day of Count	Monday, March 23, 2020			Weather	
AM Peak Period	Tuesday, March 24, 2020			Clear & Dry	
Midday Peak Period					
PM Peak Period	Monday, March 23, 2020			Clear & Dry	
Calculated Peak Hours					
AM	7:00-8:00am	MD		PM	3:30-4:30pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD		PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(4) Rural Arterials & Collectors				
Count Expansion Group	(4) Rural Arterials & Collectors				
Daily/Seasonal Adjustment Factor	1.142	Count Expansion Factor	2.448		
Company Name	TADi			Manual Adj.	1.000
Observers	AM Peak Period	Lee Oestreich			
	Midday Peak Period				
	PM Peak Period	JK Bieberitz			
Comments	2018 DOT Seasonal Factors				

Observed 6 Hour Volume Summary





Estimated 24 Hour AADT



Intersection Traffic Volume Report

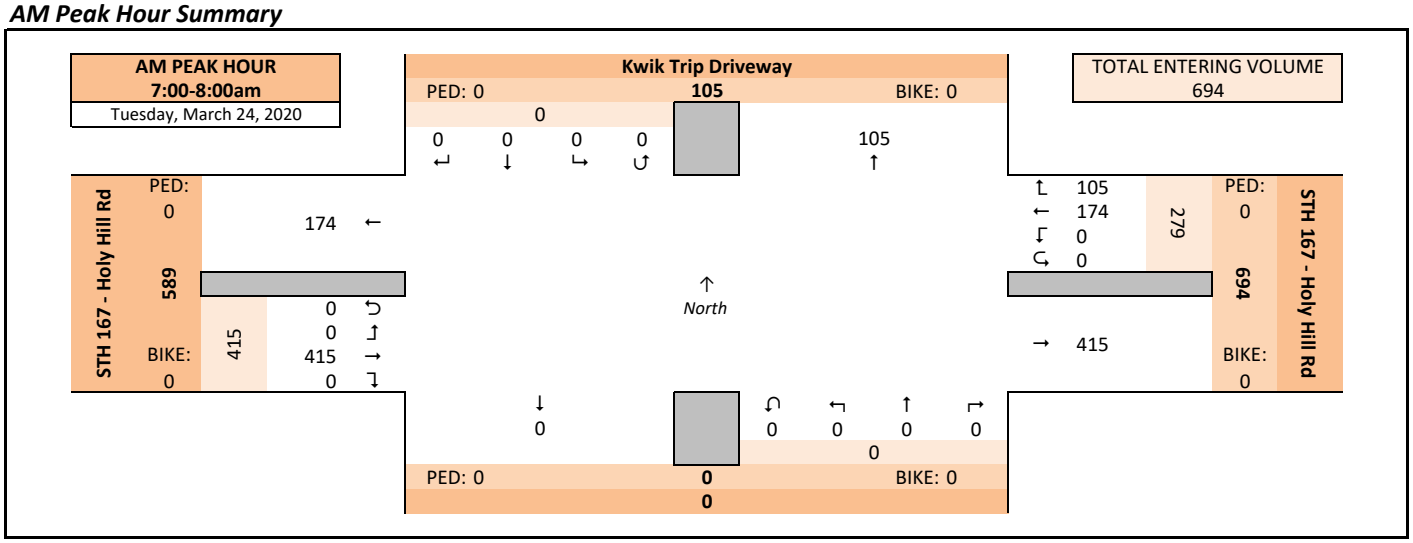
Count Basics			Page 2 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

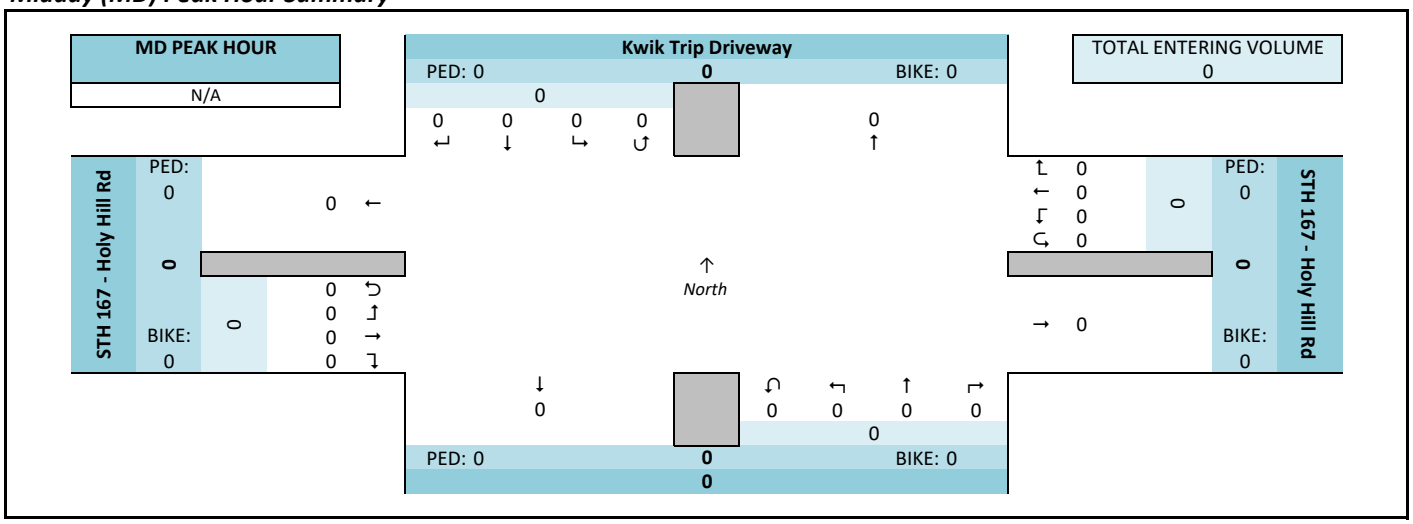
All Motor Vehicles

Kwik Trip Driveway and STH 167 - Holy Hill Rd

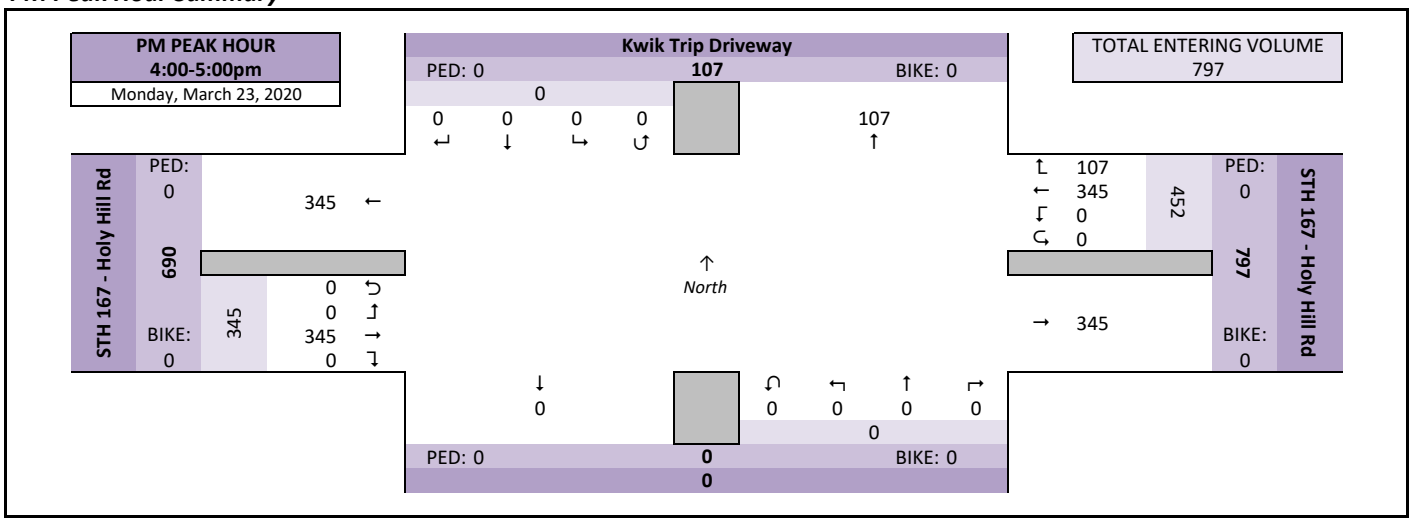
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics		*Page 3 of 13*
Start Date: Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6	Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Kwik Trip Driveway and STH 167 - Holy Hill Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Tuesday, March 24, 2020		From North					From East					From South					From West					
	AM Peak Hour	Kwik Trip Driveway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	0	0	0	0	0	24	23	0	0	47	0	0	0	0	0	0	98	0	0	98	145
	7:15 AM	0	0	0	0	0	25	47	0	0	72	0	0	0	0	0	0	94	0	0	94	166
	7:30 AM	0	0	0	0	0	30	55	0	0	85	0	0	0	0	0	0	104	0	0	104	189
	7:45 AM	0	0	0	0	0	26	49	0	0	75	0	0	0	0	0	0	119	0	0	119	194
	Peak Hour Volume	0	0	0	0	0	105	174	0	0	279	0	0	0	0	0	0	415	0	0	415	694
	Rounded Hourly Volume	0	0	0	0	0	105	175	0	0	280	0	0	0	0	0	0	415	0	0	415	695
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	11.4	7.5	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	5.3	6.8
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	10.5	1.1	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	5.5	5.2
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	21.9	8.6	0.0	0.0	13.6	0.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	0.0	10.8	12.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.87	0.79	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.87	0.89

N/A		From North					From East					From South					From West					
	MD Peak Hour	Kwik Trip Driveway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monday, March 23, 2020		From North					From East					From South					From West					
	PM Peak Hour	Kwik Trip Driveway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	0	0	0	0	0	34	74	0	0	108	0	0	0	0	0	0	71	0	0	71	179
	4:15 PM	0	0	0	0	0	29	92	0	0	121	0	0	0	0	0	0	92	0	0	92	213
	4:30 PM	0	0	0	0	0	23	93	0	0	116	0	0	0	0	0	0	95	0	0	95	211
	4:45 PM	0	0	0	0	0	21	86	0	0	107	0	0	0	0	0	0	87	0	0	87	194
	Peak Hour Volume	0	0	0	0	0	107	345	0	0	452	0	0	0	0	0	0	345	0	0	345	797
	Rounded Hourly Volume	0	0	0	0	0	105	345	0	0	450	0	0	0	0	0	0	345	0	0	345	795
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	2.8	2.9	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	4.6	3.6
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	10.3	0.9	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	6.1	4.4
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	13.1	3.8	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	0.0	0.0	10.7	8.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.79	0.93	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.91	0.94

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Kwik Trip Driveway			STH 167 - Holy Hill Rd			0			STH 167 - Holy Hill Rd			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 13*
Start Date: Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Kwik Trip Driveway and STH 167 - Holy Hill Rd

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		↓ From North: Kwik Trip Driveway					← From East: STH 167 - Holy Hill Rd					↑ From South: 0					→ From West: STH 167 - Holy Hill Rd					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	19	22	0	0	41	0	0	0	0	0	0	94	0	0	94	135	623	0.91
	6:15 AM	0	0	0	0	0	38	28	0	0	66	0	0	0	0	0	0	82	0	0	82	148	633	0.92
	6:30 AM	0	0	0	0	0	33	27	0	0	60	0	0	0	0	0	0	112	0	0	112	172	651	0.95
	6:45 AM	0	0	0	0	0	21	46	0	0	67	0	0	0	0	0	0	101	0	0	101	168	668	0.88
	7:00 AM	0	0	0	0	0	24	23	0	0	47	0	0	0	0	0	0	98	0	0	98	145	694	0.89
	7:15 AM	0	0	0	0	0	25	47	0	0	72	0	0	0	0	0	0	94	0	0	94	166	672	0.87
	7:30 AM	0	0	0	0	0	30	55	0	0	85	0	0	0	0	0	0	104	0	0	104	189	626	0.81
	7:45 AM	0	0	0	0	0	26	49	0	0	75	0	0	0	0	0	0	119	0	0	119	194	574	0.74
	8:00 AM	0	0	0	0	0	18	35	0	0	53	0	0	0	0	0	0	70	0	0	70	123	508	0.93
	8:15 AM	0	0	0	0	0	14	34	0	0	48	0	0	0	0	0	0	72	0	0	72	120		
	8:30 AM	0	0	0	0	0	14	44	0	0	58	0	0	0	0	0	0	79	0	0	79	137		
	8:45 AM	0	0	0	0	0	19	36	0	0	55	0	0	0	0	0	0	73	0	0	73	128		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	0	0	0	27	57	0	0	84	0	0	0	0	0	0	86	0	0	86	170	787	0.93
	3:15 PM	0	0	0	0	0	31	74	0	0	105	0	0	0	0	0	0	90	0	0	90	195	796	0.94
	3:30 PM	0	0	0	0	0	26	86	0	0	112	0	0	0	0	0	0	100	0	0	100	212	814	0.96
	3:45 PM	0	0	0	0	0	24	99	0	0	123	0	0	0	0	0	0	87	0	0	87	210	813	0.95
	4:00 PM	0	0	0	0	0	34	74	0	0	108	0	0	0	0	0	0	71	0	0	71	179	797	0.94
	4:15 PM	0	0	0	0	0	29	92	0	0	121	0	0	0	0	0	0	92	0	0	92	213	789	0.93
	4:30 PM	0	0	0	0	0	23	93	0	0	116	0	0	0	0	0	0	95	0	0	95	211	764	0.91
	4:45 PM	0	0	0	0	0	21	86	0	0	107	0	0	0	0	0	0	87	0	0	87	194	712	0.92
	5:00 PM	0	0	0	0	0	21	69	0	0	90	0	0	0	0	0	0	81	0	0	81	171	648	0.86
	5:15 PM	0	0	0	0	0	23	77	0	0	100	0	0	0	0	0	0	88	0	0	88	188		
	5:30 PM	0	0	0	0	0	25	65	0	0	90	0	0	0	0	0	0	69	0	0	69	159		
	5:45 PM	0	0	0	0	0	8	66	0	0	74	0	0	0	0	0	0	56	0	0	56	130		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		0	0	0	0	0	573	1384	0	0	1957	0	0	0	0	0	0	2100	0	0	2100	4057		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		↓ From North: Kwik Trip Driveway					← From East: STH 167 - Holy Hill Rd					↑ From South: 0					→ From West: STH 167 - Holy Hill Rd					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	0	0	0	0	0	105	174	0	0	279	0	0	0	0	0	0	415	0	0	415	694	0.89
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:00 PM	0	0	0	0	0	107	345	0	0	452	0	0	0	0	0	0	345	0	0	345	797	0.94

Intersection Traffic Volume Report

Count Basics			*Page 9 of 13*
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Kwik Trip Driveway and STH 167 - Holy Hill Rd

15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time		↓ From North					← From East					↑ From South					→ From West					15-Min Totals	Hourly Sum
		Kwik Trip Driveway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd						
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	0	0	0	0	5	2	0	0	7	0	0	0	0	0	0	10	0	0	10	17	86
	6:15 AM	0	0	0	0	0	9	3	0	0	12	0	0	0	0	0	0	8	0	0	8	20	88
	6:30 AM	0	0	0	0	0	8	3	0	0	11	0	0	0	0	0	0	14	0	0	14	25	87
	6:45 AM	0	0	0	0	0	8	5	0	0	13	0	0	0	0	0	0	11	0	0	11	24	83
	7:00 AM	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	13	0	0	13	19	83
	7:15 AM	0	0	0	0	0	8	5	0	0	13	0	0	0	0	0	0	6	0	0	6	19	87
	7:30 AM	0	0	0	0	0	4	4	0	0	8	0	0	0	0	0	0	13	0	0	13	21	99
	7:45 AM	0	0	0	0	0	6	5	0	0	11	0	0	0	0	0	0	13	0	0	13	24	107
	8:00 AM	0	0	0	0	0	8	6	0	0	14	0	0	0	0	0	0	9	0	0	9	23	104
	8:15 AM	0	0	0	0	0	8	8	0	0	16	0	0	0	0	0	0	15	0	0	15	31	
	8:30 AM	0	0	0	0	0	6	11	0	0	17	0	0	0	0	0	0	12	0	0	12	29	
	8:45 AM	0	0	0	0	0	5	4	0	0	9	0	0	0	0	0	0	12	0	0	12	21	
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3:00 PM	0	0	0	0	0	5	7	0	0	12	0	0	0	0	0	0	12	0	0	12	24	79
	3:15 PM	0	0	0	0	0	6	5	0	0	11	0	0	0	0	0	0	8	0	0	8	19	71
	3:30 PM	0	0	0	0	0	5	3	0	0	8	0	0	0	0	0	0	9	0	0	9	17	65
	3:45 PM	0	0	0	0	0	6	5	0	0	11	0	0	0	0	0	0	8	0	0	8	19	70
	4:00 PM	0	0	0	0	0	5	4	0	0	9	0	0	0	0	0	0	7	0	0	7	16	64
	4:15 PM	0	0	0	0	0	4	1	0	0	5	0	0	0	0	0	0	8	0	0	8	13	64
	4:30 PM	0	0	0	0	0	4	6	0	0	10	0	0	0	0	0	0	12	0	0	12	22	62
	4:45 PM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	10	0	0	10	13	52
	5:00 PM	0	0	0	0	0	6	3	0	0	9	0	0	0	0	0	0	7	0	0	7	16	52
	5:15 PM	0	0	0	0	0	4	2	0	0	6	0	0	0	0	0	0	5	0	0	5	11	
	5:30 PM	0	0	0	0	0	6	3	0	0	9	0	0	0	0	0	0	3	0	0	3	12	
	5:45 PM	0	0	0	0	0	4	3	0	0	7	0	0	0	0	0	0	6	0	0	6	13	
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		0	0	0	0	0	136	101	0	0	237	0	0	0	0	0	0	231	0	0	231	468	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time		↓ From North					← From East					↑ From South					→ From West					Total Hourly Volume
		Kwik Trip Driveway					STH 167 - Holy Hill Rd					0					STH 167 - Holy Hill Rd					
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	0	0	0	0	0	23	15	0	0	38	0	0	0	0	0	0	45	0	0	45	83
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	14	13	0	0	27	0	0	0	0	0	0	37	0	0	37	64

Intersection Traffic Volume Report

Count Basics	Version 2011.M3		Page 1 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: I41/USH41/USH45 SB Ramps & STH167/Holy Hill Rd

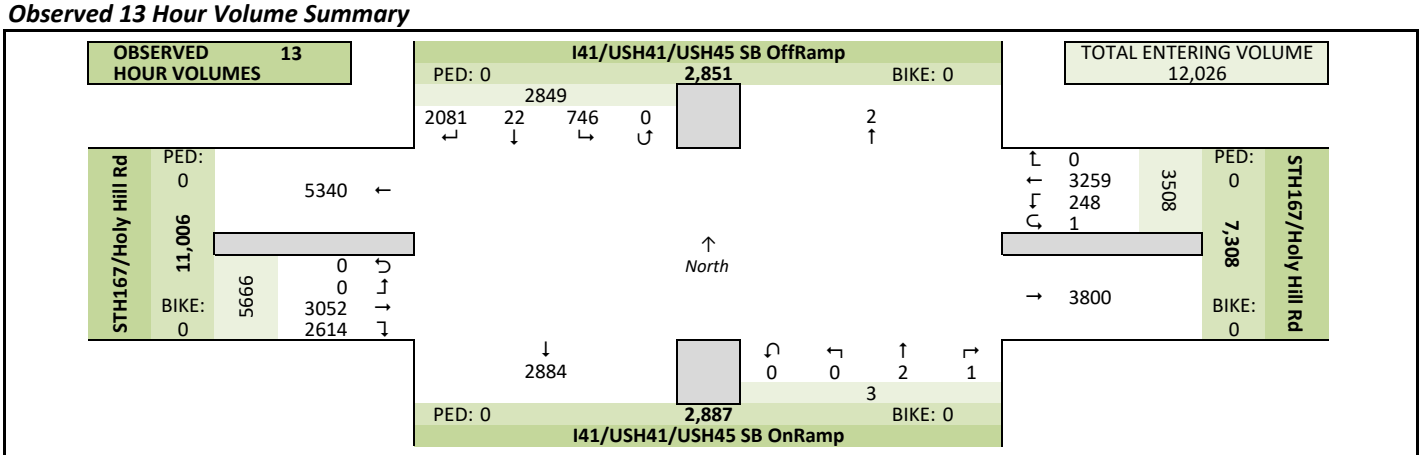
Site Information

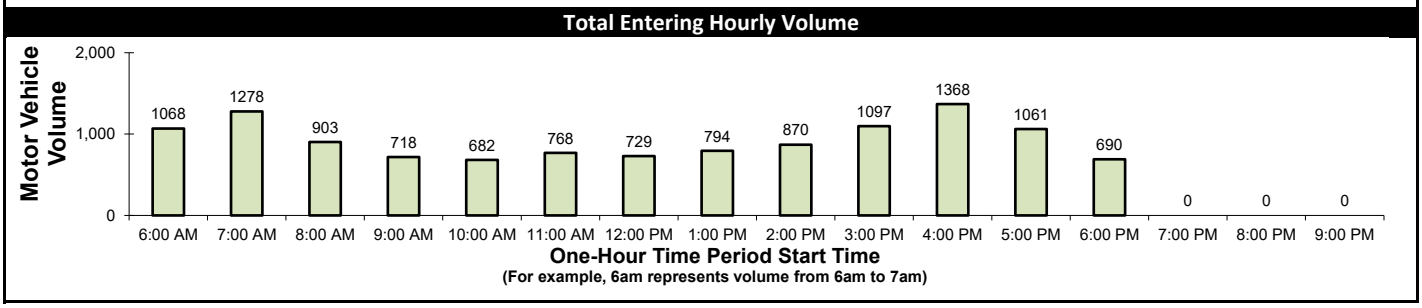
Municipality	Village - Germantown		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	I41/USH41/USH45 SB OffRamp		
East Leg	STH167/Holy Hill Rd		
South Leg	I41/USH41/USH45 SB OnRamp		
West Leg	STH167/Holy Hill Rd		
Special Considerations			
Schools	Unknown		
Holidays			
Special Events	None		
Roadway Names			
Pre-school children		None	
Elementry school age children		None	
Visually impaired (white cane/helper dog)		None	
Elderly/disabled (except wheelchairs)		None	
Wheelchairs/electric scooters		None	
Other (describe)	None	None	

Count Information

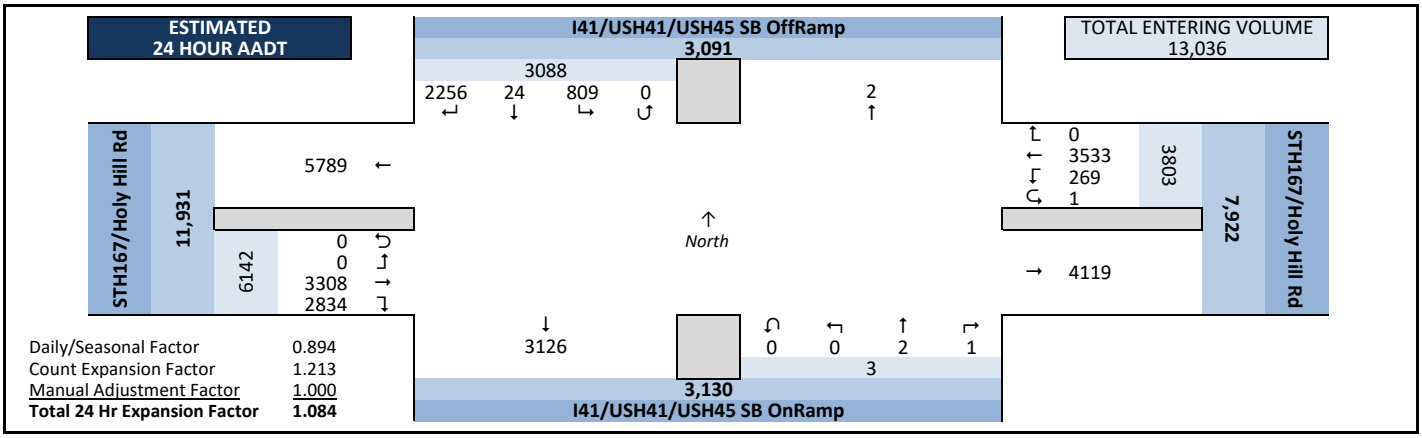
Hrs Counted:	6:00 AM-7:00 PM				
1st Day of Count	Tuesday, August 28, 2018			Weather	
AM Peak Period	Tuesday, August 28, 2018			Clear & Dry	
Midday Peak Period	Tuesday, August 28, 2018			Clear & Dry	
PM Peak Period	Tuesday, August 28, 2018			Clear & Dry	
Calculated Peak Hours					
AM	6:45-7:45am	MD	12:45-1:45pm	PM	4:00-5:00pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	12:45-1:45pm	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.894		Count Expansion Factor	1.213	
Company Name	DLZ			Manual Adj.	1.000
Observers	AM Peak Period	Miovision Video Recording			
	Midday Peak Period	Miovision Video Recording			
	PM Peak Period	Miovision Video Recording			
Comments	2016 DOT Seasonal Factors				

Observed 13 Hour Volume Summary





Estimated 24 Hour AADT



Daily/Seasonal Factor	0.894
Count Expansion Factor	1.213
Manual Adjustment Factor	1.000
Total 24 Hr Expansion Factor	**1.084**

Intersection Traffic Volume Report

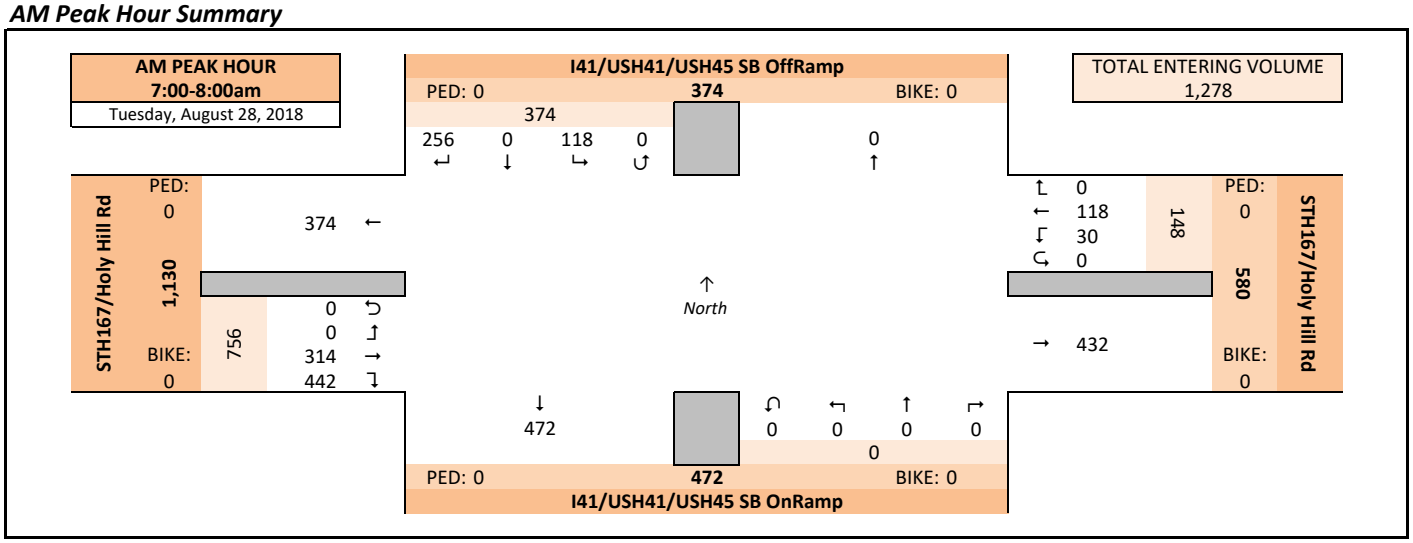
Count Basics			Page 2 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

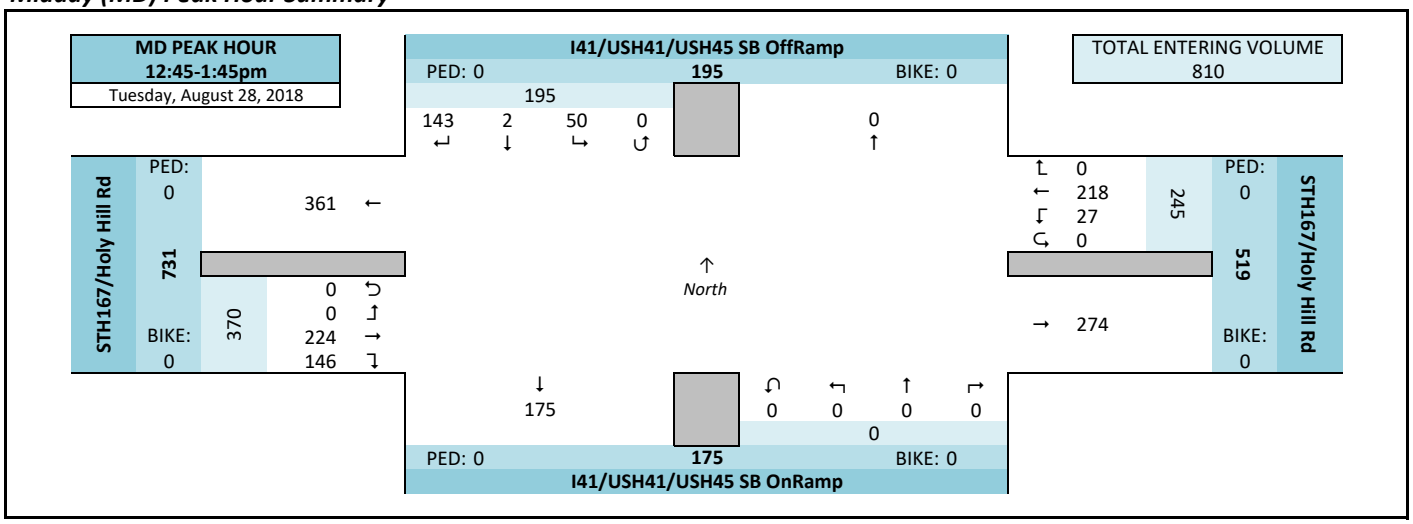
All Motor Vehicles

I41/USH41/USH45 SB Ramps & STH167/Holy Hill Rd

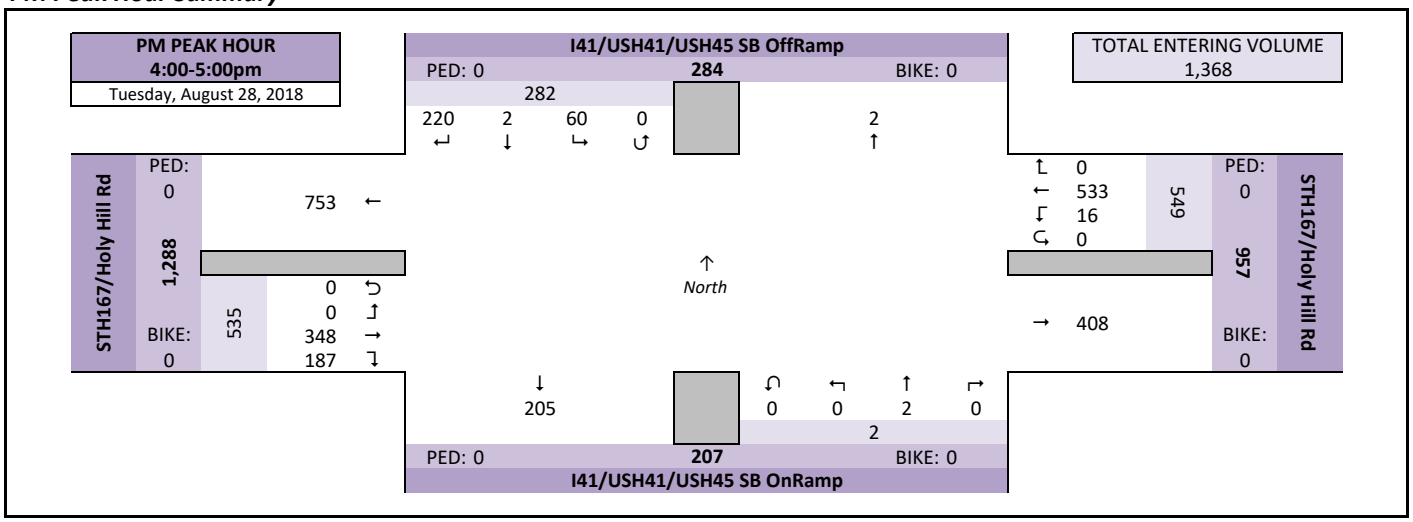
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

I41/USH41/USH45 SB Ramps & STH167/Holy Hill Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Tuesday, August 28, 2018		From North					From East					From South					From West					
	AM Peak Hour	I41/USH41/USH45 SB OffRamp					STH167/Holy Hill Rd					I41/USH41/USH45 SB OnRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	68	0	31	0	99	0	19	13	0	32	0	0	0	0	0	118	87	0	0	205	336
	7:15 AM	69	0	30	0	99	0	40	3	0	43	0	0	0	0	0	117	67	0	0	184	326
	7:30 AM	63	0	18	0	81	0	33	6	0	39	0	0	0	0	0	112	88	0	0	200	320
	7:45 AM	56	0	39	0	95	0	26	8	0	34	0	0	0	0	0	95	72	0	0	167	296
	Peak Hour Volume	256	0	118	0	374	0	118	30	0	148	0	0	0	0	0	442	314	0	0	756	1278
	Rounded Hourly Volume	255	0	120	0	375	0	120	30	0	150	0	0	0	0	0	440	315	0	0	755	1280
	% Single Unit Trucks	5.5	0.0	0.0	0.0	3.7	0.0	5.9	10.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	1.8	2.9	0.0	0.0	2.2	3.2
	% Heavy Trucks	2.0	0.0	1.7	0.0	1.9	0.0	2.5	3.3	0.0	2.7	0.0	0.0	0.0	0.0	0.0	1.4	3.8	0.0	0.0	2.4	2.3
	% Trucks (Total)	7.4	0.0	1.7	0.0	5.6	0.0	8.5	13.3	0.0	9.5	0.0	0.0	0.0	0.0	0.0	3.2	6.7	0.0	0.0	4.6	5.5
	Peak Hour Factor (PHF)	0.93	0.00	0.76	0.00	0.94	0.00	0.74	0.58	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.94	0.89	0.00	0.00	0.92	0.95

Tuesday, August 28, 2018		From North					From East					From South					From West					
	MD Peak Hour	I41/USH41/USH45 SB OffRamp					STH167/Holy Hill Rd					I41/USH41/USH45 SB OnRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:45 PM	32	0	14	0	46	0	51	7	0	58	0	0	0	0	0	41	52	0	0	93	197
	1:00 PM	36	0	12	0	48	0	55	7	0	62	0	0	0	0	0	26	47	0	0	73	183
	1:15 PM	33	1	14	0	48	0	53	6	0	59	0	0	0	0	0	37	59	0	0	96	203
	1:30 PM	42	1	10	0	53	0	59	7	0	66	0	0	0	0	0	42	66	0	0	108	227
	Peak Hour Volume	143	2	50	0	195	0	218	27	0	245	0	0	0	0	0	146	224	0	0	370	810
	Rounded Hourly Volume	145	0	50	0	195	0	220	25	0	245	0	0	0	0	0	145	225	0	0	370	810
	% Single Unit Trucks	3.5	50.0	10.0	0.0	5.6	0.0	4.1	11.1	0.0	4.9	0.0	0.0	0.0	0.0	0.0	4.8	5.8	0.0	0.0	5.4	5.3
	% Heavy Trucks	3.5	0.0	8.0	0.0	4.6	0.0	5.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	4.8	4.9	0.0	0.0	4.9	4.7
	% Trucks (Total)	7.0	50.0	18.0	0.0	10.3	0.0	9.2	11.1	0.0	9.4	0.0	0.0	0.0	0.0	0.0	9.6	10.7	0.0	0.0	10.3	10.0
	Peak Hour Factor (PHF)	0.85	0.50	0.89	0.00	0.92	0.00	0.92	0.96	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.87	0.85	0.00	0.00	0.86	0.89

Tuesday, August 28, 2018		From North					From East					From South					From West					
	PM Peak Hour	I41/USH41/USH45 SB OffRamp					STH167/Holy Hill Rd					I41/USH41/USH45 SB OnRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	41	0	17	0	58	0	126	4	0	130	0	0	0	0	0	47	76	0	0	123	311
	4:15 PM	61	2	14	0	77	0	133	6	0	139	0	0	0	0	0	43	88	0	0	131	347
	4:30 PM	68	0	17	0	85	0	144	3	0	147	0	1	0	0	1	56	103	0	0	159	392
	4:45 PM	50	0	12	0	62	0	130	3	0	133	0	1	0	0	1	41	81	0	0	122	318
	Peak Hour Volume	220	2	60	0	282	0	533	16	0	549	0	2	0	0	2	187	348	0	0	535	1368
	Rounded Hourly Volume	220	0	60	0	280	0	535	15	0	550	0	0	0	0	0	185	350	0	0	535	1365
	% Single Unit Trucks	1.8	0.0	1.7	0.0	1.8	0.0	1.9	6.2	0.0	2.0	0.0	50.0	0.0	0.0	50.0	1.6	5.5	0.0	0.0	4.1	2.9
	% Heavy Trucks	2.7	50.0	5.0	0.0	3.5	0.0	1.9	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	2.7	2.3	0.0	0.0	2.4	2.4
	% Trucks (Total)	4.5	50.0	6.7	0.0	5.3	0.0	3.8	6.2	0.0	3.8	0.0	50.0	0.0	0.0	50.0	4.3	7.8	0.0	0.0	6.5	5.3
	Peak Hour Factor (PHF)	0.81	0.25	0.88	0.00	0.83	0.00	0.93	0.67	0.00	0.93	0.00	0.50	0.00	0.00	0.50	0.83	0.84	0.00	0.00	0.84	0.87

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		I41/USH41/USH45 SB OffRamp			STH167/Holy Hill Rd			I41/USH41/USH45 SB OnRamp			STH167/Holy Hill Rd			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

I41/USH41/USH45 SB Ramps & STH167/Holy Hill Rd

15-Minute Motor Vehicle Data

15-Minute Time Period		From North (↓) I41/USH41/USH45 SB OffRamp					From East (←) STH167/Holy Hill Rd					From South (↑) I41/USH41/USH45 SB OnRamp					From West (→) STH167/Holy Hill Rd					15-Min Totals	Hourly Sum	PHF
Start Time		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	30	0	26	0	56	0	19	9	0	28	0	0	0	0	0	66	29	0	0	95	179	1068	0.81
	6:15 AM	44	0	27	0	71	0	28	5	0	33	0	0	0	0	0	86	57	0	0	143	247	1225	0.91
	6:30 AM	58	0	31	0	89	0	26	6	0	32	0	0	0	0	0	130	60	0	0	190	311	1304	0.97
	6:45 AM	55	1	52	0	108	0	34	12	0	46	0	0	0	0	0	100	77	0	0	177	331	1313	0.98
	7:00 AM	68	0	31	0	99	0	19	13	0	32	0	0	0	0	0	118	87	0	0	205	336	1278	0.95
	7:15 AM	69	0	30	0	99	0	40	3	0	43	0	0	0	0	0	117	67	0	0	184	326	1202	0.92
	7:30 AM	63	0	18	0	81	0	33	6	0	39	0	0	0	0	0	112	88	0	0	200	320	1080	0.84
	7:45 AM	56	0	39	0	95	0	26	8	0	34	0	0	0	0	0	95	72	0	0	167	296	1005	0.85
	8:00 AM	56	0	21	0	77	0	36	6	0	42	0	0	0	0	0	77	64	0	0	141	260	903	0.87
	8:15 AM	39	1	19	0	59	0	41	4	0	45	0	0	0	0	0	56	44	0	0	100	204	819	0.84
	8:30 AM	42	1	16	0	59	0	49	11	0	60	0	0	0	0	0	69	57	0	0	126	245	795	0.81
	8:45 AM	32	1	17	0	50	0	41	7	0	48	0	0	0	0	0	50	46	0	0	96	194	746	0.95
	9:00 AM	28	1	6	0	35	0	36	5	0	41	0	0	0	0	0	46	54	0	0	100	176	718	0.92
	9:15 AM	30	0	17	0	47	0	44	5	0	49	0	0	0	0	0	41	43	0	0	84	180	719	0.92
	9:30 AM	30	1	6	0	37	0	55	5	0	60	0	0	0	0	0	52	47	0	0	99	196	715	0.91
	9:45 AM	25	0	8	0	33	0	38	3	0	41	0	0	0	0	0	48	44	0	0	92	166	688	0.97
Midday Peak Period	10:00 AM	37	0	14	0	51	0	39	2	0	41	0	0	0	0	0	45	40	0	0	85	177	682	0.96
	10:15 AM	32	0	9	0	41	0	47	3	0	50	0	0	0	0	0	43	42	0	0	85	176	682	0.96
	10:30 AM	27	1	5	0	33	0	43	2	0	45	1	0	0	0	1	42	48	0	0	90	169	712	0.86
	10:45 AM	31	0	14	0	45	0	33	2	0	35	0	0	0	0	0	41	39	0	0	80	160	727	0.88
	11:00 AM	39	1	12	0	52	0	39	1	1	41	0	0	0	0	0	37	47	0	0	84	177	768	0.93
	11:15 AM	51	0	13	0	64	0	46	4	0	50	0	0	0	0	0	43	49	0	0	92	206	767	0.93
	11:30 AM	26	1	8	0	35	0	55	8	0	63	0	0	0	0	0	42	44	0	0	86	184	739	0.92
	11:45 AM	35	0	8	0	43	0	53	7	0	60	0	0	0	0	0	48	50	0	0	98	201	733	0.91
	12:00 PM	28	0	8	0	36	0	55	3	0	58	0	0	0	0	0	27	55	0	0	82	176	729	0.93
	12:15 PM	37	0	8	0	45	0	58	0	0	58	0	0	0	0	0	37	38	0	0	75	178	736	0.93
	12:30 PM	30	1	8	0	39	0	54	4	0	58	0	0	0	0	0	39	42	0	0	81	178	761	0.94
	12:45 PM	32	0	14	0	46	0	51	7	0	58	0	0	0	0	0	41	52	0	0	93	197	810	0.89
	1:00 PM	36	0	12	0	48	0	55	7	0	62	0	0	0	0	0	26	47	0	0	73	183	794	0.87
	1:15 PM	33	1	14	0	48	0	53	6	0	59	0	0	0	0	0	37	59	0	0	96	203	800	0.88
	1:30 PM	42	1	10	0	53	0	59	7	0	66	0	0	0	0	0	42	66	0	0	108	227	810	0.89
	1:45 PM	34	0	8	0	42	0	41	4	0	45	0	0	0	0	0	33	61	0	0	94	181	831	0.84
PM Peak Period	2:00 PM	32	1	13	0	46	0	56	2	0	58	0	0	0	0	0	39	46	0	0	85	189	870	0.88
	2:15 PM	37	1	9	0	47	0	68	8	0	76	0	0	0	0	0	42	48	0	0	90	213	930	0.93
	2:30 PM	33	1	14	0	48	0	83	4	0	87	0	0	0	0	0	51	62	0	0	113	248	1002	0.88
	2:45 PM	46	1	7	0	54	0	72	3	0	75	0	0	0	0	0	39	52	0	0	91	220	1018	0.89
	3:00 PM	45	0	9	0	54	0	87	6	0	93	0	0	0	0	0	42	60	0	0	102	249	1097	0.92
	3:15 PM	44	0	10	0	54	0	107	6	0	113	0	0	0	0	0	40	78	0	0	118	285	1159	0.93
	3:30 PM	43	0	11	0	54	0	91	3	0	94	0	0	0	0	0	46	70	0	0	116	264	1221	0.88
	3:45 PM	60	2	11	0	73	0	111	5	0	116	0	0	0	0	0	30	80	0	0	110	299	1349	0.86
	4:00 PM	41	0	17	0	58	0	126	4	0	130	0	0	0	0	0	47	76	0	0	123	311	1368	0.87
	4:15 PM	61	2	14	0	77	0	133	6	0	139	0	0	0	0	0	43	88	0	0	131	347	1336	0.85
	4:30 PM	68	0	17	0	85	0	144	3	0	147	0	1	0	0	1	56	103	0	0	159	392	1292	0.82
	4:45 PM	50	0	12	0	62	0	130	3	0	133	0	1	0	0	1	41	81	0	0	122	318	1182	0.93
	5:00 PM	42	0	10	0	52	0	112	5	0	117	0	0	0	0	0	29	81	0	0	110	279	1061	0.88
	5:15 PM	37	1	17	0	55	0	114	4	0	118	0	0	0	0	0	31	99	0	0	130	303	971	0.80
	5:30 PM	39	0	3	0	42	0	134	2	0	136	0	0	0	0	0	34	70	0	0	104	282	873	0.77
	5:45 PM	25	0	10	0	35	0	88	1	0	89	0	0	0	0	0	22	51	0	0	73	197	760	0.93
	6:00 PM	31	0	9	0	40	0	66	0	0	66	0	0	0	0	0	22	61	0	0	83	189	690	0.84
	6:15 PM	27	0	10	0	37	0	85	4	0	89	0	0	0	0	0	25	54	0	0	79	205		
	6:30 PM	29	0	7	0	36	0	48	1	0	49	0	0	0	0	0	31	53	0	0	84	169		
	6:45 PM	16	1	7	0	24	0	58	3	0	61	0	0	0	0	0	18	24	0	0	42	127		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		2081	22	746	0	2849	0	3259	248	1	3508	1	2	0	0	3	2614	3052	0	0	5666	12026		

Peak Hour All Vehicle Volume Summary

Hourly Time Period		From North (↓) I41/USH41/USH45 SB OffRamp					From East (←) STH167/Holy Hill Rd					From South (↑) I41/USH41/USH45 SB OnRamp					From West (→) STH167/Holy Hill Rd					Total Hourly Volume	PHF
Start Time		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	256	0	118	0	374	0	118	30	0	148	0	0	0	0	0	442	314	0	0	756	1278	0.95
MD	12:45 PM	143	2	50	0	195	0	218	27	0	245	0	0	0	0	0	146	224	0	0	370	810	0.89
PM	4:00 PM	220	2	60	0	282	0	533	16	0	549	0	2	0	0	2	187	348	0	0	535	1368	0.87

Intersection Traffic Volume Report

Count Basics			Page 9 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

I41/USH41/USH45 SB Ramps & STH167/Holy Hill Rd

15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time		From North (↓) I41/USH41/USH45 SB OffRamp					From East (←) STH167/Holy Hill Rd					From South (↑) I41/USH41/USH45 SB OnRamp					From West (→) STH167/Holy Hill Rd					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	1	0	0	0	1	0	3	1	0	4	0	0	0	0	0	1	1	0	0	2	7	54
	6:15 AM	2	0	0	0	2	0	3	2	0	5	0	0	0	0	0	4	1	0	0	5	12	67
	6:30 AM	5	0	1	0	6	0	3	0	0	3	0	0	0	0	0	3	1	0	0	4	13	77
	6:45 AM	1	1	2	0	4	0	6	1	0	7	0	0	0	0	0	6	5	0	0	11	22	74
	7:00 AM	8	0	1	0	9	0	2	2	0	4	0	0	0	0	0	1	6	0	0	7	20	70
	7:15 AM	5	0	1	0	6	0	6	0	0	6	0	0	0	0	0	3	7	0	0	10	22	74
	7:30 AM	4	0	0	0	4	0	1	0	0	1	0	0	0	0	0	3	2	0	0	5	10	70
	7:45 AM	2	0	0	0	2	0	1	2	0	3	0	0	0	0	0	7	6	0	0	13	18	80
	8:00 AM	3	0	1	0	4	0	9	0	0	9	0	0	0	0	0	3	8	0	0	11	24	85
	8:15 AM	2	1	2	0	5	0	5	1	0	6	0	0	0	0	0	1	6	0	0	7	18	85
	8:30 AM	4	0	1	0	5	0	2	2	0	4	0	0	0	0	0	7	4	0	0	11	20	89
	8:45 AM	2	0	3	0	5	0	7	1	0	8	0	0	0	0	0	2	8	0	0	10	23	91
	9:00 AM	6	0	1	0	7	0	7	2	0	9	0	0	0	0	0	1	7	0	0	8	24	88
	9:15 AM	2	0	5	0	7	0	9	1	0	10	0	0	0	0	0	3	2	0	0	5	22	84
	9:30 AM	4	0	0	0	4	0	5	1	0	6	0	0	0	0	0	4	8	0	0	12	22	83
	9:45 AM	2	0	0	0	2	0	4	0	0	4	0	0	0	0	0	7	7	0	0	14	20	83
Midday Peak Period	10:00 AM	6	0	4	0	10	0	1	1	0	2	0	0	0	0	0	7	1	0	0	8	20	75
	10:15 AM	3	0	0	0	3	0	7	1	0	8	0	0	0	0	0	4	6	0	0	10	21	72
	10:30 AM	5	1	1	0	7	0	4	0	0	4	0	0	0	0	0	3	8	0	0	11	22	71
	10:45 AM	2	0	1	0	3	0	2	1	0	3	0	0	0	0	0	1	5	0	0	6	12	69
	11:00 AM	7	0	1	0	8	0	3	0	0	3	0	0	0	0	0	2	4	0	0	6	17	74
	11:15 AM	5	0	1	0	6	0	1	1	0	2	0	0	0	0	0	5	7	0	0	12	20	73
	11:30 AM	5	0	0	0	5	0	5	4	0	9	0	0	0	0	0	3	3	0	0	6	20	65
	11:45 AM	1	0	2	0	3	0	2	1	0	3	0	0	0	0	0	7	4	0	0	11	17	60
	12:00 PM	5	0	1	0	6	0	3	1	0	4	0	0	0	0	0	1	5	0	0	6	16	69
	12:15 PM	4	0	2	0	6	0	0	0	0	0	0	0	0	0	0	3	3	0	0	6	12	71
	12:30 PM	1	1	0	0	2	0	5	0	0	5	0	0	0	0	0	5	3	0	0	8	15	70
	12:45 PM	3	0	3	0	6	0	4	1	0	5	0	0	0	0	0	4	11	0	0	15	26	81
	1:00 PM	4	0	1	0	5	0	4	1	0	5	0	0	0	0	0	4	4	0	0	8	18	71
	1:15 PM	1	0	2	0	3	0	5	0	0	5	0	0	0	0	0	0	3	0	0	3	11	70
	1:30 PM	2	1	3	0	6	0	7	1	0	8	0	0	0	0	0	6	6	0	0	12	26	72
	1:45 PM	2	0	2	0	4	0	4	1	0	5	0	0	0	0	0	4	3	0	0	7	16	64
PM Peak Period	2:00 PM	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	8	6	0	0	14	17	63
	2:15 PM	4	0	0	0	4	0	6	0	0	6	0	0	0	0	0	2	1	0	0	3	13	71
	2:30 PM	3	0	1	0	4	0	8	1	0	9	0	0	0	0	0	2	3	0	0	5	18	75
	2:45 PM	5	0	0	0	5	0	5	1	0	6	0	0	0	0	0	2	2	0	0	4	15	73
	3:00 PM	9	0	3	0	12	0	4	1	0	5	0	0	0	0	0	2	6	0	0	8	25	84
	3:15 PM	4	0	3	0	7	0	5	0	0	5	0	0	0	0	0	1	4	0	0	5	17	78
	3:30 PM	1	0	1	0	2	0	3	0	0	3	0	0	0	0	0	6	5	0	0	11	16	76
	3:45 PM	3	1	3	0	7	0	8	0	0	8	0	0	0	0	0	2	9	0	0	11	26	84
	4:00 PM	3	0	2	0	5	0	6	0	0	6	0	0	0	0	0	3	5	0	0	8	19	72
	4:15 PM	2	1	0	0	3	0	4	1	0	5	0	0	0	0	0	1	6	0	0	7	15	64
	4:30 PM	0	0	2	0	2	0	7	0	0	7	0	1	0	0	1	2	12	0	0	14	24	55
	4:45 PM	5	0	0	0	5	0	3	0	0	3	0	0	0	0	0	2	4	0	0	6	14	49
	5:00 PM	2	0	3	0	5	0	2	0	0	2	0	0	0	0	0	2	2	0	0	4	11	41
	5:15 PM	1	0	1	0	2	0	3	0	0	3	0	0	0	0	0	1	0	0	0	1	6	38
	5:30 PM	2	0	0	0	2	0	8	0	0	8	0	0	0	0	0	2	6	0	0	8	18	35
	5:45 PM	1	0	0	0	1	0	2	1	0	3	0	0	0	0	0	1	1	0	0	2	6	19
	6:00 PM	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	2	2	0	0	4	8	16
	6:15 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3	
	6:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2	
	6:45 PM	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	3	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		158	7	62	0	227	0	212	35	0	247	0	1	0	0	1	157	230	0	0	387	862	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time		From North (↓) I41/USH41/USH45 SB OffRamp					From East (←) STH167/Holy Hill Rd					From South (↑) I41/USH41/USH45 SB OnRamp					From West (→) STH167/Holy Hill Rd					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	19	0	2	0	21	0	10	4	0	14	0	0	0	0	0	14	21	0	0	35	70
MD	12:45 PM	10	1	9	0	20	0	20	3	0	23	0	0	0	0	0	14	24	0	0	38	81
PM	4:00 PM	10	1	4	0	15	0	20	1	0	21	0	1	0	0	1	8	27	0	0	35	72

Intersection Traffic Volume Report

Count Basics	Version 2011.M3		Page 1 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: I41/USH41/USH45 NB Ramps & STH167/Holy Hill Rd

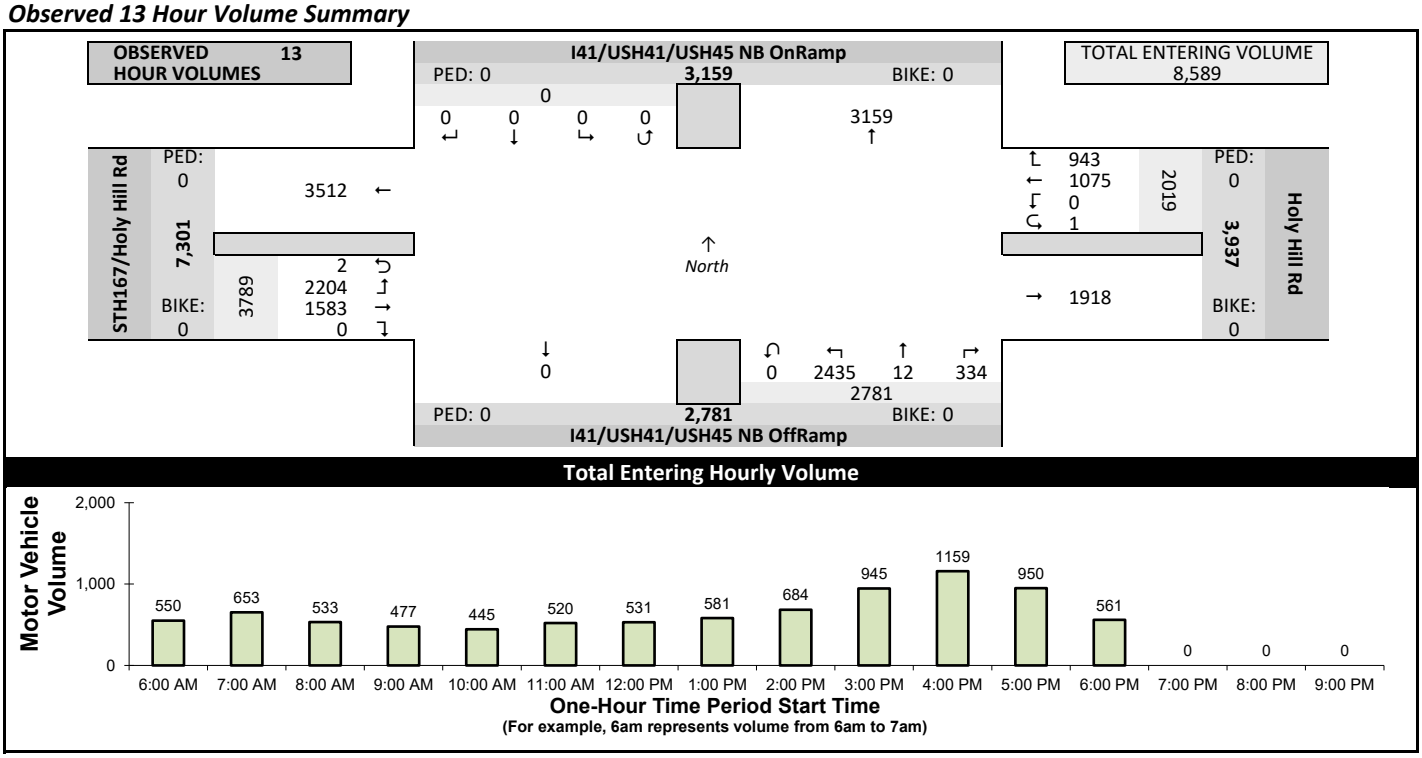
Site Information

Municipality	Village - Germantown		
County	Washington	WisDOT Region	SE
Traffic Control	All-Way Stop		
Roadway Names		North Direction	↑
North Leg	I41/USH41/USH45 NB OnRamp		
East Leg	Holy Hill Rd		
South Leg	I41/USH41/USH45 NB OffRamp		
West Leg	STH167/Holy Hill Rd		
Special Considerations			
Schools	Unknown		
Holidays			
Special Events	None		
Roadway Names			
		Pre-school children	None
		Elementry school age children	None
		Visually impaired (white cane/helper dog)	None
		Elderly/disabled (except wheelchairs)	None
		Wheelchairs/electric scooters	None
Other (describe)		None	None

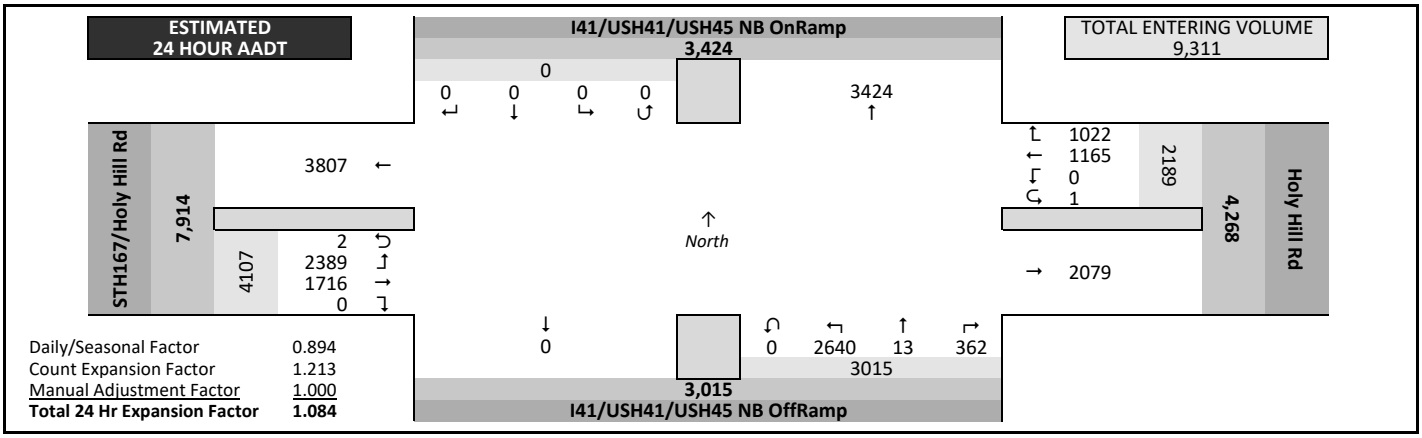
Count Information

Hrs Counted:	6:00 AM-7:00 PM					
1st Day of Count		Tuesday, August 28, 2018			Weather	
AM Peak Period		Tuesday, August 28, 2018			Clear & Dry	
Midday Peak Period		Tuesday, August 28, 2018			Clear & Dry	
PM Peak Period		Tuesday, August 28, 2018			Clear & Dry	
Calculated Peak Hours						
	AM	6:45-7:45am	MD	12:45-1:45pm	PM	4:00-5:00pm
Peak Hours Selected for Analysis						
	AM	7:00-8:00am	MD	12:45-1:45pm	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group		(2) Urban Arterials & Collectors				
Count Expansion Group		(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor		0.894		Count Expansion Factor		1.213
Company Name		DLZ			Manual Adj.	1.000
Observers		AM Peak Period	Miovision Video Recording			
		Midday Peak Period	Miovision Video Recording			
		PM Peak Period	Miovision Video Recording			
Comments	2016 DOT Seasonal Factors					

Observed 13 Hour Volume Summary



Estimated 24 Hour AADT



Intersection Traffic Volume Report

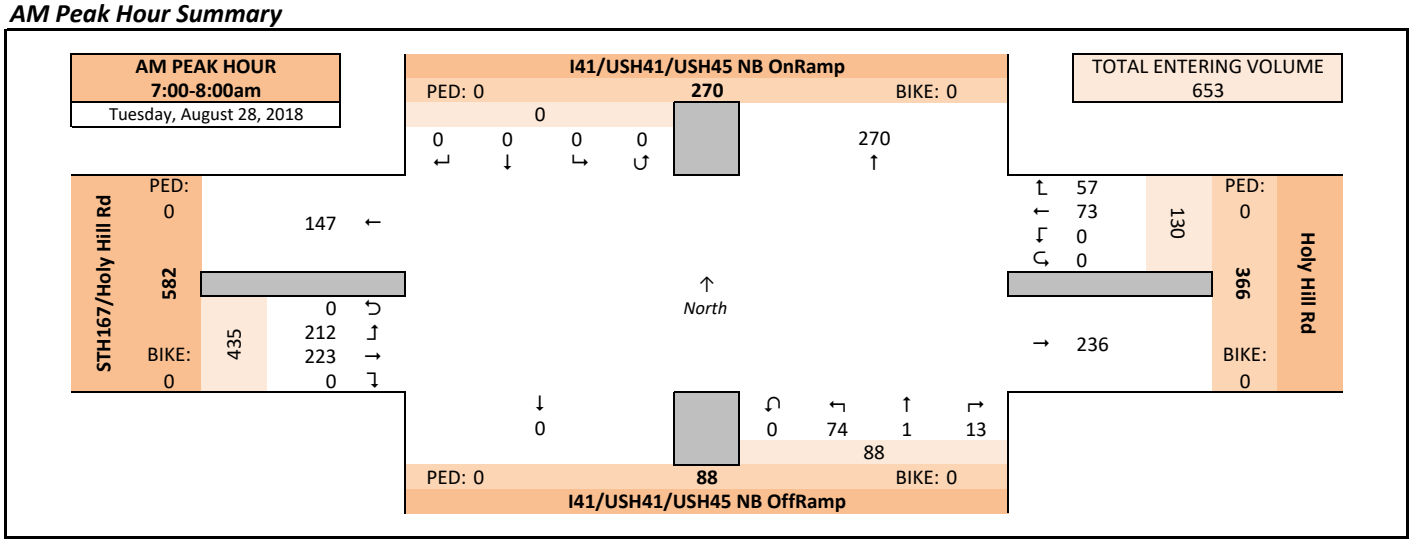
Count Basics			Page 2 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

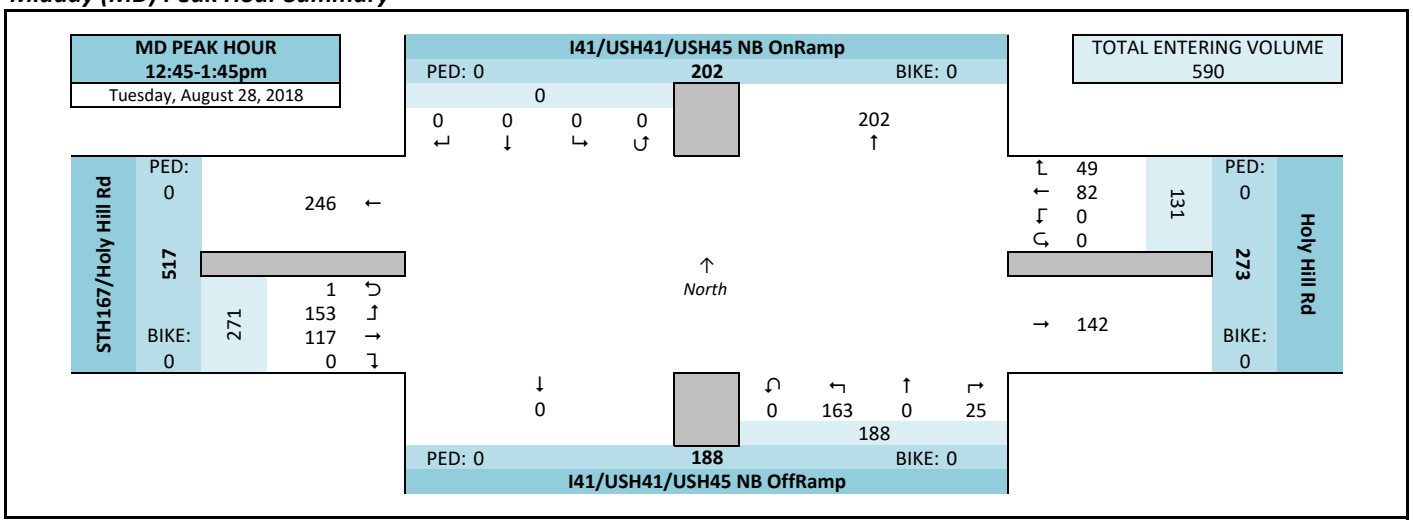
All Motor Vehicles

I41/USH41/USH45 NB Ramps & STH167/Holy Hill Rd

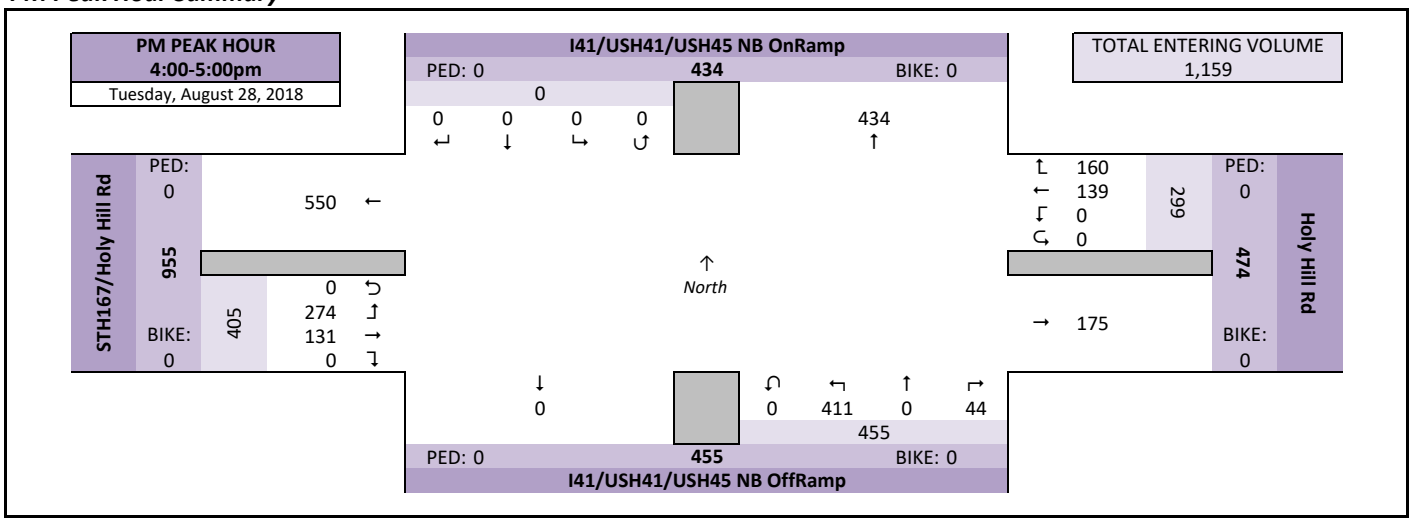
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

I41/USH41/USH45 NB Ramps & STH167/Holy Hill Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Tuesday, August 28, 2018		From North					From East					From South					From West					
	AM Peak Hour	I41/USH41/USH45 NB OnRamp					Holy Hill Rd					I41/USH41/USH45 NB OffRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	0	0	0	0	0	12	22	0	0	34	1	0	9	0	10	0	55	63	0	118	162
	7:15 AM	0	0	0	0	0	17	13	0	0	30	5	0	30	0	35	0	62	38	0	100	165
	7:30 AM	0	0	0	0	0	16	19	0	0	35	5	1	20	0	26	0	48	56	0	104	165
	7:45 AM	0	0	0	0	0	12	19	0	0	31	2	0	15	0	17	0	58	55	0	113	161
	Peak Hour Volume	0	0	0	0	0	57	73	0	0	130	13	1	74	0	88	0	223	212	0	435	653
	Rounded Hourly Volume	0	0	0	0	0	55	75	0	0	130	15	0	75	0	90	0	225	210	0	435	655
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	5.3	6.8	0.0	0.0	6.2	0.0	0.0	6.8	0.0	5.7	0.0	1.3	3.3	0.0	2.3	3.5
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	1.8	1.4	0.0	0.0	1.5	15.4	100.0	2.7	0.0	5.7	0.0	2.2	5.2	0.0	3.7	3.5
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	7.0	8.2	0.0	0.0	7.7	15.4	100.0	9.5	0.0	11.4	0.0	3.6	8.5	0.0	6.0	7.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.84	0.83	0.00	0.00	0.93	0.65	0.25	0.62	0.00	0.63	0.00	0.90	0.84	0.00	0.92	0.99

Tuesday, August 28, 2018		From North					From East					From South					From West					
	MD Peak Hour	I41/USH41/USH45 NB OnRamp					Holy Hill Rd					I41/USH41/USH45 NB OffRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:45 PM	0	0	0	0	0	12	18	0	0	30	7	0	41	0	48	0	25	38	0	63	141
	1:00 PM	0	0	0	0	0	13	20	0	0	33	10	0	41	0	51	0	25	31	1	57	141
	1:15 PM	0	0	0	0	0	12	18	0	0	30	4	0	41	0	45	0	33	43	0	76	151
	1:30 PM	0	0	0	0	0	12	26	0	0	38	4	0	40	0	44	0	34	41	0	75	157
	Peak Hour Volume	0	0	0	0	0	49	82	0	0	131	25	0	163	0	188	0	117	153	1	271	590
	Rounded Hourly Volume	0	0	0	0	0	50	80	0	0	130	25	0	165	0	190	0	115	155	0	270	590
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	14.3	6.1	0.0	0.0	9.2	4.0	0.0	4.3	0.0	4.3	0.0	7.7	5.2	0.0	6.3	6.3
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	6.1	3.7	0.0	0.0	4.6	12.0	0.0	4.3	0.0	5.3	0.0	4.3	7.2	0.0	5.9	5.4
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	20.4	9.8	0.0	0.0	13.7	16.0	0.0	8.6	0.0	9.6	0.0	12.0	12.4	0.0	12.2	11.7
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.94	0.79	0.00	0.00	0.86	0.62	0.00	0.99	0.00	0.92	0.00	0.86	0.89	0.25	0.89	0.94

Tuesday, August 28, 2018		From North					From East					From South					From West					
	PM Peak Hour	I41/USH41/USH45 NB OnRamp					Holy Hill Rd					I41/USH41/USH45 NB OffRamp					STH167/Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	0	0	0	0	0	36	33	0	0	69	11	0	100	0	111	0	27	66	0	93	273
	4:15 PM	0	0	0	0	0	38	38	0	0	76	11	0	99	0	110	0	32	69	0	101	287
	4:30 PM	0	0	0	0	0	58	24	0	0	82	10	0	124	0	134	0	38	80	0	118	334
	4:45 PM	0	0	0	0	0	28	44	0	0	72	12	0	88	0	100	0	34	59	0	93	265
	Peak Hour Volume	0	0	0	0	0	160	139	0	0	299	44	0	411	0	455	0	131	274	0	405	1159
	Rounded Hourly Volume	0	0	0	0	0	160	140	0	0	300	45	0	410	0	455	0	130	275	0	405	1160
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.0	0.0	0.0	2.9	0.0	2.6	0.0	6.1	4.4	0.0	4.9	3.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	1.2	0.7	0.0	0.0	1.0	0.0	0.0	2.2	0.0	2.0	0.0	2.3	3.3	0.0	3.0	2.1
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	3.1	0.7	0.0	0.0	2.0	0.0	0.0	5.1	0.0	4.6	0.0	8.4	7.7	0.0	7.9	5.1
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.69	0.79	0.00	0.00	0.91	0.92	0.00	0.83	0.00	0.85	0.00	0.86	0.86	0.00	0.86	0.87

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		I41/USH41/USH45 NB OnRamp			Holy Hill Rd			I41/USH41/USH45 NB OffRamp			STH167/Holy Hill Rd			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

I41/USH41/USH45 NB Ramps & STH167/Holy Hill Rd

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (↓) I41/USH41/USH45 NB OnRamp					From East (←) Holy Hill Rd					From South (↑) I41/USH41/USH45 NB OffRamp					From West (→) STH167/Holy Hill Rd					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	5	15	0	0	20	3	0	14	0	17	0	39	17	0	56	93	550	0.73
	6:15 AM	0	0	0	0	0	6	13	0	0	19	6	0	19	0	25	0	46	37	0	83	127	619	0.82
	6:30 AM	0	0	0	0	0	14	13	0	0	27	5	0	19	0	24	0	49	42	0	91	142	657	0.87
	6:45 AM	0	0	0	0	0	13	24	0	0	37	2	0	22	0	24	0	86	41	0	127	188	680	0.90
	7:00 AM	0	0	0	0	0	12	22	0	0	34	1	0	9	0	10	0	55	63	0	118	162	653	0.99
	7:15 AM	0	0	0	0	0	17	13	0	0	30	5	0	30	0	35	0	62	38	0	100	165	636	0.96
	7:30 AM	0	0	0	0	0	16	19	0	0	35	5	1	20	0	26	0	48	56	0	104	165	599	0.91
	7:45 AM	0	0	0	0	0	12	19	0	0	31	2	0	15	0	17	0	58	55	0	113	161	574	0.89
	8:00 AM	0	0	0	0	0	12	18	0	0	30	5	0	26	0	31	0	39	45	0	84	145	533	0.92
	8:15 AM	0	0	0	0	0	15	16	0	0	31	3	1	27	0	31	0	28	38	0	66	128	499	0.89
	8:30 AM	0	0	0	0	0	3	23	0	0	26	6	1	38	0	45	0	35	34	0	69	140	493	0.88
	8:45 AM	0	0	0	0	0	7	18	0	0	25	1	1	30	0	32	0	29	34	0	63	120	485	0.92
	9:00 AM	0	0	0	0	0	8	14	0	0	22	3	0	26	0	29	0	20	40	0	60	111	477	0.90
	9:15 AM	0	0	0	0	0	9	19	0	0	28	3	1	31	0	35	0	33	26	0	59	122	480	0.91
	9:30 AM	0	0	0	0	0	16	17	0	0	33	3	0	42	0	45	0	26	28	0	54	132	479	0.91
	9:45 AM	0	0	0	0	0	16	16	0	0	32	1	2	25	0	28	0	27	25	0	52	112	460	0.95
Midday Peak Period	10:00 AM	0	0	0	0	0	14	12	0	0	26	6	0	30	0	36	0	18	34	0	52	114	445	0.92
	10:15 AM	0	0	0	0	0	14	15	0	0	29	5	0	33	0	38	0	17	37	0	54	121	449	0.93
	10:30 AM	0	0	0	0	0	9	16	0	0	25	8	0	29	0	37	0	18	33	0	51	113	464	0.85
	10:45 AM	0	0	0	0	0	6	7	0	0	13	4	0	27	0	31	0	19	34	0	53	97	478	0.88
	11:00 AM	0	0	0	0	0	13	15	0	0	28	4	0	25	0	29	0	31	30	0	61	118	520	0.94
	11:15 AM	0	0	0	0	0	10	20	0	0	30	8	1	34	0	43	0	21	42	0	63	136	545	0.95
	11:30 AM	0	0	0	0	0	8	20	0	0	28	3	0	45	0	48	0	24	27	0	51	127	534	0.93
	11:45 AM	0	0	0	0	0	11	21	0	0	32	9	0	40	0	49	0	28	30	0	58	139	529	0.92
	12:00 PM	0	0	0	0	0	16	17	0	1	34	5	0	41	0	46	0	21	42	0	63	143	531	0.93
	12:15 PM	0	0	0	0	0	9	17	0	0	26	6	3	44	0	53	0	21	25	0	46	125	529	0.94
	12:30 PM	0	0	0	0	0	16	18	0	0	34	3	0	36	0	39	0	15	34	0	49	122	555	0.92
	12:45 PM	0	0	0	0	0	12	18	0	0	30	7	0	41	0	48	0	25	38	0	63	141	590	0.94
	1:00 PM	0	0	0	0	0	13	20	0	0	33	10	0	41	0	51	0	25	31	1	57	141	581	0.93
	1:15 PM	0	0	0	0	0	12	18	0	0	30	4	0	41	0	45	0	33	43	0	76	151	590	0.94
	1:30 PM	0	0	0	0	0	12	26	0	0	38	4	0	40	0	44	0	34	41	0	75	157	604	0.92
	1:45 PM	0	0	0	0	0	12	10	0	0	22	6	0	35	0	41	0	24	45	0	69	132	651	0.80
PM Peak Period	2:00 PM	0	0	0	0	0	18	22	0	0	40	9	0	40	0	49	0	23	38	0	61	150	684	0.84
	2:15 PM	0	0	0	0	0	24	19	0	0	43	12	0	54	0	66	0	28	28	0	56	165	740	0.90
	2:30 PM	0	0	0	0	0	31	29	0	0	60	12	0	59	0	71	0	28	45	0	73	204	812	0.86
	2:45 PM	0	0	0	0	0	28	28	0	0	56	4	1	45	0	50	0	17	42	0	59	165	868	0.83
	3:00 PM	0	0	0	0	0	38	27	0	0	65	6	0	67	0	73	0	24	44	0	68	206	945	0.91
	3:15 PM	0	0	0	0	0	28	37	0	0	65	10	0	73	0	83	0	38	51	0	89	237	1012	0.93
	3:30 PM	0	0	0	0	0	70	33	0	0	103	11	0	65	0	76	0	26	55	0	81	260	1062	0.93
	3:45 PM	0	0	0	0	0	29	28	0	0	57	11	0	84	0	95	0	32	58	0	90	242	1136	0.85
	4:00 PM	0	0	0	0	0	36	33	0	0	69	11	0	100	0	111	0	27	66	0	93	273	1159	0.87
	4:15 PM	0	0	0	0	0	38	38	0	0	76	11	0	99	0	110	0	32	69	0	101	287	1153	0.86
	4:30 PM	0	0	0	0	0	58	24	0	0	82	10	0	124	0	134	0	38	80	0	118	334	1132	0.85
	4:45 PM	0	0	0	0	0	28	44	0	0	72	12	0	88	0	100	0	34	59	0	93	265	1043	0.98
	5:00 PM	0	0	0	0	0	43	35	0	0	78	14	0	83	0	97	0	37	55	0	92	267	950	0.89
	5:15 PM	0	0	0	0	0	21	24	0	0	45	13	0	95	0	108	0	36	77	0	113	266	853	0.80
	5:30 PM	0	0	0	0	0	25	23	0	0	48	10	0	113	0	123	0	20	54	0	74	245	747	0.76
	5:45 PM	0	0	0	0	0	15	23	0	0	38	8	0	65	0	73	0	15	46	0	61	172	624	0.91
	6:00 PM	0	0	0	0	0	22	12	0	0	34	9	0	56	0	65	0	16	55	0	71	170	561	0.83
	6:15 PM	0	0	0	0	0	9	22	0	0	31	3	0	63	0	66	0	25	37	1	63	160		
	6:30 PM	0	0	0	0	0	5	9	0	0	14	5	0	40	0	45	0	20	43	0	63	122		
	6:45 PM	0	0	0	0	0	9	16	0	0	25	7	0	47	0	54	0	13	17	0	30	109		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		0	0	0	0	0	943	1075	0	1	2019	334	12	2435	0	2781	0	1583	2204	2	3789	8589		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (↓) I41/USH41/USH45 NB OnRamp					From East (←) Holy Hill Rd					From South (↑) I41/USH41/USH45 NB OffRamp					From West (→) STH167/Holy Hill Rd					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	0	0	0	0	0	57	73	0	0	130	13	1	74	0	88	0	223	212	0	435	653	0.99
MD	12:45 PM	0	0	0	0	0	49	82	0	0	131	25	0	163	0	188	0	117	153	1	271	590	0.94
PM	4:00 PM	0	0	0	0	0	160	139	0	0	299	44	0	411	0	455	0	131	274	0	405	1159	0.87

Intersection Traffic Volume Report

Count Basics		*Page 9 of 11*
Start Date: Tuesday, August 28, 2018	Weekday	
Total Number of Hours Counted: 13	Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

I41/USH41/USH45 NB Ramps & STH167/Holy Hill Rd

15-Minute Heavy Vehicle Data

	15-Minute Time Period Start Time	From North (I41/USH41/USH45 NB OnRamp)					From East (Holy Hill Rd)					From South (I41/USH41/USH45 NB OffRamp)					From West (STH167/Holy Hill Rd)					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	3	0	3	0	0	1	0	1	5	35
	6:15 AM	0	0	0	0	0	1	3	0	0	4	2	0	2	0	4	0	0	1	0	1	9	40
	6:30 AM	0	0	0	0	0	1	0	0	0	1	1	0	3	0	4	0	1	1	0	2	7	46
	6:45 AM	0	0	0	0	0	0	2	0	0	2	1	0	5	0	6	0	2	4	0	6	14	47
	7:00 AM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	1	6	0	7	10	46
	7:15 AM	0	0	0	0	0	0	2	0	0	2	0	0	4	0	4	0	4	5	0	9	15	56
	7:30 AM	0	0	0	0	0	0	0	0	0	0	2	1	2	0	5	0	1	2	0	3	8	59
	7:45 AM	0	0	0	0	0	3	2	0	0	5	0	0	1	0	1	0	2	5	0	7	13	61
	8:00 AM	0	0	0	0	0	1	3	0	0	4	2	0	6	0	8	0	1	7	0	8	20	67
	8:15 AM	0	0	0	0	0	3	3	0	0	6	0	1	2	0	3	0	4	5	0	9	18	69
	8:30 AM	0	0	0	0	0	0	2	0	0	2	0	0	3	0	3	0	1	4	0	5	10	67
	8:45 AM	0	0	0	0	0	1	1	0	0	2	0	1	6	0	7	0	6	4	0	10	19	74
	9:00 AM	0	0	0	0	0	3	4	0	0	7	1	0	5	0	6	0	1	8	0	9	22	70
	9:15 AM	0	0	0	0	0	0	3	0	0	3	0	0	6	0	6	0	7	0	0	7	16	57
	9:30 AM	0	0	0	0	0	3	1	0	0	4	0	0	5	0	5	0	4	4	0	8	17	57
	9:45 AM	0	0	0	0	0	2	1	0	0	3	1	2	3	0	6	0	2	4	0	6	15	57
Midday Peak Period	10:00 AM	0	0	0	0	0	1	1	0	0	2	0	0	2	0	2	0	3	2	0	5	9	54
	10:15 AM	0	0	0	0	0	1	0	0	0	1	2	0	6	0	8	0	1	6	0	7	16	57
	10:30 AM	0	0	0	0	0	2	2	0	0	4	2	0	2	0	4	0	1	8	0	9	17	53
	10:45 AM	0	0	0	0	0	3	2	0	0	5	0	0	1	0	1	0	1	5	0	6	12	49
	11:00 AM	0	0	0	0	0	3	1	0	0	4	1	0	2	0	3	0	2	3	0	5	12	51
	11:15 AM	0	0	0	0	0	1	2	0	0	3	2	0	0	0	2	0	2	5	0	7	12	53
	11:30 AM	0	0	0	0	0	0	4	0	0	4	0	0	6	0	6	0	1	2	0	3	13	50
	11:45 AM	0	0	0	0	0	2	1	0	0	3	2	0	2	0	4	0	3	4	0	7	14	48
	12:00 PM	0	0	0	0	0	2	2	0	0	4	2	0	2	0	4	0	3	3	0	6	14	55
	12:15 PM	0	0	0	0	0	2	0	0	0	2	0	2	1	0	3	0	1	3	0	4	9	58
	12:30 PM	0	0	0	0	0	3	1	0	0	4	0	0	4	0	4	0	0	3	0	3	11	62
	12:45 PM	0	0	0	0	0	3	0	0	0	3	1	0	4	0	5	0	4	9	0	13	21	69
	1:00 PM	0	0	0	0	0	4	1	0	0	5	2	0	4	0	6	0	3	3	0	6	17	59
	1:15 PM	0	0	0	0	0	2	2	0	0	4	0	0	4	0	4	0	2	3	0	5	13	51
	1:30 PM	0	0	0	0	0	1	5	0	0	6	1	0	2	0	3	0	5	4	0	9	18	46
	1:45 PM	0	0	0	0	0	2	2	0	0	4	0	0	3	0	3	0	2	2	0	4	11	42
PM Peak Period	2:00 PM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	4	3	0	7	9	42
	2:15 PM	0	0	0	0	0	1	2	0	0	3	0	0	4	0	4	0	0	1	0	1	8	48
	2:30 PM	0	0	0	0	0	0	2	0	0	2	1	0	7	0	8	0	1	3	0	4	14	58
	2:45 PM	0	0	0	0	0	2	6	0	0	8	0	0	0	0	0	0	3	0	0	3	11	54
	3:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	5	0	7	0	2	6	0	8	15	65
	3:15 PM	0	0	0	0	0	1	2	0	0	3	4	0	3	0	7	0	6	2	0	8	18	63
	3:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	3	0	3	0	1	5	0	6	10	59
	3:45 PM	0	0	0	0	0	2	0	0	0	2	1	0	7	0	8	0	5	7	0	12	22	72
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0	2	5	0	7	13	59
	4:15 PM	0	0	0	0	0	2	0	0	0	2	0	0	6	0	6	0	4	2	0	6	14	56
	4:30 PM	0	0	0	0	0	2	1	0	0	3	0	0	6	0	6	0	3	11	0	14	23	45
	4:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	3	0	3	0	2	3	0	5	9	37
	5:00 PM	0	0	0	0	0	0	1	0	0	1	2	0	1	0	3	0	3	3	0	6	10	33
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	0	1	3	29
	5:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	8	0	8	0	2	4	0	6	15	28
	5:45 PM	0	0	0	0	0	0	2	0	0	2	1	0	1	0	2	0	0	1	0	1	5	14
	6:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	3	0	3	0	0	2	0	2	6	11
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	
	6:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	2	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		0	0	0	0	0	66	74	0	0	140	36	7	169	0	212	0	111	184	0	295	647	

Peak Hour Heavy Vehicle Volume Summary

	Hourly Time Period Start Time	From North (I41/USH41/USH45 NB OnRamp)					From East (Holy Hill Rd)					From South (I41/USH41/USH45 NB OffRamp)					From West (STH167/Holy Hill Rd)					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	0	0	0	0	0	4	6	0	0	10	2	1	7	0	10	0	8	18	0	26	46
MD	12:45 PM	0	0	0	0	0	10	8	0	0	18	4	0	14	0	18	0	14	19	0	33	69
PM	4:00 PM	0	0	0	0	0	5	1	0	0	6	0	0	21	0	21	0	11	21	0	32	59

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 11
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Base Information, Observed (12) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Gateway Frontage Road and Holy Hill Road

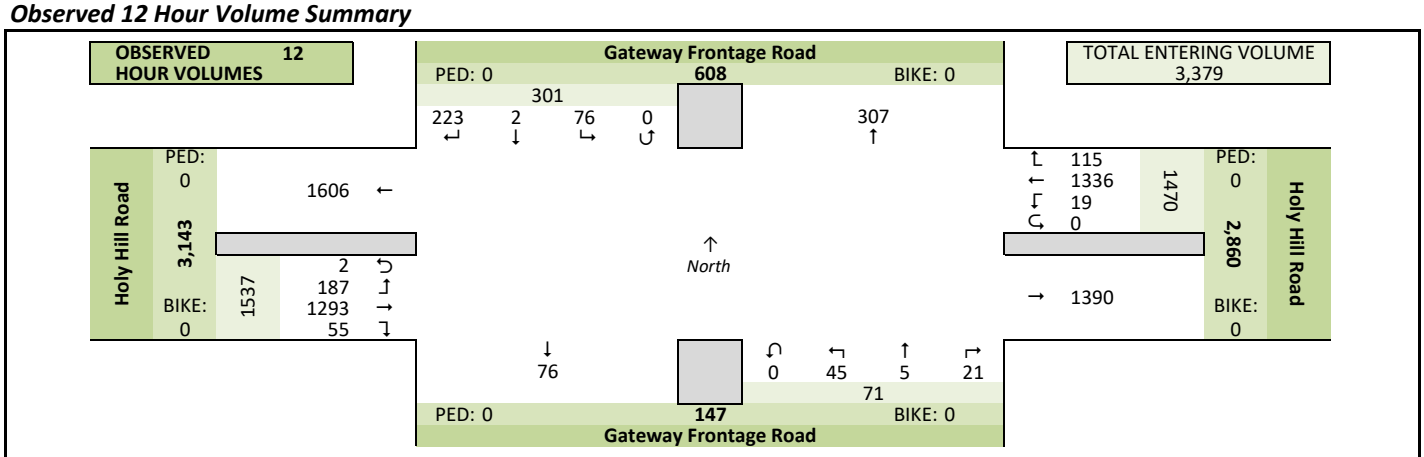
Site Information

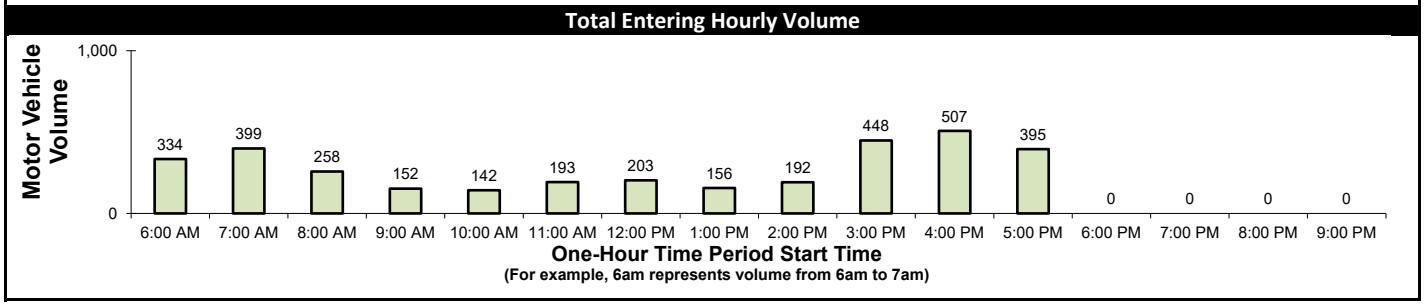
Municipality	Village of Germantown		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	Gateway Frontage Road		
East Leg	Holy Hill Road		
South Leg	Gateway Frontage Road		
West Leg	Holy Hill Road		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementry school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None	None	

Count Information

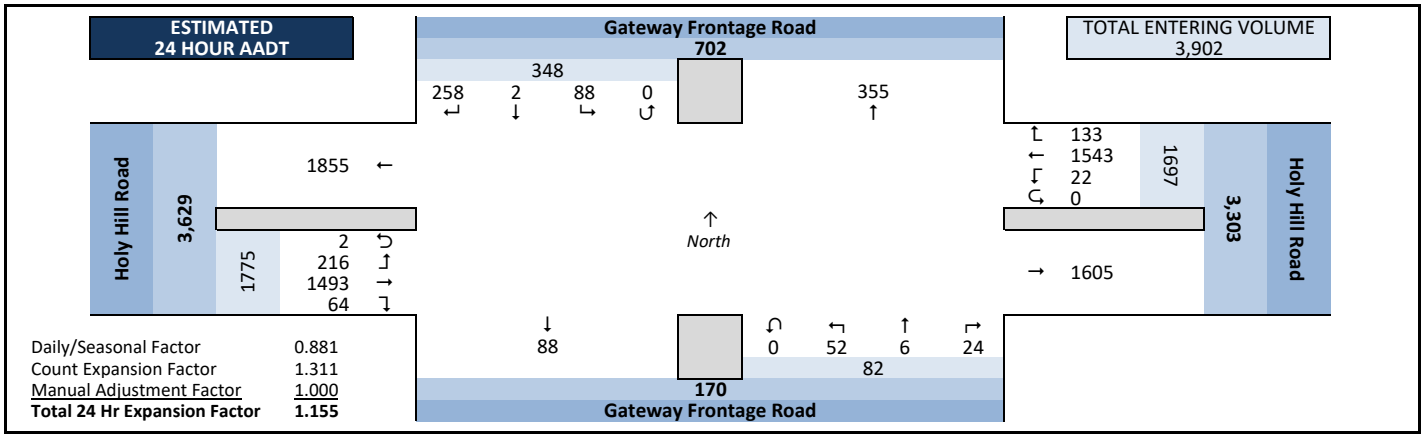
Hrs Counted:	6:00 AM-6:00 PM				
1st Day of Count	Wednesday, May 30, 2018			Weather	
AM Peak Period	Thursday, May 31, 2018			Clear & Dry	
Midday Peak Period	Tuesday, October 22, 2019			Clear & Dry	
PM Peak Period	Wednesday, May 30, 2018			Clear & Dry	
Calculated Peak Hours					
AM	6:45-7:45am	MD	11:15-12:15am	PM	4:00-5:00pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	11:15-12:15am	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.881		Count Expansion Factor	1.311	
Company Name	TADI, Inc			Manual Adj.	1.000
Observers	AM Peak Period	Jeff Schleif			
	Midday Peak Period	None			
	PM Peak Period	Karlyn Bieberitz			
Comments	2016 DOT Seasonal Factors				

Observed 12 Hour Volume Summary





Estimated 24 Hour AADT



Intersection Traffic Volume Report

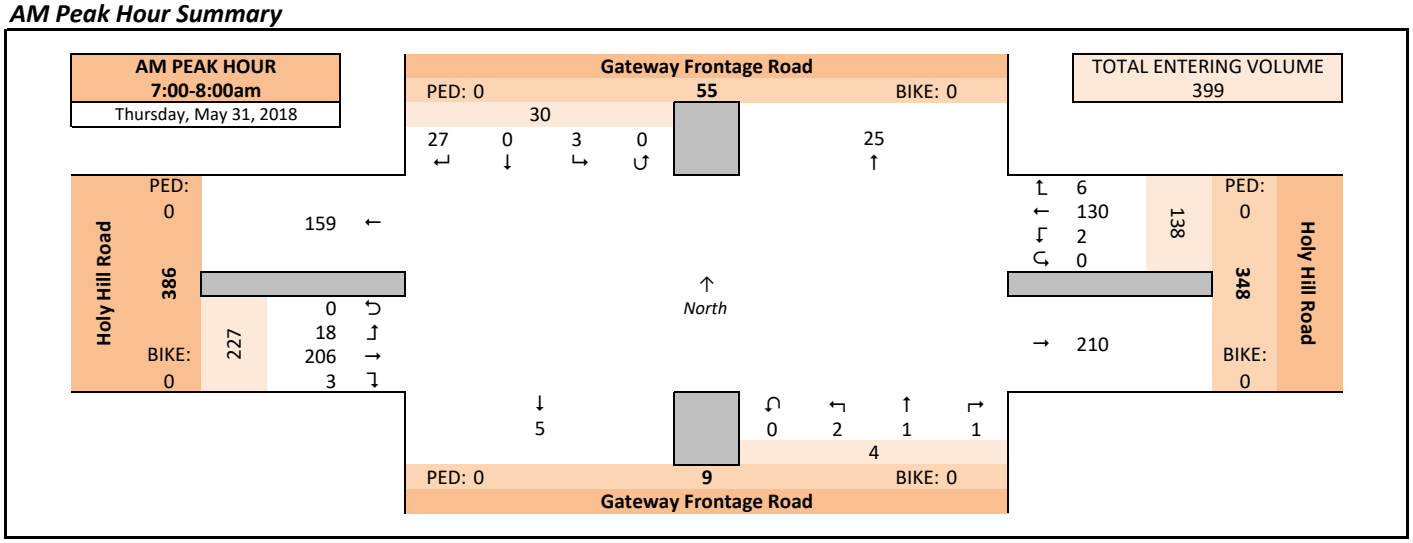
Count Basics			Page 2 of 11
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

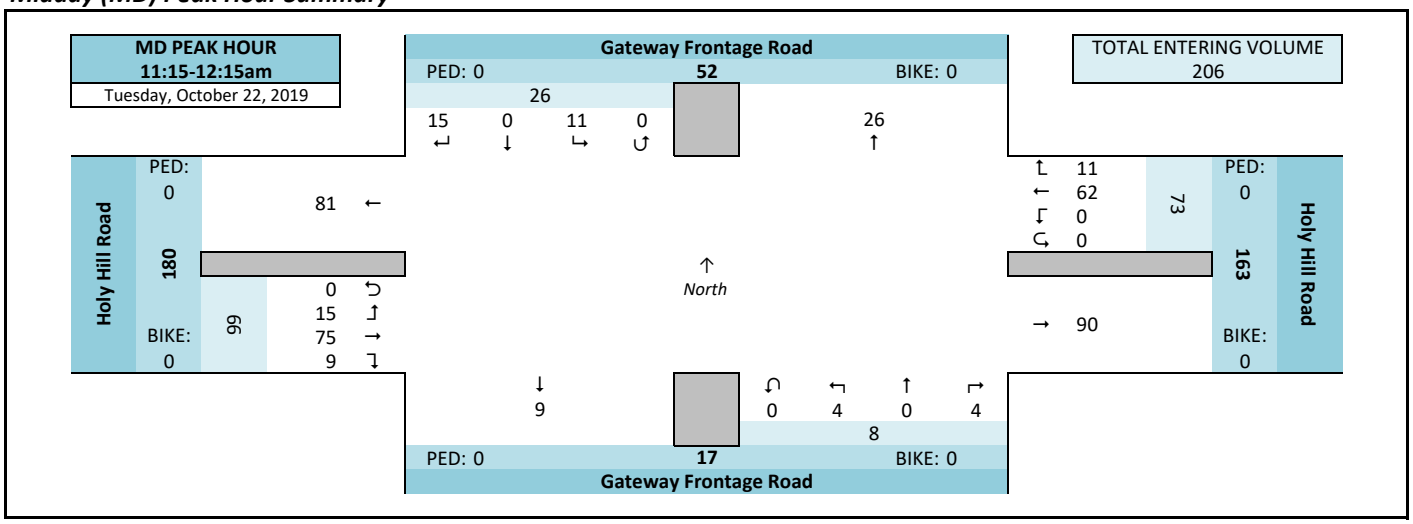
All Motor Vehicles

Gateway Frontage Road and Holy Hill Road

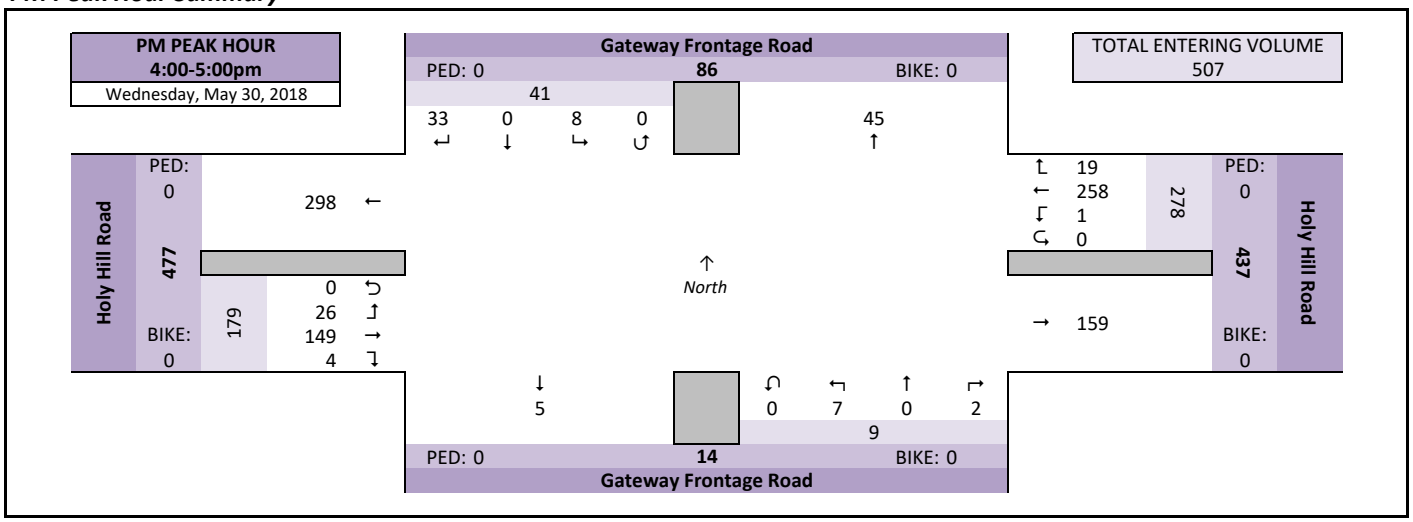
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			*Page 3 of 11*
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Gateway Frontage Road and Holy Hill Road

Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, May 31, 2018		From North					From East					From South					From West					
	AM Peak Hour	Gateway Frontage Road					Holy Hill Road					Gateway Frontage Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	8	0	1	0	9	2	44	0	0	46	0	0	0	0	0	1	47	3	0	51	106
	7:15 AM	4	0	1	0	5	1	24	0	0	25	0	1	1	0	2	1	52	7	0	60	92
	7:30 AM	10	0	1	0	11	3	37	1	0	41	0	0	0	0	0	1	44	6	0	51	103
	7:45 AM	5	0	0	0	5	0	25	1	0	26	1	0	1	0	2	0	63	2	0	65	98
	Peak Hour Volume	27	0	3	0	30	6	130	2	0	138	1	1	2	0	4	3	206	18	0	227	399
	Rounded Hourly Volume	25	0	5	0	30	5	130	0	0	135	0	0	0	0	0	5	205	20	0	230	395
	% Single Unit Trucks	22.2	0.0	0.0	0.0	20.0	16.7	4.6	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	4.9	16.7	0.0	5.7	6.5
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.6	2.3
	% Trucks (Total)	22.2	0.0	0.0	0.0	20.0	16.7	6.9	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	7.8	16.7	0.0	8.4	8.8
	Peak Hour Factor (PHF)	0.67	0.00	0.75	0.00	0.68	0.50	0.74	0.50	0.00	0.75	0.25	0.25	0.50	0.00	0.50	0.75	0.82	0.64	0.00	0.87	0.94

Tuesday, October 22, 2019		From North					From East					From South					From West					
	MD Peak Hour	Gateway Frontage Road					Holy Hill Road					Gateway Frontage Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	11:15 AM	2	0	4	0	6	3	11	0	0	14	3	0	1	0	4	6	20	2	0	28	52
	11:30 AM	4	0	3	0	7	4	11	0	0	15	0	0	0	0	0	0	19	5	0	24	46
	11:45 AM	6	0	3	0	9	1	13	0	0	14	1	0	2	0	3	2	19	3	0	24	50
	12:00 PM	3	0	1	0	4	3	27	0	0	30	0	0	1	0	1	1	17	5	0	23	58
	Peak Hour Volume	15	0	11	0	26	11	62	0	0	73	4	0	4	0	8	9	75	15	0	99	206
	Rounded Hourly Volume	15	0	10	0	25	10	60	0	0	70	5	0	5	0	10	10	75	15	0	100	205
	% Single Unit Trucks	13.3	0.0	9.1	0.0	11.5	18.2	25.8	0.0	0.0	24.7	50.0	0.0	0.0	0.0	25.0	33.3	16.0	13.3	0.0	17.2	19.4
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	12.9	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	9.1	8.3
	% Trucks (Total)	13.3	0.0	9.1	0.0	11.5	18.2	38.7	0.0	0.0	35.6	50.0	0.0	0.0	0.0	25.0	33.3	28.0	13.3	0.0	26.3	27.7
	Peak Hour Factor (PHF)	0.62	0.00	0.69	0.00	0.72	0.69	0.57	0.00	0.00	0.61	0.33	0.00	0.50	0.00	0.50	0.37	0.94	0.75	0.00	0.88	0.89

Wednesday, May 30, 2018		From North					From East					From South					From West					
	PM Peak Hour	Gateway Frontage Road					Holy Hill Road					Gateway Frontage Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	7	0	1	0	8	5	64	0	0	69	0	0	3	0	3	3	37	8	0	48	128
	4:15 PM	3	0	3	0	6	3	42	1	0	46	2	0	0	0	2	0	42	4	0	46	100
	4:30 PM	10	0	3	0	13	4	94	0	0	98	0	0	1	0	1	1	34	8	0	43	155
	4:45 PM	13	0	1	0	14	7	58	0	0	65	0	0	3	0	3	0	36	6	0	42	124
	Peak Hour Volume	33	0	8	0	41	19	258	1	0	278	2	0	7	0	9	4	149	26	0	179	507
	Rounded Hourly Volume	35	0	10	0	45	20	260	0	0	280	0	0	5	0	5	5	150	25	0	180	510
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	25.0	9.4	0.0	0.0	8.4	5.7
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	2.2	1.4
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	25.0	12.1	0.0	0.0	10.6	7.1
	Peak Hour Factor (PHF)	0.63	0.00	0.67	0.00	0.73	0.68	0.69	0.25	0.00	0.71	0.25	0.00	0.58	0.00	0.75	0.33	0.89	0.81	0.00	0.93	0.82

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Gateway Frontage Road			Holy Hill Road			Gateway Frontage Road			Holy Hill Road			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Gateway Frontage Road and Holy Hill Road

15-Minute Motor Vehicle Data

	15-Minute Time Period Start Time	From North (Gateway Frontage Road)					From East (Holy Hill Road)					From South (Gateway Frontage Road)					From West (Holy Hill Road)					15-Min Totals	Hourly Sum	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	4	0	0	0	4	1	17	0	0	18	0	0	0	0	0	1	40	2	0	43	65	334	0.75
	6:15 AM	1	0	0	0	1	3	22	0	0	25	0	0	1	0	1	0	39	2	0	41	68	375	0.84
	6:30 AM	3	0	3	0	6	5	21	0	0	26	0	0	0	0	0	1	54	3	0	58	90	399	0.90
	6:45 AM	2	0	2	0	4	2	23	0	0	25	0	0	1	0	1	0	80	1	0	81	111	412	0.93
	7:00 AM	8	0	1	0	9	2	44	0	0	46	0	0	0	0	0	1	47	3	0	51	106	399	0.94
	7:15 AM	4	0	1	0	5	1	24	0	0	25	0	1	1	0	2	1	52	7	0	60	92	363	0.88
	7:30 AM	10	0	1	0	11	3	37	1	0	41	0	0	0	0	0	1	44	6	0	51	103	338	0.82
	7:45 AM	5	0	0	0	5	0	25	1	0	26	1	0	1	0	2	0	63	2	0	65	98	288	0.73
	8:00 AM	2	0	0	0	2	2	27	0	0	29	0	0	0	0	0	0	38	1	0	39	70	258	0.92
	8:15 AM	2	0	0	0	2	1	25	0	0	26	0	0	0	0	0	0	37	2	0	39	67	233	0.86
	8:30 AM	2	0	0	0	2	1	22	1	0	24	0	0	1	0	1	2	22	2	0	26	53	202	0.74
	8:45 AM	4	0	2	0	6	1	19	1	0	21	1	0	1	0	2	1	32	5	1	39	68	188	0.69
	9:00 AM	4	1	1	0	6	0	13	1	0	14	1	0	1	0	2	2	15	6	0	23	45	152	0.84
	9:15 AM	3	0	1	0	4	2	10	2	0	14	1	0	1	0	2	1	14	1	0	16	36	140	0.90
	9:30 AM	2	0	0	0	2	0	11	1	0	12	1	0	3	0	4	4	16	1	0	21	39	133	0.85
	9:45 AM	0	0	2	0	2	1	11	0	0	12	0	0	1	0	1	2	12	3	0	17	32	130	0.90
Midday Peak Period	10:00 AM	2	0	2	0	4	0	8	0	0	8	1	1	2	0	4	2	13	2	0	17	33	142	0.81
	10:15 AM	2	0	0	0	2	0	13	0	0	13	0	1	0	0	1	1	9	3	0	13	29	154	0.86
	10:30 AM	3	0	1	0	4	0	10	2	0	12	1	0	3	0	4	1	12	3	0	16	36	177	0.85
	10:45 AM	3	0	2	0	5	1	16	1	0	18	0	0	0	0	0	2	16	3	0	21	44	187	0.90
	11:00 AM	5	0	1	0	6	5	15	3	0	23	0	1	2	0	3	0	8	5	0	13	45	193	0.93
	11:15 AM	2	0	4	0	6	3	11	0	0	14	3	0	1	0	4	6	20	2	0	28	52	206	0.89
	11:30 AM	4	0	3	0	7	4	11	0	0	15	0	0	0	0	0	0	19	5	0	24	46	198	0.85
	11:45 AM	6	0	3	0	9	1	13	0	0	14	1	0	2	0	3	2	19	3	0	24	50	204	0.88
	12:00 PM	3	0	1	0	4	3	27	0	0	30	0	0	1	0	1	1	17	5	0	23	58	203	0.88
	12:15 PM	0	0	6	0	6	5	13	0	0	18	1	0	0	0	1	0	16	3	0	19	44	182	0.88
	12:30 PM	6	0	4	0	10	3	13	0	0	16	0	0	0	0	0	1	21	4	0	26	52	189	0.91
	12:45 PM	4	0	5	0	9	6	9	1	0	16	0	0	2	0	2	0	17	5	0	22	49	177	0.87
	1:00 PM	5	0	3	0	8	0	10	0	0	10	2	0	1	0	3	2	11	3	0	16	37	156	0.76
	1:15 PM	1	0	1	0	2	1	27	1	0	29	0	0	1	0	1	1	15	2	1	19	51	169	0.83
	1:30 PM	4	0	3	0	7	1	17	1	0	19	0	0	0	0	0	1	11	2	0	14	40	158	0.79
	1:45 PM	0	0	1	0	1	0	14	0	0	14	1	0	0	0	1	0	10	2	0	12	28	172	0.80
PM Peak Period	2:00 PM	5	0	0	0	5	1	22	0	0	23	1	0	0	0	1	4	14	3	0	21	50	192	0.89
	2:15 PM	1	0	0	0	1	1	19	0	0	20	0	0	2	0	2	0	15	2	0	17	40	247	0.59
	2:30 PM	7	0	3	0	10	0	24	0	0	24	0	0	2	0	2	0	13	5	0	18	54	309	0.74
	2:45 PM	4	0	0	0	4	2	15	0	0	17	0	0	0	0	0	0	21	6	0	27	48	390	0.72
	3:00 PM	8	0	0	0	8	8	48	1	0	57	1	1	0	0	2	2	32	4	0	38	105	448	0.83
	3:15 PM	10	0	3	0	13	3	48	0	0	51	0	0	0	0	0	0	33	5	0	38	102	471	0.87
	3:30 PM	13	0	0	0	13	9	76	0	0	85	1	0	1	0	2	1	27	7	0	35	135	469	0.87
	3:45 PM	10	0	0	0	10	0	58	0	0	58	0	0	1	0	1	5	27	5	0	37	106	489	0.79
	4:00 PM	7	0	1	0	8	5	64	0	0	69	0	0	3	0	3	3	37	8	0	48	128	507	0.82
	4:15 PM	3	0	3	0	6	3	42	1	0	46	2	0	0	0	2	0	42	4	0	46	100	483	0.78
	4:30 PM	10	0	3	0	13	4	94	0	0	98	0	0	1	0	1	1	34	8	0	43	155	487	0.79
	4:45 PM	13	0	1	0	14	7	58	0	0	65	0	0	3	0	3	0	36	6	0	42	124	432	0.87
	5:00 PM	6	0	3	0	9	5	52	0	0	57	1	0	1	0	2	1	30	5	0	36	104	395	0.95
	5:15 PM	8	0	3	0	11	4	52	0	0	56	0	0	1	0	1	0	28	8	0	36	104		
	5:30 PM	5	1	2	0	8	3	47	0	0	50	0	0	1	0	1	0	35	6	0	41	100		
	5:45 PM	7	0	0	0	7	2	39	0	0	41	0	0	2	0	2	1	30	6	0	37	87		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		223	2	76	0	301	115	1336	19	0	1470	21	5	45	0	71	55	1293	187	2	1537	3379		

Peak Hour All Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Gateway Frontage Road)					From East (Holy Hill Road)					From South (Gateway Frontage Road)					From West (Holy Hill Road)					Total Hourly Volume	PHF
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM	7:00 AM	27	0	3	0	30	6	130	2	0	138	1	1	2	0	4	3	206	18	0	227	399	0.94
MD	11:15 AM	15	0	11	0	26	11	62	0	0	73	4	0	4	0	8	9	75	15	0	99	206	0.89
PM	4:00 PM	33	0	8	0	41	19	258	1	0	278	2	0	7	0	9	4	149	26	0	179	507	0.82

Intersection Traffic Volume Report

Count Basics			*Page 9 of 11*
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Gateway Frontage Road and Holy Hill Road

15-Minute Heavy Vehicle Data

	15-Minute Time Period Start Time	From North (Gateway Frontage Road)					From East (Holy Hill Road)					From South (Gateway Frontage Road)					From West (Holy Hill Road)					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	1	0	3	4	27
	6:15 AM	1	0	0	0	1	2	5	0	0	7	0	0	0	0	0	0	2	0	0	2	10	30
	6:30 AM	1	0	0	0	1	1	4	0	0	5	0	0	0	0	0	1	0	0	0	1	7	21
	6:45 AM	1	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	3	0	0	3	6	28
	7:00 AM	2	0	0	0	2	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	7	35
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	37
	7:30 AM	1	0	0	0	1	1	5	0	0	6	0	0	0	0	0	0	4	3	0	7	14	43
	7:45 AM	3	0	0	0	3	0	1	0	0	1	0	0	0	0	0	0	9	0	0	9	13	39
	8:00 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	7	0	0	7	9	33
	8:15 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	5	0	0	5	7	34
	8:30 AM	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	1	4	0	0	5	10	34
	8:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5	1	0	6	7	40
	9:00 AM	0	0	1	0	1	0	5	1	0	6	1	0	0	0	1	0	2	0	0	2	10	38
	9:15 AM	0	0	0	0	0	0	5	1	0	6	0	0	0	0	0	0	1	0	0	1	7	37
	9:30 AM	1	0	0	0	1	0	3	0	0	3	1	0	2	0	3	1	8	0	0	9	16	35
	9:45 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	5	28
Midday Peak Period	10:00 AM	0	0	1	0	1	0	2	0	0	2	0	1	1	0	2	0	4	0	0	4	9	35
	10:15 AM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	1	0	0	1	5	35
	10:30 AM	0	0	0	0	0	0	2	2	0	4	1	0	0	0	1	0	4	0	0	4	9	48
	10:45 AM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	1	7	0	0	8	12	50
	11:00 AM	0	0	0	0	0	0	4	2	0	6	0	1	1	0	2	0	1	0	0	1	9	52
	11:15 AM	1	0	0	0	1	0	5	0	0	5	2	0	0	0	2	2	7	1	0	10	18	57
	11:30 AM	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	0	6	0	0	6	11	52
	11:45 AM	1	0	1	0	2	0	5	0	0	5	0	0	0	0	0	1	6	0	0	7	14	52
	12:00 PM	0	0	0	0	0	1	10	0	0	11	0	0	0	0	0	0	2	1	0	3	14	47
	12:15 PM	0	0	1	0	1	2	5	0	0	7	0	0	0	0	0	0	5	0	0	5	13	40
	12:30 PM	1	0	1	0	2	1	4	0	0	5	0	0	0	0	0	0	4	0	0	4	11	40
	12:45 PM	1	0	0	0	1	0	2	0	0	2	0	0	1	0	1	0	4	1	0	5	9	42
	1:00 PM	1	0	0	0	1	0	2	0	0	2	1	0	0	0	1	1	2	0	0	3	7	41
	1:15 PM	0	0	0	0	0	1	6	1	0	8	0	0	0	0	0	1	3	1	0	5	13	41
	1:30 PM	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	0	5	0	0	5	13	38
	1:45 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	2	0	0	2	8	33
PM Peak Period	2:00 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	2	1	0	4	7	34
	2:15 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	6	0	0	6	10	33
	2:30 PM	1	0	1	0	2	0	1	0	0	1	0	0	0	0	0	0	4	1	0	5	8	30
	2:45 PM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	9	32
	3:00 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6	31
	3:15 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	7	36
	3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	9	0	0	9	10	36
	3:45 PM	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	1	0	0	1	8	35
	4:00 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	8	0	0	8	11	36
	4:15 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	7	27
	4:30 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	1	4	0	0	5	9	23
	4:45 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	3	0	0	3	9	19
	5:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2	14
	5:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	2	3	
	5:30 PM	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	0	0	1	0	1	5	
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	0	0	3	4	
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		17	1	7	0	25	11	163	7	0	181	6	2	8	0	16	12	176	13	0	201	423	

Peak Hour Heavy Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Gateway Frontage Road)					From East (Holy Hill Road)					From South (Gateway Frontage Road)					From West (Holy Hill Road)					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	6	0	0	0	6	1	9	0	0	10	0	0	0	0	0	0	16	3	0	19	35
MD	11:15 AM	2	0	1	0	3	2	24	0	0	26	2	0	0	0	2	3	21	2	0	26	57
PM	4:00 PM	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	1	18	0	0	19	36

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Base Information, Observed (6) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Gateway Drive and Holy Hill Rd

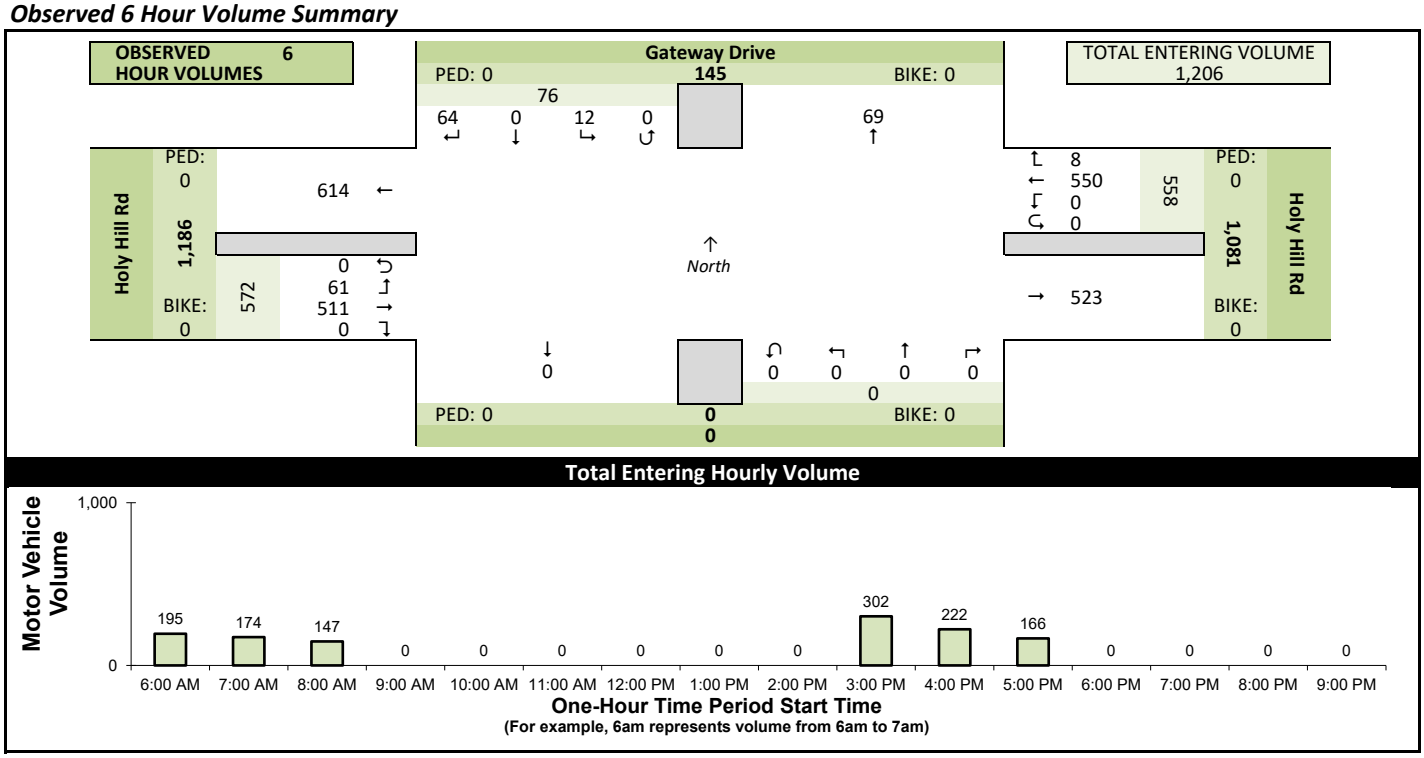
Site Information

Municipality	Germantown		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	Gateway Drive		
East Leg	Holy Hill Rd		
South Leg			
West Leg	Holy Hill Rd		
Special Considerations			
Schools	Not in Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementry school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None	None	

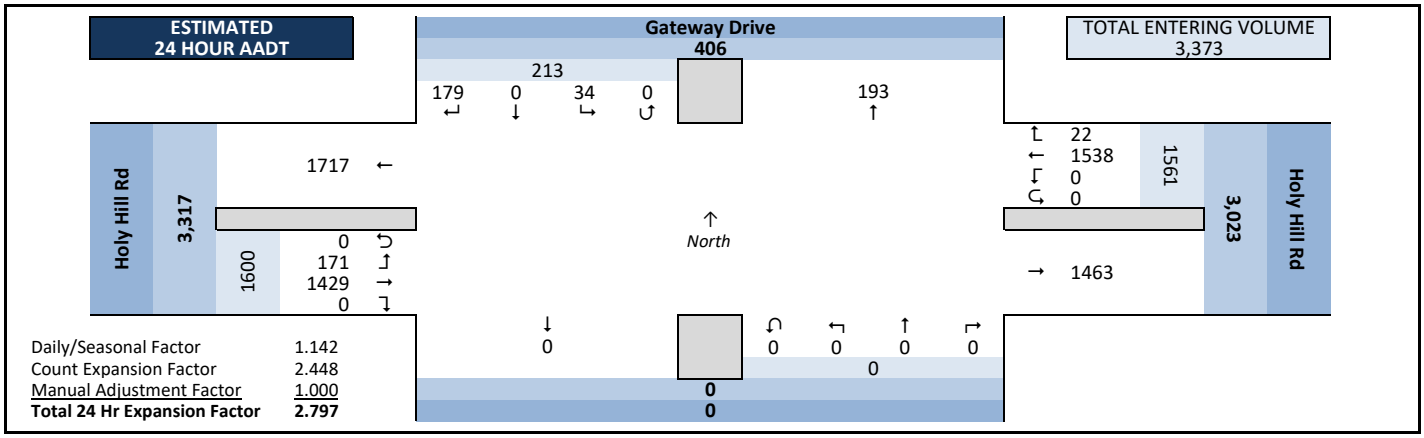
Count Information

Hrs Counted:	6:00 AM-9:00 AM and 3:00 PM-6:00 PM				
1st Day of Count	Monday, March 23, 2020			Weather	
AM Peak Period	Tuesday, March 24, 2020			Clear & Dry	
Midday Peak Period					
PM Peak Period	Monday, March 23, 2020			Clear & Dry	
Calculated Peak Hours					
AM	6:30-7:30am	MD		PM	3:00-4:00pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD		PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(4) Rural Arterials & Collectors				
Count Expansion Group	(4) Rural Arterials & Collectors				
Daily/Seasonal Adjustment Factor	1.142		Count Expansion Factor	2.448	
Company Name	TADi			Manual Adj.	1.000
Observers	AM Peak Period	Ron Andryk			
	Midday Peak Period				
	PM Peak Period	Ted Atwell			
Comments	2018 DOT Seasonal Factors				

Observed 6 Hour Volume Summary



Estimated 24 Hour AADT



Intersection Traffic Volume Report

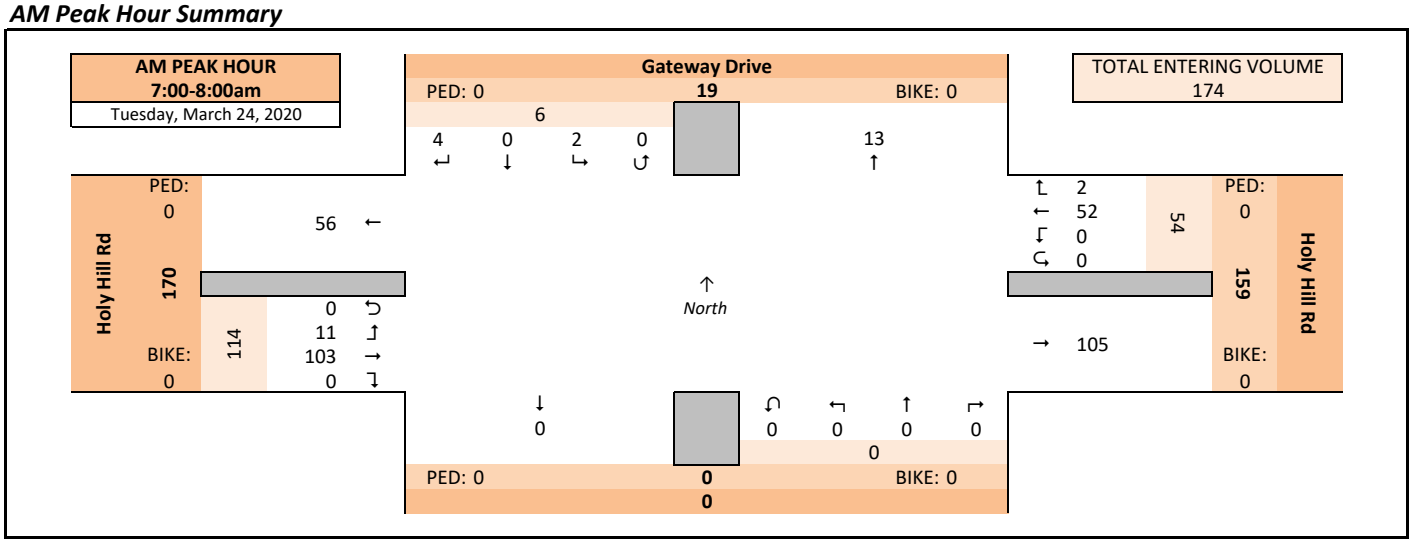
Count Basics			Page 2 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

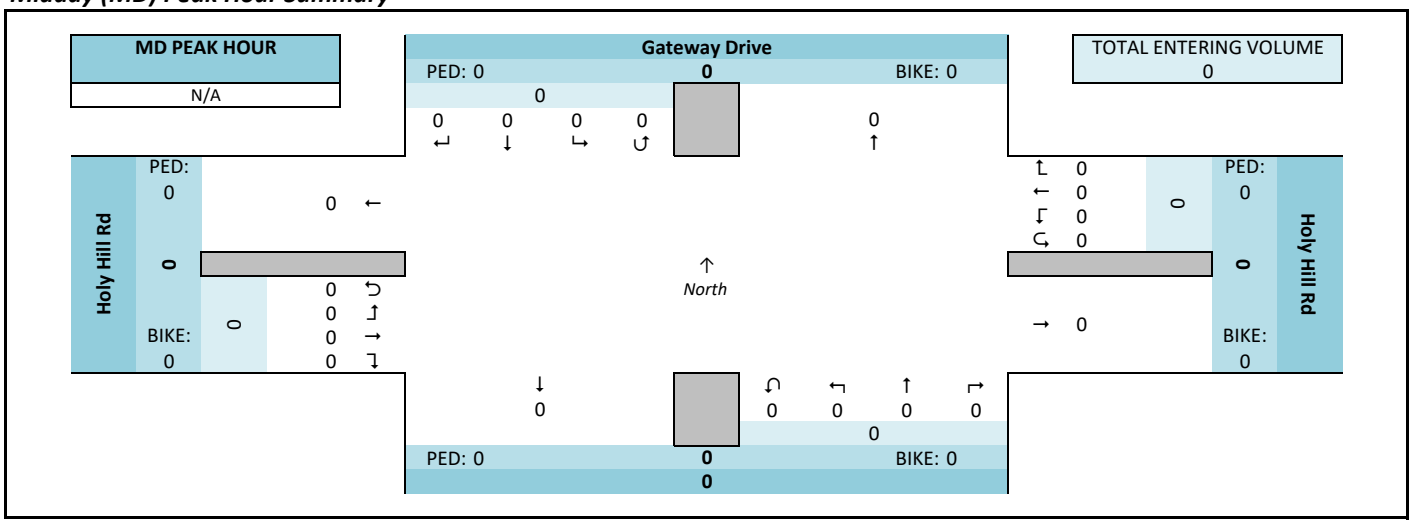
All Motor Vehicles

Gateway Drive and Holy Hill Rd

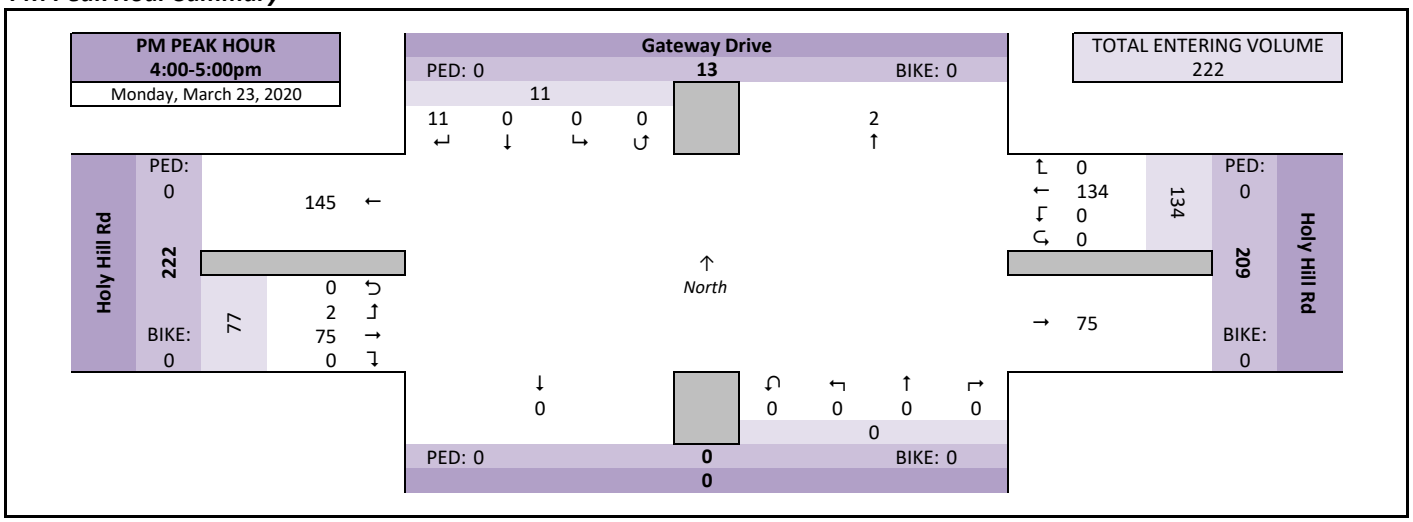
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			Page 3 of 13
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Gateway Drive and Holy Hill Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Tuesday, March 2020		From North					From East					From South					From West					
	AM Peak Hour	Gateway Drive					Holy Hill Rd					0					Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	0	32	2	0	34	48
	7:15 AM	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	0	26	1	0	27	41
	7:30 AM	2	0	0	0	2	1	13	0	0	14	0	0	0	0	0	0	26	3	0	29	45
	7:45 AM	2	0	0	0	2	1	13	0	0	14	0	0	0	0	0	0	19	5	0	24	40
	Peak Hour Volume	4	0	2	0	6	2	52	0	0	54	0	0	0	0	0	0	103	11	0	114	174
	Rounded Hourly Volume	5	0	0	0	5	0	50	0	0	50	0	0	0	0	0	0	105	10	0	115	170
	% Single Unit Trucks	75.0	0.0	0.0	0.0	50.0	0.0	9.6	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	8.7	18.2	0.0	9.6	10.9
	% Heavy Trucks	0.0	0.0	50.0	0.0	16.7	100.0	5.8	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0	6.8	9.1	0.0	7.0	8.0
	% Trucks (Total)	75.0	0.0	50.0	0.0	66.7	100.0	15.4	0.0	0.0	18.5	0.0	0.0	0.0	0.0	0.0	0.0	15.5	27.3	0.0	16.7	19.0
	Peak Hour Factor (PHF)	0.50	0.00	0.50	0.00	0.75	0.50	1.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.55	0.00	0.84	0.91

N/A		From North					From East					From South					From West					
	MD Peak Hour	Gateway Drive					Holy Hill Rd					0					Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Monday, March 23, 2020		From North					From East					From South					From West					
	PM Peak Hour	Gateway Drive					Holy Hill Rd					0					Holy Hill Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	5	0	0	0	5	0	37	0	0	37	0	0	0	0	0	0	10	0	0	10	52
	4:15 PM	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	23	1	0	24	55
	4:30 PM	4	0	0	0	4	0	41	0	0	41	0	0	0	0	0	0	20	0	0	20	65
	4:45 PM	2	0	0	0	2	0	25	0	0	25	0	0	0	0	0	0	22	1	0	23	50
	Peak Hour Volume	11	0	0	0	11	0	134	0	0	134	0	0	0	0	0	0	75	2	0	77	222
	Rounded Hourly Volume	10	0	0	0	10	0	135	0	0	135	0	0	0	0	0	0	75	0	0	75	220
	% Single Unit Trucks	9.1	0.0	0.0	0.0	9.1	0.0	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	9.3	50.0	0.0	10.4	4.5
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	7.8	5.0
	% Trucks (Total)	9.1	0.0	0.0	0.0	9.1	0.0	4.5	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	17.3	50.0	0.0	18.2	9.5
	Peak Hour Factor (PHF)	0.55	0.00	0.00	0.00	0.55	0.00	0.82	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.50	0.00	0.80	0.85

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Gateway Drive			Holy Hill Rd			0			Holy Hill Rd			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 13*
Start Date: Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Gateway Drive and Holy Hill Rd

15-Minute Motor Vehicle Data

15-Minute Time Period Start Time		From North (Gateway Drive) Right	Thru	Left	U-Tn	Total	From East (Holy Hill Rd) Right	Thru	Left	U-Tn	Total	From South (0) Right	Thru	Left	U-Tn	Total	From West (Holy Hill Rd) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum	PHF
AM Peak Period	6:00 AM	0	0	0	0	0	1	6	0	0	7	0	0	0	0	0	0	18	5	0	23	30	195	0.70
	6:15 AM	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	24	7	0	31	39	213	0.76
	6:30 AM	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	0	34	10	0	44	56	215	0.77
	6:45 AM	2	0	1	0	3	0	10	0	0	10	0	0	0	0	0	0	45	12	0	57	70	204	0.73
	7:00 AM	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	0	32	2	0	34	48	174	0.91
	7:15 AM	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	0	26	1	0	27	41	173	0.92
	7:30 AM	2	0	0	0	2	1	13	0	0	14	0	0	0	0	0	0	26	3	0	29	45	169	0.90
	7:45 AM	2	0	0	0	2	1	13	0	0	14	0	0	0	0	0	0	19	5	0	24	40	158	0.84
	8:00 AM	7	0	1	0	8	1	13	0	0	14	0	0	0	0	0	0	21	4	0	25	47	147	0.78
	8:15 AM	3	0	1	0	4	1	15	0	0	16	0	0	0	0	0	0	16	1	0	17	37		
	8:30 AM	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	0	20	0	0	20	34		
	8:45 AM	0	0	0	0	0	2	11	0	0	13	0	0	0	0	0	0	16	0	0	16	29		
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	3:00 PM	0	0	2	0	2	0	54	0	0	54	0	0	0	0	0	0	21	6	0	27	83	302	0.75
	3:15 PM	2	0	0	0	2	0	36	0	0	36	0	0	0	0	0	0	17	3	0	20	58	271	0.67
	3:30 PM	29	0	4	0	33	0	46	0	0	46	0	0	0	0	0	0	22	0	0	22	101	268	0.66
	3:45 PM	0	0	0	0	0	0	45	0	0	45	0	0	0	0	0	0	15	0	0	15	60	232	0.89
	4:00 PM	5	0	0	0	5	0	37	0	0	37	0	0	0	0	0	0	10	0	0	10	52	222	0.85
	4:15 PM	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	23	1	0	24	55	216	0.83
	4:30 PM	4	0	0	0	4	0	41	0	0	41	0	0	0	0	0	0	20	0	0	20	65	211	0.81
	4:45 PM	2	0	0	0	2	0	25	0	0	25	0	0	0	0	0	0	22	1	0	23	50	179	0.90
	5:00 PM	3	0	0	0	3	1	31	0	0	32	0	0	0	0	0	0	11	0	0	11	46	166	0.83
	5:15 PM	1	0	0	0	1	0	28	0	0	28	0	0	0	0	0	0	21	0	0	21	50		
	5:30 PM	2	0	0	0	2	0	13	0	0	13	0	0	0	0	0	0	18	0	0	18	33		
	5:45 PM	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	14	0	0	14	37		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		64	0	12	0	76	8	550	0	0	558	0	0	0	0	0	0	511	61	0	572	1206		

Peak Hour All Vehicle Volume Summary

Hourly Time Period Start Time		From North (Gateway Drive) Right	Thru	Left	U-Tn	Total	From East (Holy Hill Rd) Right	Thru	Left	U-Tn	Total	From South (0) Right	Thru	Left	U-Tn	Total	From West (Holy Hill Rd) Right	Thru	Left	U-Tn	Total	Total Hourly Volume	PHF
AM	7:00 AM	4	0	2	0	6	2	52	0	0	54	0	0	0	0	0	0	103	11	0	114	174	0.91
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	4:00 PM	11	0	0	0	11	0	134	0	0	134	0	0	0	0	0	0	75	2	0	77	222	0.85

Intersection Traffic Volume Report

Count Basics			*Page 9 of 13*
Start Date:	Monday, March 23, 2020	Weekday	Schools Not in Session
Total Number of Hours Counted: 6		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Gateway Drive and Holy Hill Rd

15-Minute Heavy Vehicle Data

	15-Minute Time Period Start Time	From North (Gateway Drive)					From East (Holy Hill Rd)					From South (0)					From West (Holy Hill Rd)					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	20
	6:15 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	5	27
	6:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4	27
	6:45 AM	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	0	5	1	0	6	10	36
	7:00 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	8	33
	7:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	3	1	0	4	5	31
	7:30 AM	2	0	0	0	2	1	3	0	0	4	0	0	0	0	0	0	5	2	0	7	13	37
	7:45 AM	1	0	0	0	1	1	2	0	0	3	0	0	0	0	0	0	3	0	0	3	7	35
	8:00 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6	37
	8:15 AM	0	0	1	0	1	1	6	0	0	7	0	0	0	0	0	0	3	0	0	3	11	
	8:30 AM	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	0	7	0	0	7	11	
	8:45 AM	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	0	4	0	0	4	9	
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	3:00 PM	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	0	2	1	0	3	7	22
	3:15 PM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	3	0	0	3	9	20
	3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3	14
	3:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	3	18
	4:00 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	5	21
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	3	19
	4:30 PM	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	5	0	0	5	7	23
	4:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	6	16
	5:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	3	13
	5:15 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	7	
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	5:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3	
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		4	0	5	0	9	4	56	0	0	60	0	0	0	0	0	0	71	6	0	77	146	

Peak Hour Heavy Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Gateway Drive)					From East (Holy Hill Rd)					From South (0)					From West (Holy Hill Rd)					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	3	0	1	0	4	2	8	0	0	10	0	0	0	0	0	0	16	3	0	19	33
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	0	13	1	0	14	21

Intersection Traffic Volume Report

Count Basics	Version 2013.J4.1		Page 1 of 11
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Base Information, Observed (12) Hour and Estimated (24) Hour Volume Summaries

Intersection of: Goldendale Road and Holy Hill Road

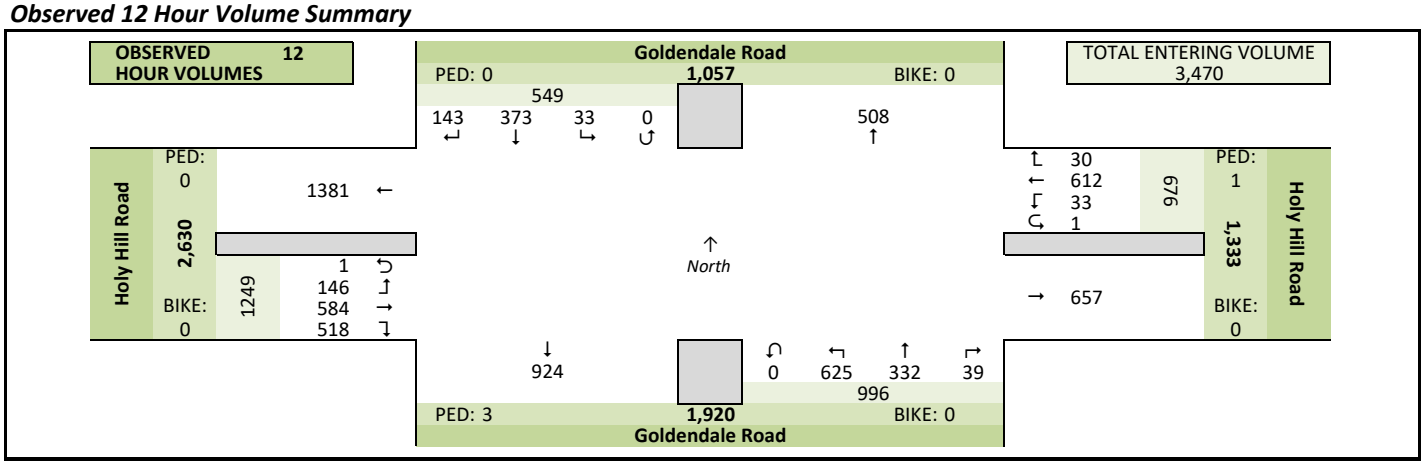
Site Information

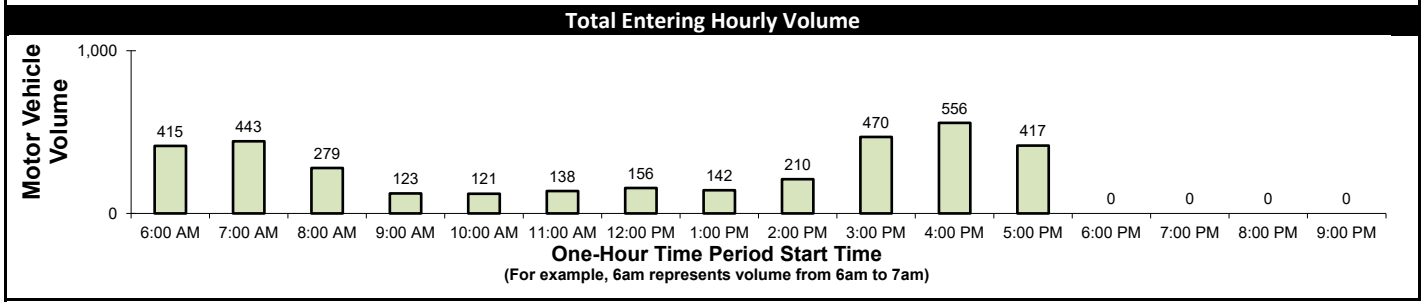
Municipality	Village of Germantown		
County	Washington	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names		North Direction	↑
North Leg	Goldendale Road		
East Leg	Holy Hill Road		
South Leg	Goldendale Road		
West Leg	Holy Hill Road		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementry school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None	None	

Count Information

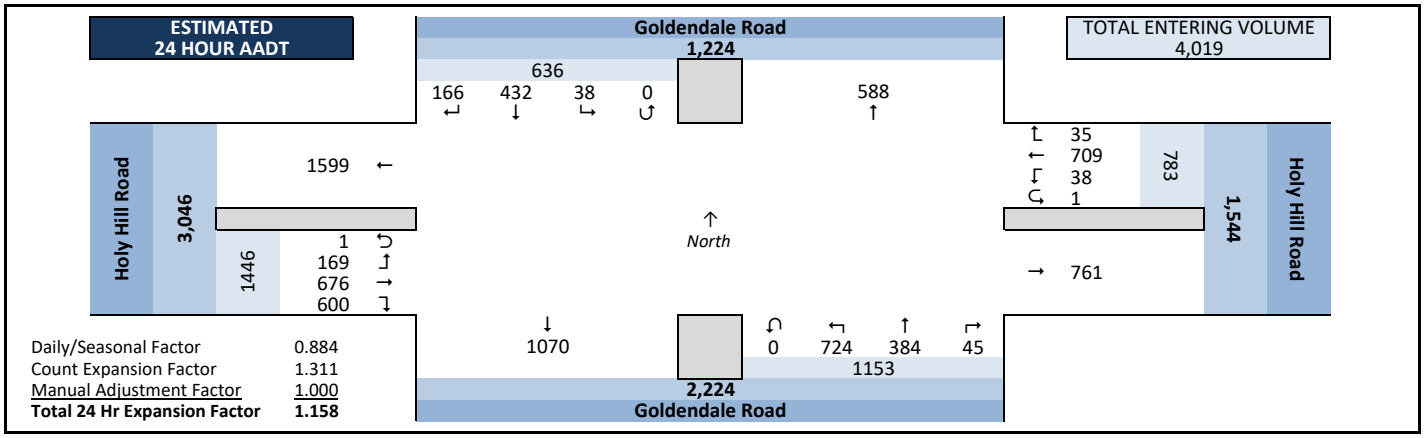
Hrs Counted:	6:00 AM-6:00 PM				
1st Day of Count	Wednesday, May 30, 2018			Weather	
AM Peak Period	Thursday, May 31, 2018			Clear & Dry	
Midday Peak Period	Wednesday, October 23, 2019			Clear & Dry	
PM Peak Period	Wednesday, May 30, 2018			Clear & Dry	
Calculated Peak Hours					
AM	6:30-7:30am	MD	12:15-1:15pm	PM	4:00-5:00pm
Peak Hours Selected for Analysis					
AM	7:00-8:00am	MD	12:15-1:15pm	PM	4:00-5:00pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors				
Count Expansion Group	(2) Urban Arterials & Collectors				
Daily/Seasonal Adjustment Factor	0.884	Count Expansion Factor	1.311		
Company Name	TADI, Inc			Manual Adj.	1.000
Observers	AM Peak Period	Lee Oestreich			
	Midday Peak Period	None			
	PM Peak Period	Wendy Picard			
Comments	2016 DOT Seasonal Factors				

Observed 12 Hour Volume Summary





Estimated 24 Hour AADT



Intersection Traffic Volume Report

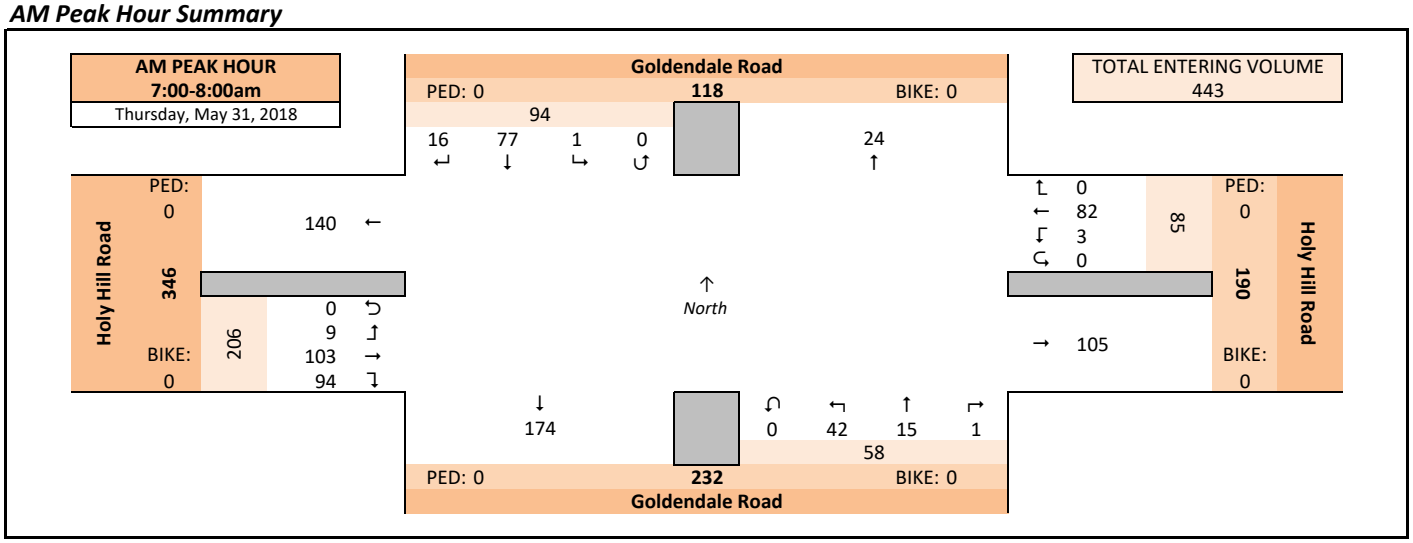
Count Basics			Page 2 of 11
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Peak Hour Volume Graphical Summary

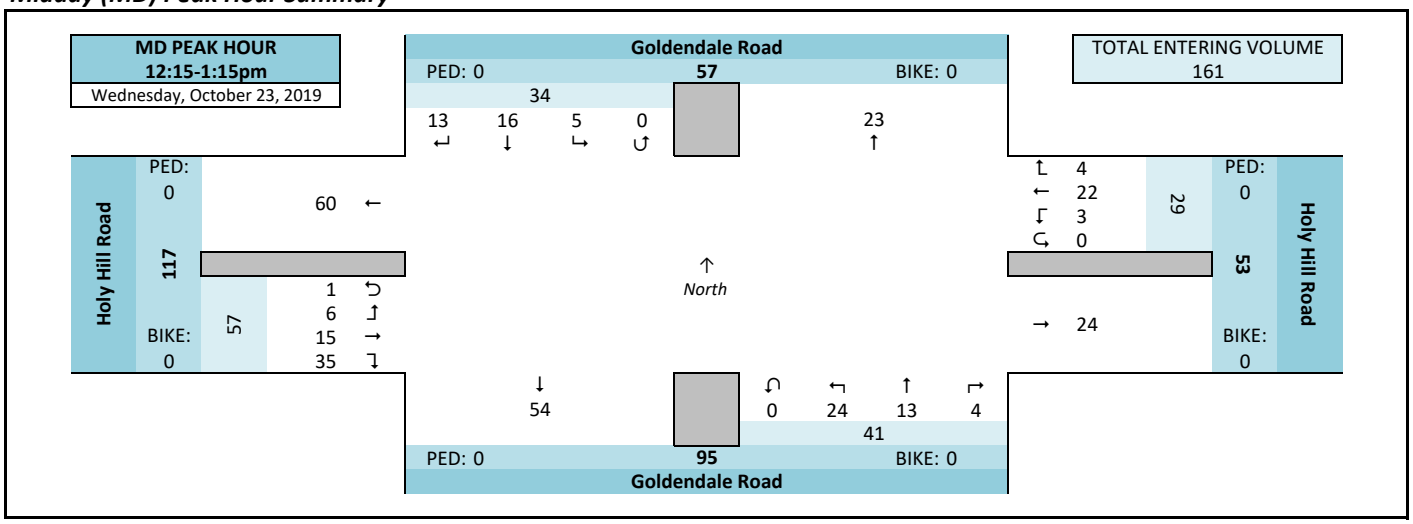
All Motor Vehicles

Goldendale Road and Holy Hill Road

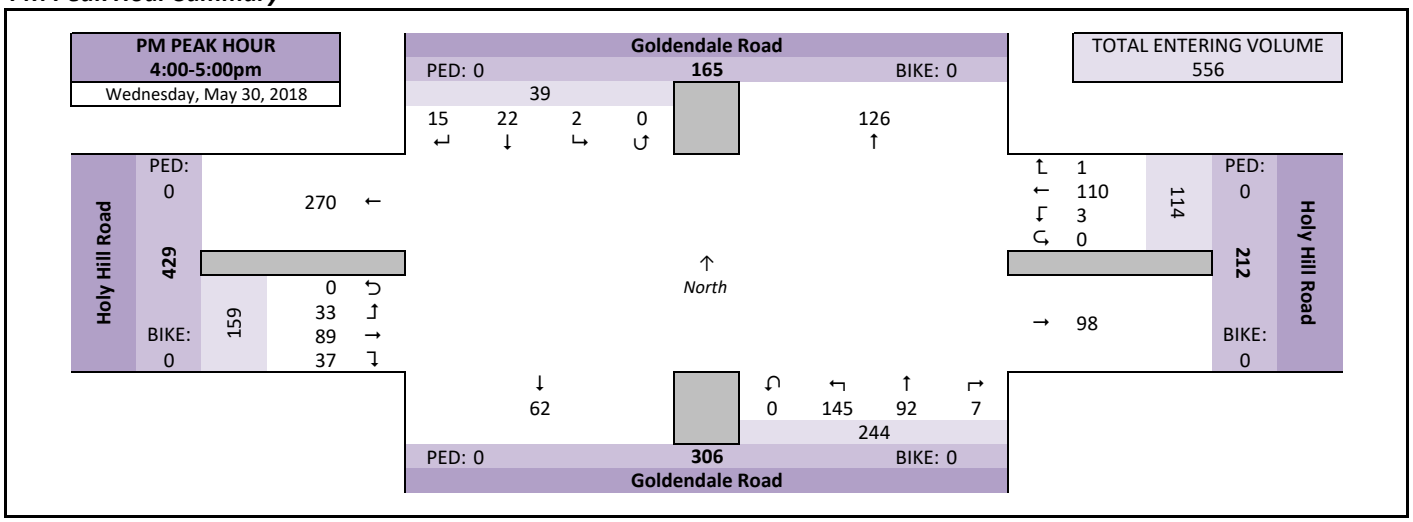
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary



Intersection Traffic Volume Report

Count Basics			*Page 3 of 11*
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

Peak Hour Volume Summary

All Motor Vehicles

Goldendale Road and Holy Hill Road

Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, May 31, 2018		From North					From East					From South					From West					
	AM Peak Hour	Goldendale Road					Holy Hill Road					Goldendale Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
AM Peak Hour	7:00 AM	5	21	1	0	27	0	25	1	0	26	1	7	17	0	25	35	14	0	0	49	127
	7:15 AM	3	21	0	0	24	0	20	2	0	22	0	3	5	0	8	23	24	1	0	48	102
	7:30 AM	5	14	0	0	19	0	23	0	0	23	0	4	10	0	14	12	35	2	0	49	105
	7:45 AM	3	21	0	0	24	0	14	0	0	14	0	1	10	0	11	24	30	6	0	60	109
	Peak Hour Volume	16	77	1	0	94	0	82	3	0	85	1	15	42	0	58	94	103	9	0	206	443
	Rounded Hourly Volume	15	75	0	0	90	0	80	5	0	85	0	15	40	0	55	95	105	10	0	210	440
	% Single Unit Trucks	6.2	2.6	0.0	0.0	3.2	0.0	3.7	0.0	0.0	3.5	0.0	20.0	9.5	0.0	12.1	0.0	5.8	33.3	0.0	4.4	5.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	3.4	4.3	1.9	0.0	0.0	2.9	1.8
	% Trucks (Total)	6.2	2.6	0.0	0.0	3.2	0.0	3.7	0.0	0.0	3.5	0.0	20.0	14.3	0.0	15.5	4.3	7.8	33.3	0.0	7.3	6.8
	Peak Hour Factor (PHF)	0.80	0.92	0.25	0.00	0.87	0.00	0.82	0.37	0.00	0.82	0.25	0.54	0.62	0.00	0.58	0.67	0.74	0.37	0.00	0.86	0.87

Wednesday, October 23, 2019		From North					From East					From South					From West					
	MD Peak Hour	Goldendale Road					Holy Hill Road					Goldendale Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
Midday (MD) Peak Hour	12:15 PM	3	5	1	0	9	1	4	0	0	5	2	2	7	0	11	8	3	2	0	13	38
	12:30 PM	4	4	1	0	9	1	4	1	0	6	1	1	6	0	8	14	2	2	0	18	41
	12:45 PM	3	4	2	0	9	1	4	2	0	7	0	4	6	0	10	5	5	1	0	11	37
	1:00 PM	3	3	1	0	7	1	10	0	0	11	1	6	5	0	12	8	5	1	1	15	45
	Peak Hour Volume	13	16	5	0	34	4	22	3	0	29	4	13	24	0	41	35	15	6	1	57	161
	Rounded Hourly Volume	15	15	5	0	35	5	20	5	0	30	5	15	25	0	45	35	15	5	0	55	165
	% Single Unit Trucks	15.4	12.5	40.0	0.0	17.6	50.0	22.7	33.3	0.0	27.6	0.0	7.7	12.5	0.0	9.8	11.4	0.0	16.7	0.0	8.8	14.3
	% Heavy Trucks	0.0	0.0	20.0	0.0	2.9	0.0	4.5	0.0	0.0	3.4	0.0	0.0	12.5	0.0	7.3	11.4	0.0	0.0	0.0	7.0	5.6
	% Trucks (Total)	15.4	12.5	60.0	0.0	20.6	50.0	27.3	33.3	0.0	31.0	0.0	7.7	25.0	0.0	17.1	22.9	0.0	16.7	0.0	15.8	19.9
	Peak Hour Factor (PHF)	0.81	0.80	0.62	0.00	0.94	1.00	0.55	0.37	0.00	0.66	0.50	0.54	0.86	0.00	0.85	0.62	0.75	0.75	0.25	0.79	0.89

Wednesday, May 30, 2018		From North					From East					From South					From West					
	PM Peak Hour	Goldendale Road					Holy Hill Road					Goldendale Road					Holy Hill Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
PM Peak Hour	4:00 PM	3	4	0	0	7	0	30	1	0	31	1	21	32	0	54	11	18	12	0	41	133
	4:15 PM	6	5	0	0	11	0	19	0	0	19	3	17	22	0	42	11	25	9	0	45	117
	4:30 PM	3	4	1	0	8	1	35	1	0	37	0	33	58	0	91	8	22	5	0	35	171
	4:45 PM	3	9	1	0	13	0	26	1	0	27	3	21	33	0	57	7	24	7	0	38	135
	Peak Hour Volume	15	22	2	0	39	1	110	3	0	114	7	92	145	0	244	37	89	33	0	159	556
	Rounded Hourly Volume	15	20	0	0	35	0	110	5	0	115	5	90	145	0	240	35	90	35	0	160	550
	% Single Unit Trucks	20.0	4.5	0.0	0.0	10.3	0.0	5.5	0.0	0.0	5.3	0.0	2.2	2.8	0.0	2.5	8.1	3.4	27.3	0.0	9.4	5.6
	% Heavy Trucks	0.0	9.1	0.0	0.0	5.1	0.0	0.9	0.0	0.0	0.9	0.0	0.0	1.4	0.0	0.8	5.4	0.0	0.0	0.0	1.3	1.3
	% Trucks (Total)	20.0	13.6	0.0	0.0	15.4	0.0	6.4	0.0	0.0	6.1	0.0	2.2	4.1	0.0	3.3	13.5	3.4	27.3	0.0	10.7	6.8
	Peak Hour Factor (PHF)	0.62	0.61	0.50	0.00	0.75	0.25	0.79	0.75	0.00	0.77	0.58	0.70	0.62	0.00	0.67	0.84	0.89	0.69	0.00	0.88	0.81

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
		Goldendale Road			Holy Hill Road			Goldendale Road			Holy Hill Road			
	15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Traffic Volume Report

Count Basics		*Page 5 of 11*
Start Date: Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12	Non-Holiday	No Special Events

15-Minute Motor Vehicle Data

All Motor Vehicles

Goldendale Road and Holy Hill Road

15-Minute Motor Vehicle Data

	15-Minute Time Period Start Time	From North (Goldendale Road) Right	Thru	Left	U-Tn	Total	From East (Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Goldendale Road) Right	Thru	Left	U-Tn	Total	From West (Holy Hill Road) Right	Thru	Left	U-Tn	Total	15-Min Totals	Hourly Sum	PHF
AM Peak Period	6:00 AM	4	14	0	0	18	0	10	0	0	10	0	0	3	0	3	23	17	2	0	42	73	415	0.66
	6:15 AM	6	14	1	0	21	0	11	0	0	11	1	2	7	0	10	16	17	3	0	36	78	469	0.75
	6:30 AM	8	26	0	0	34	0	8	0	0	8	1	2	8	0	11	20	30	4	0	54	107	493	0.79
	6:45 AM	5	48	1	0	54	0	15	0	0	15	0	0	5	0	5	57	23	3	0	83	157	491	0.78
	7:00 AM	5	21	1	0	27	0	25	1	0	26	1	7	17	0	25	35	14	0	0	49	127	443	0.87
	7:15 AM	3	21	0	0	24	0	20	2	0	22	0	3	5	0	8	23	24	1	0	48	102	403	0.92
	7:30 AM	5	14	0	0	19	0	23	0	0	23	0	4	10	0	14	12	35	2	0	49	105	369	0.85
	7:45 AM	3	21	0	0	24	0	14	0	0	14	0	1	10	0	11	24	30	6	0	60	109	317	0.73
	8:00 AM	3	11	0	0	14	1	18	0	0	19	0	2	10	0	12	17	20	5	0	42	87	279	0.80
	8:15 AM	5	7	0	0	12	0	16	0	0	16	1	1	4	0	6	13	18	3	0	34	68	219	0.77
	8:30 AM	7	6	1	0	14	0	11	1	0	12	1	2	3	0	6	8	9	4	0	21	53	186	0.65
	8:45 AM	3	10	1	0	14	1	13	1	0	15	2	0	6	0	8	12	19	3	0	34	71	173	0.61
	9:00 AM	0	5	1	0	6	0	3	0	1	4	3	2	2	0	7	6	4	0	0	10	27	123	0.77
	9:15 AM	3	6	1	0	10	2	5	0	0	7	0	1	7	0	8	4	5	1	0	10	35	124	0.78
	9:30 AM	2	11	1	0	14	0	4	0	0	4	0	4	5	0	9	8	4	1	0	13	40	121	0.76
	9:45 AM	2	3	1	0	6	0	0	0	0	0	1	3	3	0	7	4	2	2	0	8	21	109	0.85
Midday Peak Period	10:00 AM	2	5	1	0	8	0	4	0	0	4	0	4	6	0	10	3	2	1	0	6	28	121	0.92
	10:15 AM	0	6	0	0	6	0	5	0	0	5	2	1	6	0	9	7	5	0	0	12	32	133	0.83
	10:30 AM	3	4	0	0	7	0	2	0	0	2	0	1	7	0	8	6	1	4	0	11	28	135	0.84
	10:45 AM	0	2	1	0	3	1	3	0	0	4	0	5	4	0	9	13	3	1	0	17	33	137	0.86
	11:00 AM	0	4	1	0	5	1	3	5	0	9	0	3	7	0	10	10	5	1	0	16	40	138	0.86
	11:15 AM	1	3	1	0	5	0	3	1	0	4	0	1	10	0	11	5	7	2	0	14	34	138	0.86
	11:30 AM	2	2	1	0	5	0	6	0	0	6	0	5	6	0	11	5	2	1	0	8	30	142	0.89
	11:45 AM	1	2	1	0	4	0	6	0	0	6	0	5	10	0	15	6	3	0	0	9	34	153	0.93
	12:00 PM	0	2	1	0	3	1	6	0	0	7	2	6	6	0	14	11	3	2	0	16	40	156	0.95
	12:15 PM	3	5	1	0	9	1	4	0	0	5	2	2	7	0	11	8	3	2	0	13	38	161	0.89
	12:30 PM	4	4	1	0	9	1	4	1	0	6	1	1	6	0	8	14	2	2	0	18	41	145	0.81
	12:45 PM	3	4	2	0	9	1	4	2	0	7	0	4	6	0	10	5	5	1	0	11	37	138	0.77
	1:00 PM	3	3	1	0	7	1	10	0	0	11	1	6	5	0	12	8	5	1	1	15	45	142	0.79
	1:15 PM	0	2	2	0	4	1	6	0	0	7	0	2	3	0	5	3	3	0	0	6	22	147	0.74
	1:30 PM	2	1	1	0	4	1	5	1	0	7	2	6	8	0	16	3	1	3	0	7	34	168	0.84
	1:45 PM	5	3	1	0	9	1	2	0	0	3	1	6	9	0	16	7	5	1	0	13	41	198	0.77
PM Peak Period	2:00 PM	1	10	1	0	12	1	7	2	0	10	2	6	8	0	16	4	7	1	0	12	50	210	0.82
	2:15 PM	4	3	1	0	8	3	7	0	0	10	2	1	6	0	9	9	7	0	0	16	43	268	0.62
	2:30 PM	3	6	0	0	9	0	8	2	0	10	0	11	23	0	34	6	2	3	0	11	64	340	0.74
	2:45 PM	3	3	2	0	8	1	6	1	0	8	2	3	14	0	19	8	5	5	0	18	53	420	0.73
	3:00 PM	2	3	0	0	5	1	18	1	0	20	1	13	36	0	50	11	17	5	0	33	108	470	0.82
	3:15 PM	3	10	0	0	13	2	23	0	0	25	0	15	27	0	42	8	23	4	0	35	115	495	0.86
	3:30 PM	2	5	0	0	7	1	30	1	0	32	1	27	54	0	82	4	16	3	0	23	144	497	0.86
	3:45 PM	6	6	1	0	13	1	31	0	0	32	0	14	18	0	32	7	12	7	0	26	103	524	0.77
	4:00 PM	3	4	0	0	7	0	30	1	0	31	1	21	32	0	54	11	18	12	0	41	133	556	0.81
	4:15 PM	6	5	0	0	11	0	19	0	0	19	3	17	22	0	42	11	25	9	0	45	117	538	0.79
	4:30 PM	3	4	1	0	8	1	35	1	0	37	0	33	58	0	91	8	22	5	0	35	171	531	0.78
	4:45 PM	3	9	1	0	13	0	26	1	0	27	3	21	33	0	57	7	24	7	0	38	135	468	0.87
	5:00 PM	3	5	1	0	9	1	27	2	0	30	0	18	23	0	41	7	25	3	0	35	115	417	0.91
	5:15 PM	2	5	0	0	7	2	29	2	0	33	1	17	24	0	42	7	17	4	0	28	110		
	5:30 PM	2	4	0	0	6	1	28	3	0	32	0	15	20	0	35	8	15	12	0	35	108		
	5:45 PM	4	1	0	0	5	1	19	1	0	21	1	8	16	0	25	6	23	4	0	33	84		
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		143	373	33	0	549	30	612	33	1	676	39	332	625	0	996	518	584	146	1	1249	3470		

Peak Hour All Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Goldendale Road) Right	Thru	Left	U-Tn	Total	From East (Holy Hill Road) Right	Thru	Left	U-Tn	Total	From South (Goldendale Road) Right	Thru	Left	U-Tn	Total	From West (Holy Hill Road) Right	Thru	Left	U-Tn	Total	Total Hourly Volume	PHF
AM	7:00 AM	16	77	1	0	94	0	82	3	0	85	1	15	42	0	58	94	103	9	0	206	443	0.87
MD	12:15 PM	13	16	5	0	34	4	22	3	0	29	4	13	24	0	41	35	15	6	1	57	161	0.89
PM	4:00 PM	15	22	2	0	39	1	110	3	0	114	7	92	145	0	244	37	89	33	0	159	556	0.81

Intersection Traffic Volume Report

Count Basics			*Page 9 of 11*
Start Date:	Wednesday, May 30, 2018	Weekday	Schools in Session
Total Number of Hours Counted: 12		Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

Goldendale Road and Holy Hill Road

15-Minute Heavy Vehicle Data

	15-Minute Time Period Start Time	From North (Goldendale Road)					From East (Holy Hill Road)					From South (Goldendale Road)					From West (Holy Hill Road)					15-Min Totals	Hourly Sum
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM Peak Period	6:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	4	0	0	6	7	25
	6:15 AM	3	2	0	0	5	0	1	0	0	1	0	0	1	0	1	1	1	0	0	2	9	25
	6:30 AM	3	0	0	0	3	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	4	18
	6:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2	1	0	0	3	5	26
	7:00 AM	1	0	0	0	1	0	1	0	0	1	0	2	1	0	3	2	0	0	0	2	7	30
	7:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	36
	7:30 AM	0	1	0	0	1	0	2	0	0	2	0	1	4	0	5	0	4	0	0	4	12	39
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	4	3	0	8	9	37
	8:00 AM	1	0	0	0	1	0	1	0	0	1	0	2	1	0	3	2	2	4	0	8	13	36
	8:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	5	28
	8:30 AM	1	1	0	0	2	0	3	0	0	3	0	1	0	0	1	0	1	3	0	4	10	31
	8:45 AM	0	1	0	0	1	0	1	0	0	1	0	0	1	0	1	1	4	0	0	5	8	27
	9:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2	1	0	0	3	5	27
	9:15 AM	1	2	0	0	3	0	0	0	0	0	0	0	1	0	1	1	3	0	0	4	8	26
	9:30 AM	0	1	0	0	1	0	1	0	0	1	0	0	2	0	2	1	0	1	0	2	6	22
	9:45 AM	1	0	0	0	1	0	0	0	0	0	1	1	1	0	3	3	1	0	0	4	8	21
Midday Peak Period	10:00 AM	0	1	0	0	1	0	0	0	0	0	0	1	1	0	2	0	1	0	0	1	4	16
	10:15 AM	0	1	0	0	1	0	1	0	0	1	0	0	2	0	2	0	0	0	0	0	4	15
	10:30 AM	1	1	0	0	2	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	5	16
	10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	2	3	15
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	2	3	17
	11:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	2	0	0	4	5	21
	11:30 AM	0	0	0	0	0	0	1	0	0	1	0	2	1	0	3	0	0	0	0	0	4	22
	11:45 AM	0	1	1	0	2	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	5	29
	12:00 PM	0	0	0	0	0	1	2	0	0	3	1	1	1	0	3	0	0	1	0	1	7	29
	12:15 PM	0	1	1	0	2	1	1	0	0	2	0	0	0	0	0	2	0	0	0	2	6	32
	12:30 PM	1	1	1	0	3	0	0	0	0	0	0	0	3	0	3	5	0	0	0	5	11	31
	12:45 PM	1	0	1	0	2	0	1	1	0	2	0	0	1	0	1	0	0	0	0	0	5	25
	1:00 PM	0	0	0	0	0	1	4	0	0	5	0	1	2	0	3	1	0	1	0	2	10	26
	1:15 PM	0	0	1	0	1	0	2	0	0	2	0	0	2	0	2	0	0	0	0	0	5	22
	1:30 PM	1	0	1	0	2	1	0	0	0	1	0	0	2	0	2	0	0	0	0	0	5	20
	1:45 PM	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	6	23
PM Peak Period	2:00 PM	0	5	0	0	5	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	6	18
	2:15 PM	1	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	3	19
	2:30 PM	1	0	0	0	1	0	3	0	0	3	0	0	1	0	1	1	0	2	0	3	8	24
	2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	25
	3:00 PM	1	0	0	0	1	0	0	0	0	0	0	0	2	0	2	2	1	1	0	4	7	35
	3:15 PM	1	0	0	0	1	0	1	0	0	1	0	1	2	0	3	0	2	1	0	3	8	43
	3:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	1	4	2	0	7	9	44
	3:45 PM	0	4	0	0	4	0	3	0	0	3	0	0	3	0	3	1	0	0	0	1	11	42
	4:00 PM	0	1	0	0	1	0	3	0	0	3	0	1	1	0	2	2	2	5	0	9	15	38
	4:15 PM	3	2	0	0	5	0	0	0	0	0	0	0	1	0	1	1	0	2	0	3	9	27
	4:30 PM	0	0	0	0	0	0	1	0	0	1	0	1	2	0	3	2	0	1	0	3	7	19
	4:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	2	0	2	0	1	1	0	2	7	14
	5:00 PM	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	4	9
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	
	5:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	2	
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		23	31	7	0	61	4	44	1	0	49	2	20	52	0	74	44	49	29	0	122	306	

Peak Hour Heavy Vehicle Volume Summary

	Hourly Time Period Start Time	From North (Goldendale Road)					From East (Holy Hill Road)					From South (Goldendale Road)					From West (Holy Hill Road)					Total Hourly Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	7:00 AM	1	2	0	0	3	0	3	0	0	3	0	3	6	0	9	4	8	3	0	15	30
MD	12:15 PM	2	2	3	0	7	2	6	1	0	9	0	1	6	0	7	8	0	1	0	9	32
PM	4:00 PM	3	3	0	0	6	0	7	0	0	7	0	2	6	0	8	5	3	9	0	17	38

Peak Hour Factor & Percent Heavy Vehicles

		Percent HV				
		EB	WB	NB	SB	PHF
STH 167 & STH 175 (Roundabout)	AM	4%	10%	9%	12%	0.91
	PM	9%	3%	3%	9%	0.94
STH 167 & Wolf Road (Stop Signs)	AM	6%	13%	42%	14%	0.87
	PM	7%	4%	20%	2%	0.95
STH 167 & Richfield Parkway (Traffic Signal)	AM	7%	9%	2%	24%	0.89
	PM	6%	4%	2%	15%	0.92
STH 167 & Kwik-Trip In-Only Driveway (no control)	AM	11%	14%			0.89
	PM	11%	6%			0.94
STH 167 & IH-41/45 Southbound Ramps (Stop Signs)	AM	5%	10%		6%	0.95
	PM	7%	4%		5%	0.87
STH 167 & IH-41/45 Northbound Ramps (Stop Signs - All-way)	AM	6%	8%	11%		0.99
	PM	8%	2%	5%		0.87
Holy Hill Road & Gateway Frontage Road (Stop Signs)	AM	8%	7%	2%	20%	0.94
	PM	11%	6%	2%	2%	0.82
Holy Hill Road & Gateway Crossing (Stop Signs)	AM	17%	19%	2%	67%	0.91
	PM	18%	5%	2%	9%	0.85
Holy Hill Road & Gateway Court (Stop Signs)	AM	17%	19%	2%	2%	0.91
	PM	18%	5%	2%	2%	0.85
Holy Hill Road & Goldendale Road (Stop Signs)	AM	7%	4%	16%	3%	0.87
	PM	11%	6%	3%	15%	0.81

Saturation Flow Rate Calculations for Traffic Signalized Intersections (TEOpS 16-15-5.2.2)

Project: 2521 Richfield-Germantown STH 167-Holy Hill Road Study
Scenario: All scenarios, Existing Transportation System
User: TADI
Date: 1/11/2021
Population: 1,376,476
Range: 704,500+

Intersection	Direction	Approach Lanes	Posted Speed	Shared Lt/Th?	Shared Th/Rt?	Sat Flow (pcphpl) - Equation			Sat Flow (pcphpl) - Factors		
						Left	Thru	Right	Left	Thru	Right
STH 167 & Richfield Parkway	EB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	WB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	NB	2	25	N	Y	1900	1762	1762	1900	1750	1750
	SB	2	25	N	Y	1900	1762	1762	1900	1750	1750

- Per TEOpS 16-15-5.2.2.2, when calculated value <1750 pcphpl, consider field study or HCM6 default values.
HCM6 default values are 1900 with population > 250,000 and 1750 with population ≤ 250,000.

Special Notes:

TADI Worksheet, Updated 8-10-2020 (MPM)

Saturation Flow Rate Calculations for Traffic Signalized Intersections (TEOpS 16-15-5.2.2)

Project: 2521 Richfield-Germantown STH 167-Holy Hill Road Study
Scenario: Modified System - 2025 & 2040 Background; 2025 Build
User: TADI
Date: 1/11/2021
Population: 1,376,476
Range: 704,500+

Intersection	Direction	Approach Lanes	Posted Speed	Shared Lt/Th?	Shared Th/Rt?	Sat Flow (pcphpl) - Equation			Sat Flow (pcphpl) - Factors		
						Left	Thru	Right	Left	Thru	Right
STH 167 & Richfield Parkway	EB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	WB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	NB	2	25	N	Y	1900	1762	1762	1900	1750	1750
	SB	2	25	N	Y	1900	1762	1762	1900	1750	1750
STH 167 & IH-41/45 Southbound Ramps	EB	2	45	N	N	1900	1914	1900	1900	1898	1900
	WB	2	45	N	N	1900	1914	1900	1900	1898	1900
	SB	2	30	Y	N	1900	1900	1900	1900	1900	1900
STH 167 & IH-41/45 Northbound Ramps	EB	2	45	N	N	1900	1914	1900	1900	1898	1900
	WB	2	45	N	N	1900	1914	1900	1900	1898	1900
	NB	2	30	Y	N	1900	1900	1900	1900	1900	1900

- Per TEOpS 16-15-5.2.2.2, when calculated value <1750 pcphpl, consider field study or HCM6 default values.
HCM6 default values are 1900 with population > 250,000 and 1750 with population ≤ 250,000.

Special Notes:

TADI Worksheet, Updated 8-10-2020 (MPM)

Saturation Flow Rate Calculations for Traffic Signalized Intersections (TEOpS 16-15-5.2.2)

Project: 2521 Richfield-Germantown STH 167-Holy Hill Road Study
Scenario: Modified System - 2040 Build
User: TADI
Date: 1/11/2021
Population: 1,376,476
Range: 704,500+

Intersection	Direction	Approach Lanes	Posted Speed	Shared Lt/Th?	Shared Th/Rt?	Sat Flow (pcphpl) - Equation			Sat Flow (pcphpl) - Factors		
						Left	Thru	Right	Left	Thru	Right
STH 167 & Richfield Parkway	EB	3	45	N	Y	1900	1953	1953	1900	1939	1939
	WB	3	45	N	Y	1900	1953	1953	1900	1939	1939
	NB	2	25	N	Y	1900	1762	1762	1900	1750	1750
	SB	3	25	N	Y	1900	1799	1799	1900	1787	1787
STH 167 & IH-41/45 Southbound Ramps	EB	3	45	N	N	1900	1953	1900	1900	1939	1900
	WB	3	45	N	N	1900	1953	1900	1900	1939	1900
	SB	3	30	N	N	1900	1835	1900	1900	1825	1900
STH 167 & IH-41/45 Northbound Ramps	EB	4	45	N	N	1900	1974	1900	1900	1959	1900
	WB	3	45	N	N	1900	1953	1900	1900	1939	1900
	NB	3	30	N	N	1900	1835	1900	1900	1825	1900
STH 167 & Gateway Frontage Road	EB	4	45	N	N	1900	1974	1900	1900	1959	1900
	WB	4	45	N	N	1900	1974	1900	1900	1959	1900
	NB	2	25	N	Y	1900	1762	1762	1900	1750	1750
	SB	2	25	N	Y	1900	1762	1762	1900	1750	1750
STH 167 & Gateway Crossing	EB	4	45	N	N	1900	1974	1900	1900	1959	1900
	WB	4	45	N	N	1900	1974	1900	1900	1959	1900
	NB	2	25	N	Y	1900	1762	1762	1900	1750	1750
	SB	2	25	N	Y	1900	1762	1762	1900	1750	1750
STH 167 & Goldendale Road	EB	3	45	N	N	1900	1953	1900	1900	1939	1900
	WB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	NB	2	45	N	Y	1900	1914	1914	1900	1898	1898
	SB	3	55	N	N	1900	2041	1900	1900	2034	1900

- Per TEOpS 16-15-5.2.2.2, when calculated value <1750 pcphpl, consider field study or HCM6 default values.
HCM6 default values are 1900 with population > 250,000 and 1750 with population ≤ 250,000.

Special Notes:

APPENDIX A
Traffic

WisDOT Traffic Forecasts

WisDot Southeast Region
Planning Unit 1
Forecast by: Brent DesRoches
Phone: 262-548-5611
Email: brent.desroches@dot.wi.gov

Projected AM Design Hour Traffic Volumes

Indicates roundabout

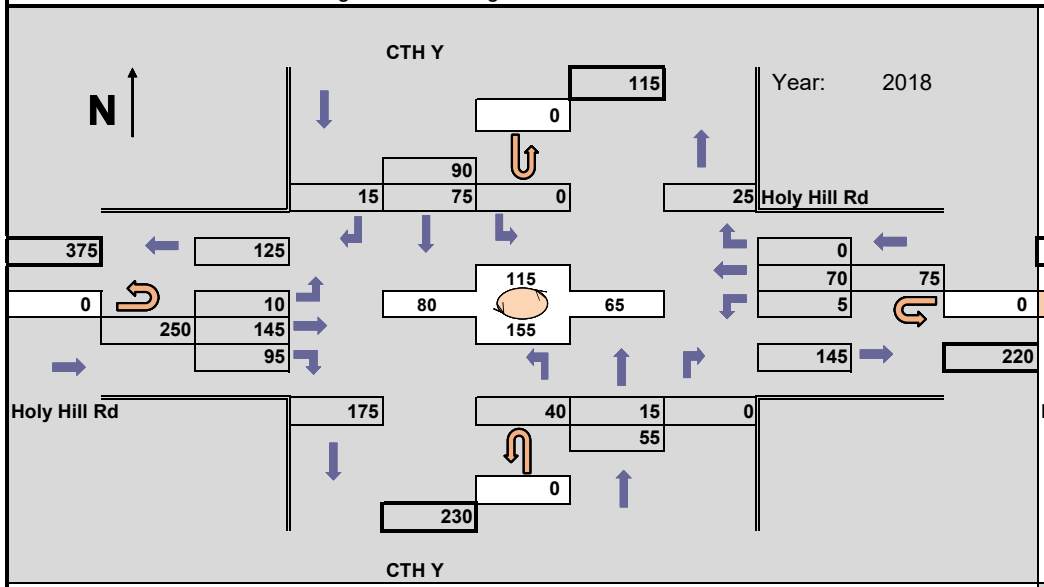
Design Hour: 7:00-8:00am

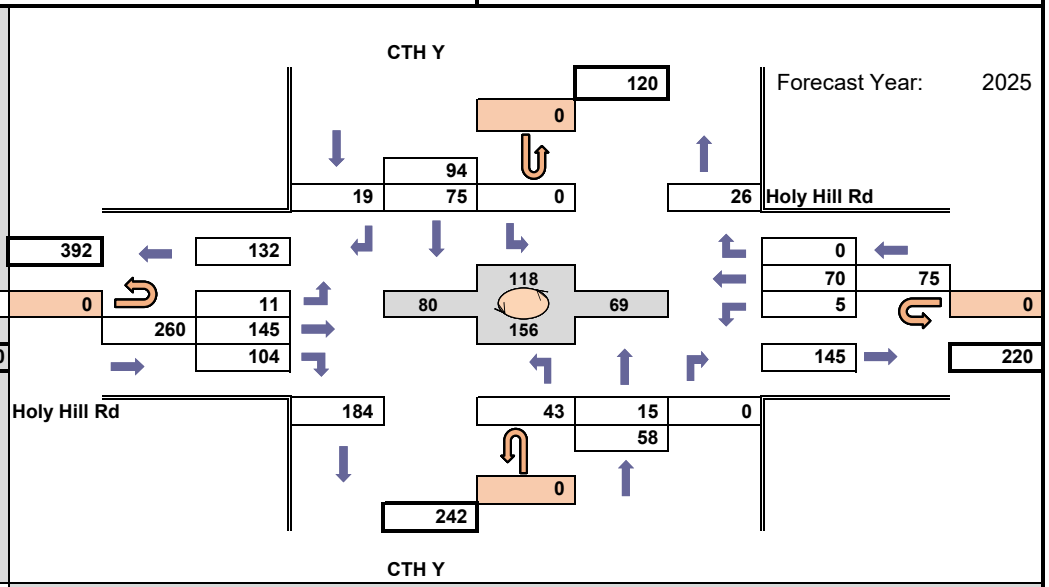
Forecast Completed: 1/1/2021

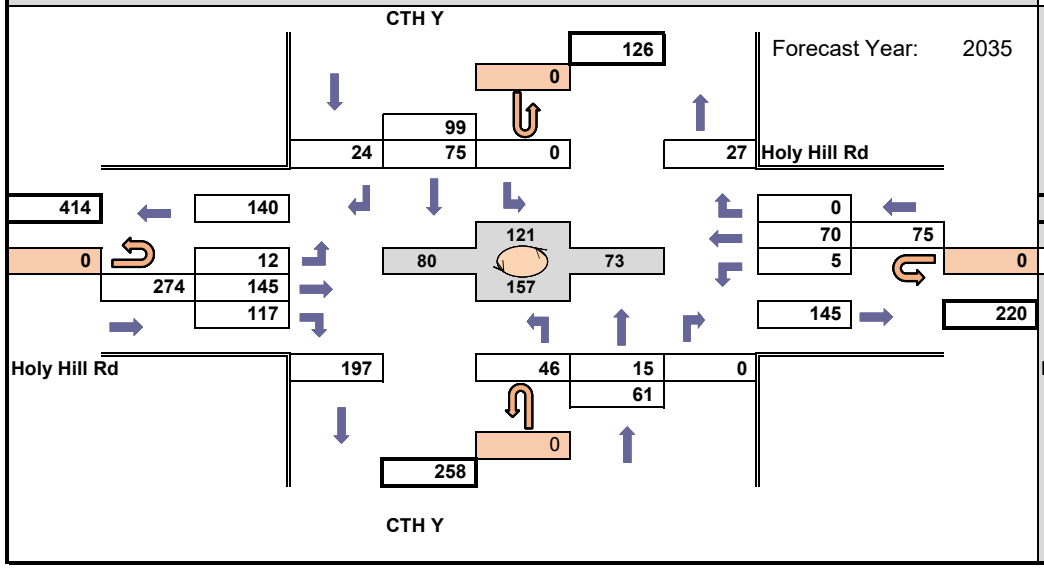
Project Description

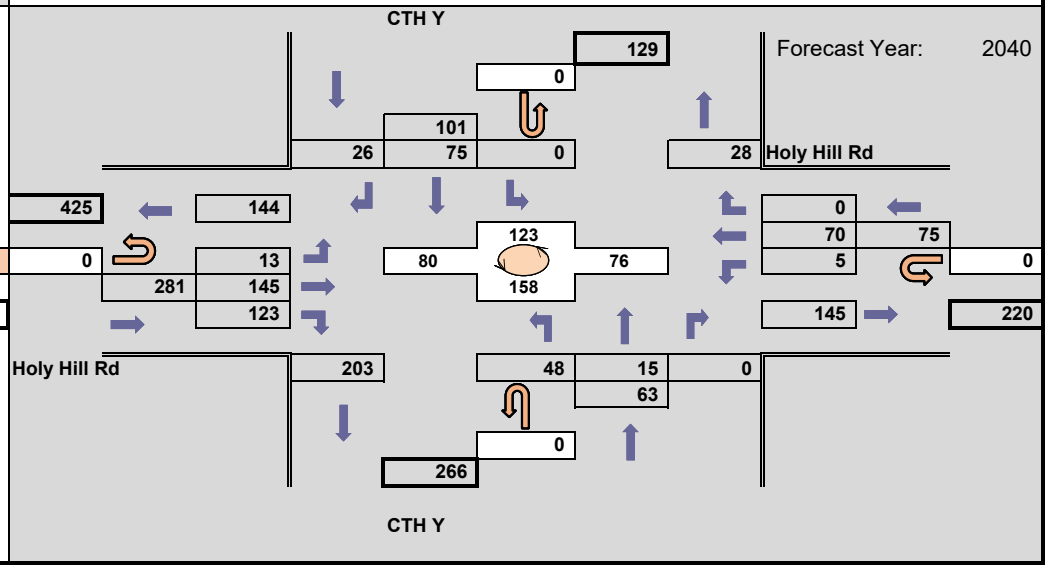
Project ID(s): Holy Hill Rd Corridor Study
Route(s): STH 167/Holy Hill Rd
Region/COUNTY(IES): SE/Washington
Location: STH 175 to CTH Y

Design Hour Turning Movement Data









WisDot Southeast Region
Planning Unit 1
Forecast by: Brent DesRoches
Phone: 262-548-5611
Email: brent.desroches@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

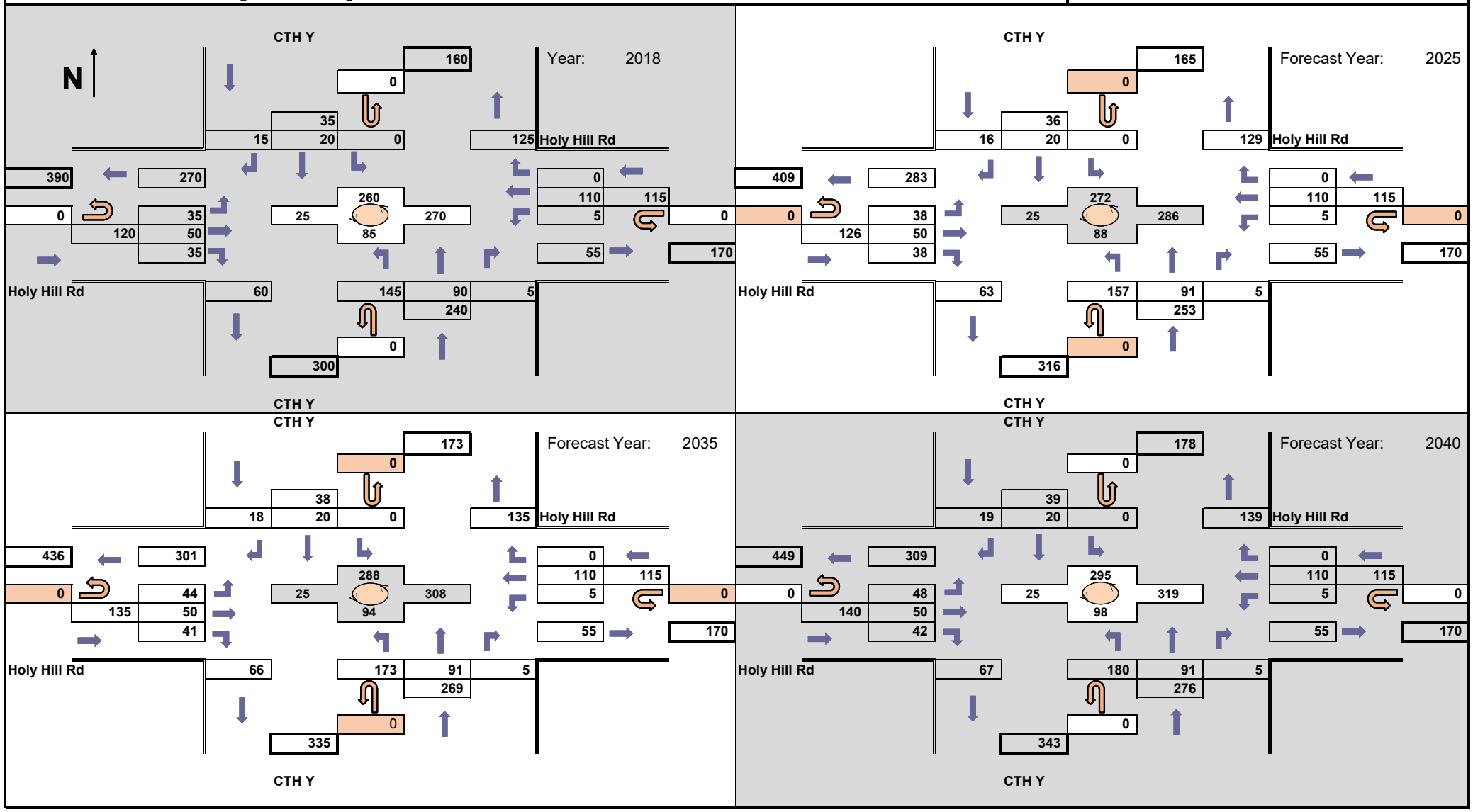
Design Hour: 4:00-5:00pm

Forecast Completed: 1/1/2021

Project Description

Project ID(s): Holy Hill Rd Corridor Study
Route(s): STH 167/Holy Hill Rd
Region/COUNTY(IES): SE/Washington
Location: STH 175 to CTH Y

Design Hour Turning Movement Data



WisDot Southeast Region
Planning Unit 1
Forecast by: Brent DesRoches
Phone: 262-548-5611
Email: brent.desroches@dot.wi.gov

Projected AM Design Hour Traffic Volumes

Indicates roundabout

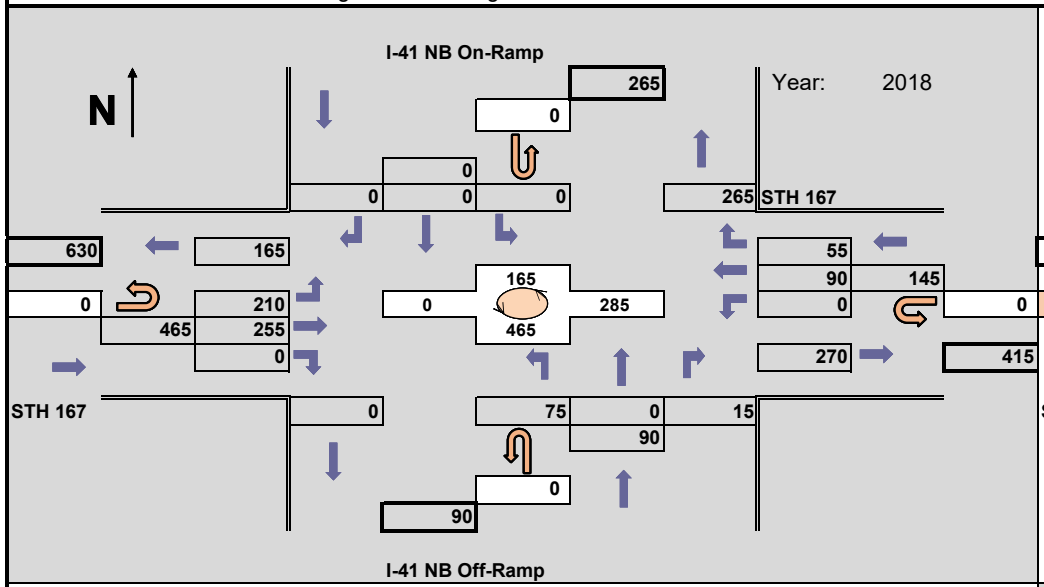
Design Hour: 7:00-8:00am

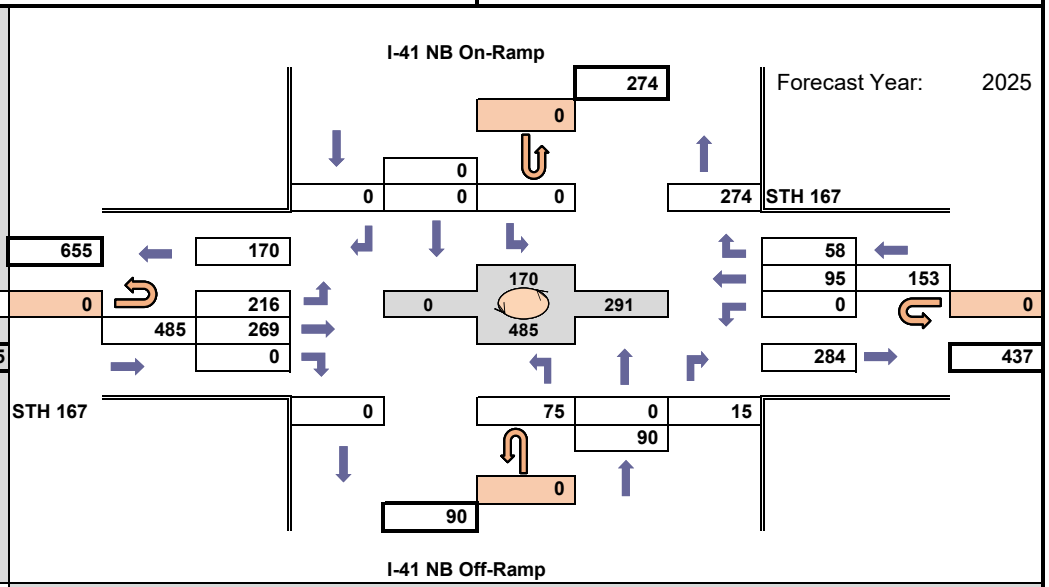
Forecast Completed: 1/1/2021

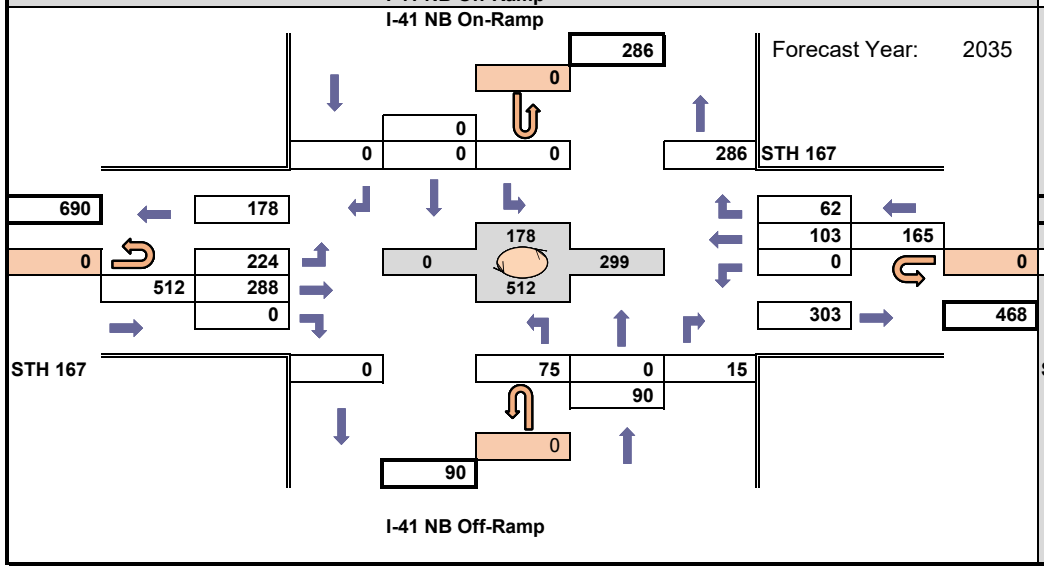
Project Description

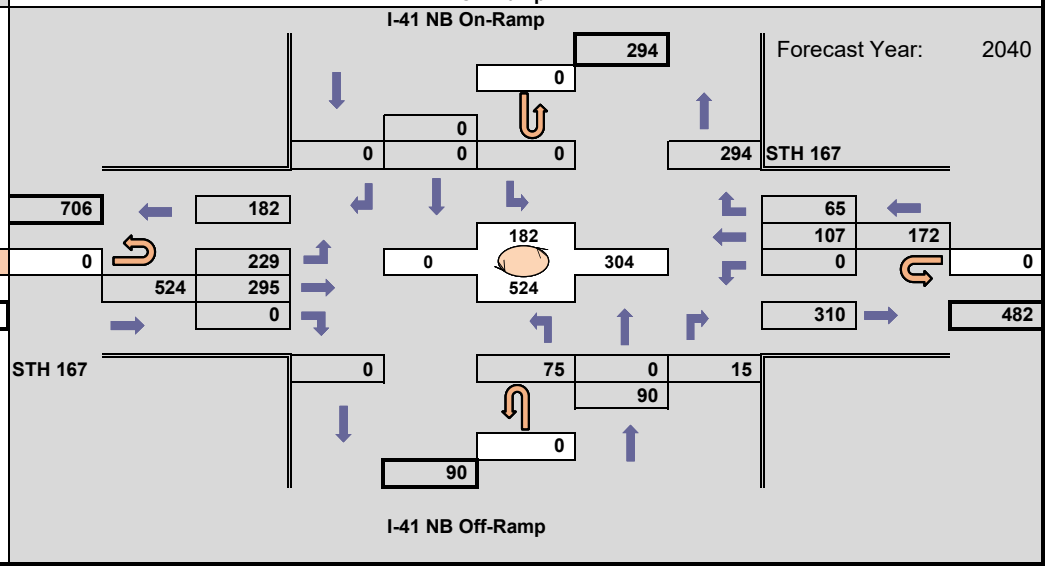
Project ID(s): Holy Hill Rd Corridor Study
Route(s): STH 167/Holy Hill Rd
Region/COUNTY(IES): SE/Washington
Location: STH 175 to CTH Y

Design Hour Turning Movement Data









WisDot Southeast Region
Planning Unit 1
Forecast by: Brent DesRoches
Phone: 262-548-5611
Email: brent.desroches@dot.wi.gov

Projected PM Design Hour Traffic Volumes

Indicates roundabout

Design Hour: 4:00-5:00pm

Forecast Completed: 1/1/2021

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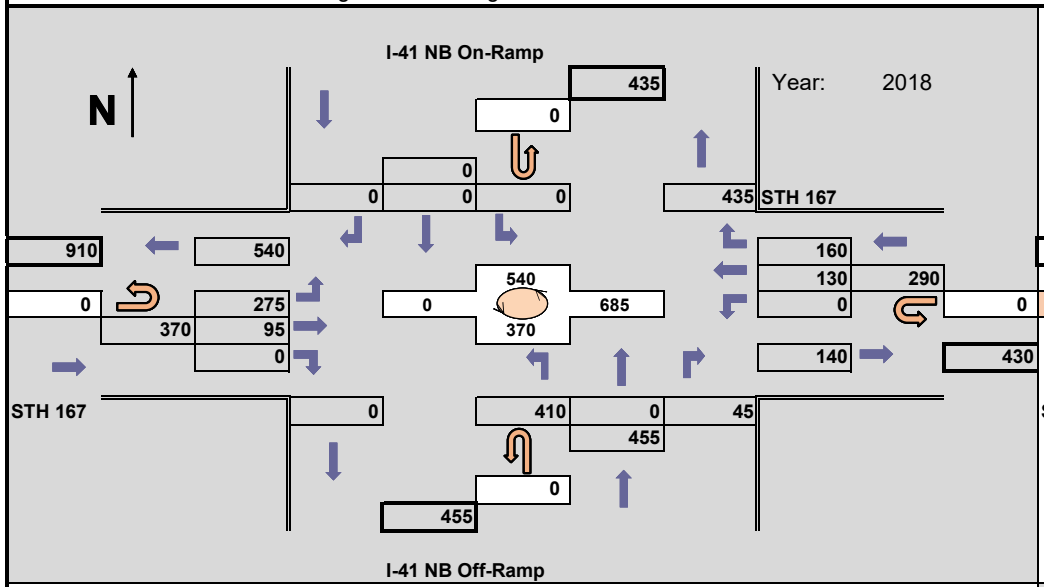

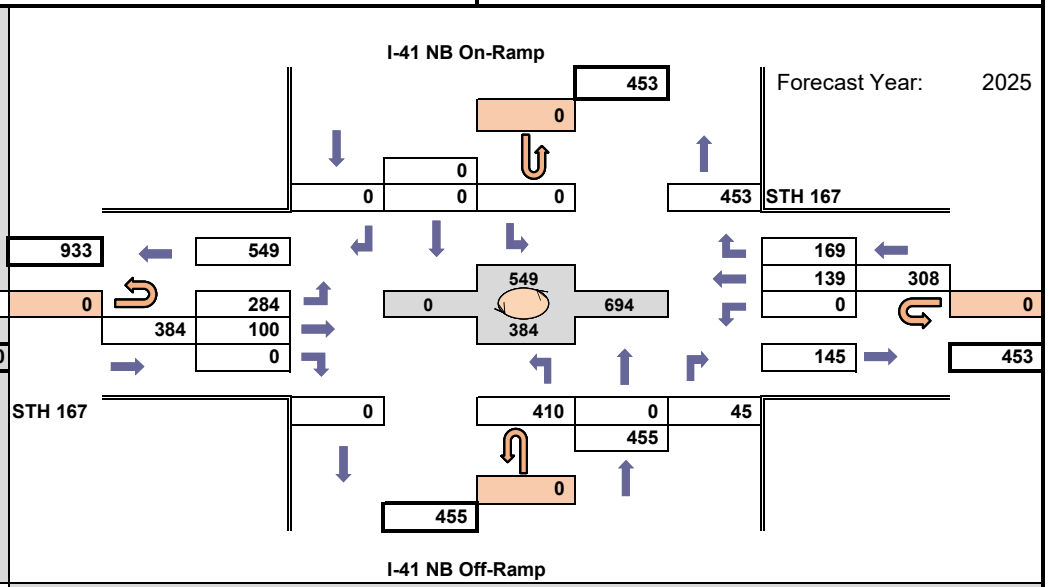

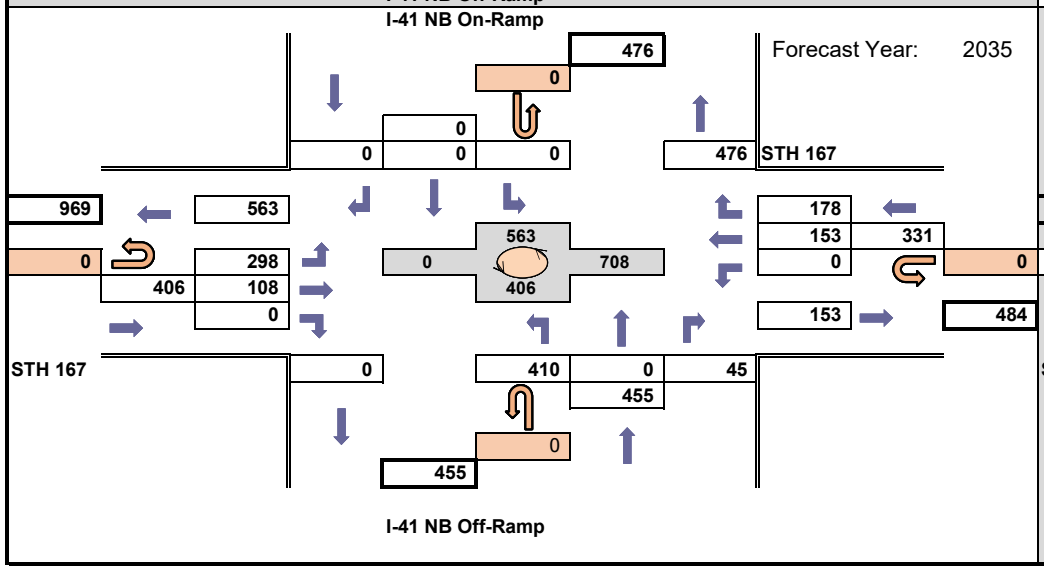

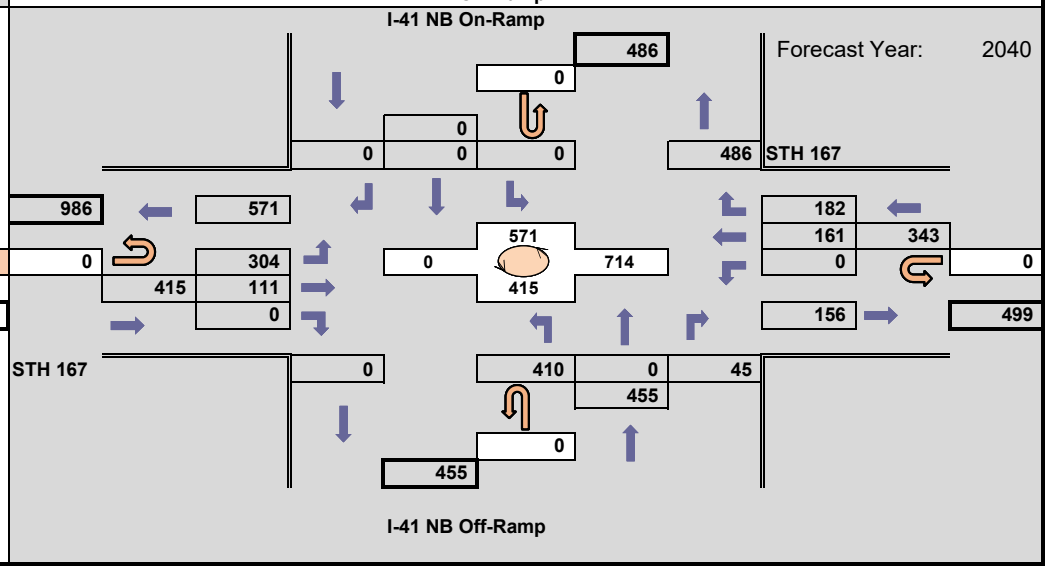

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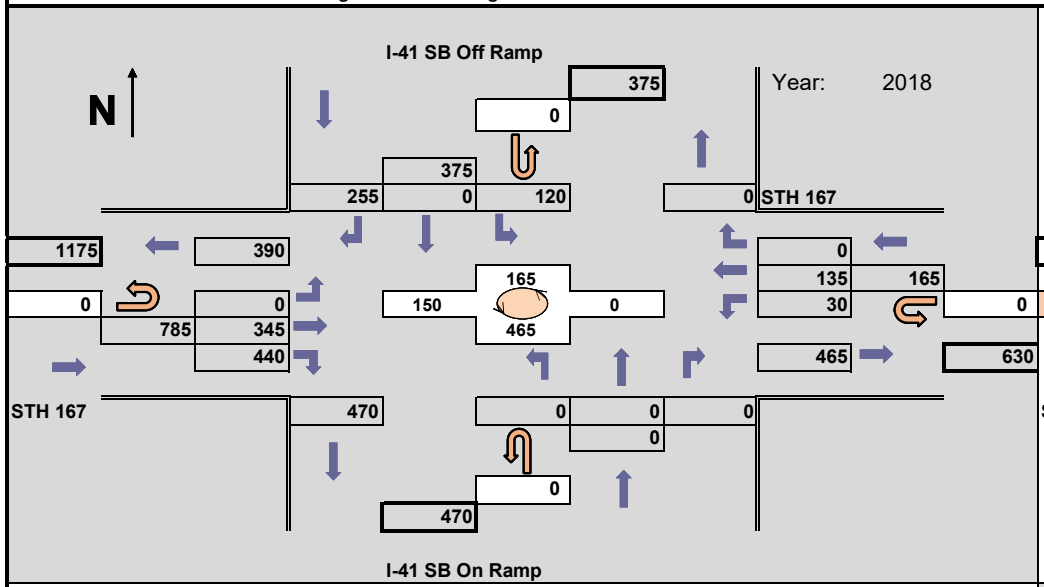

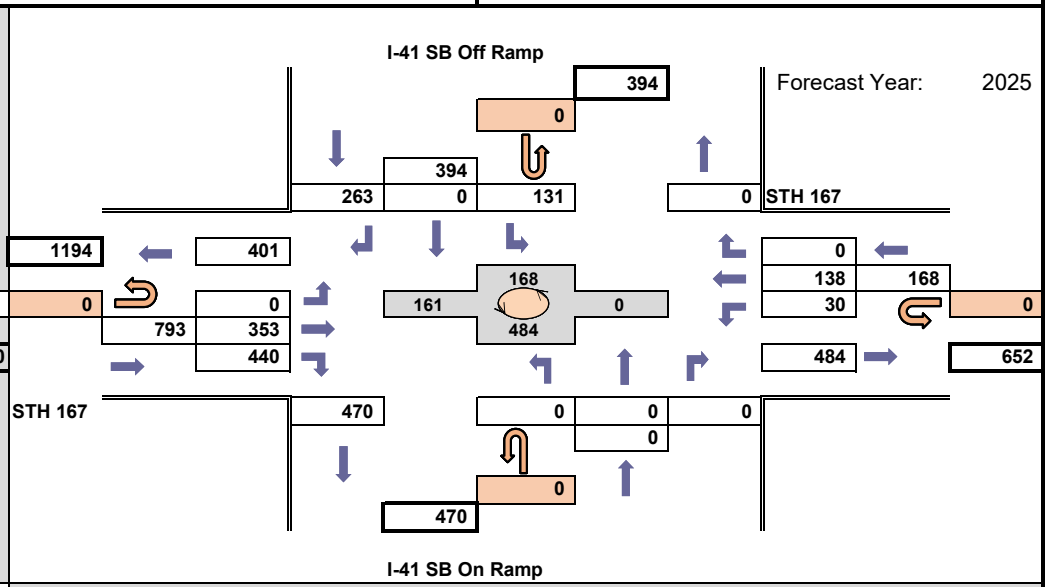

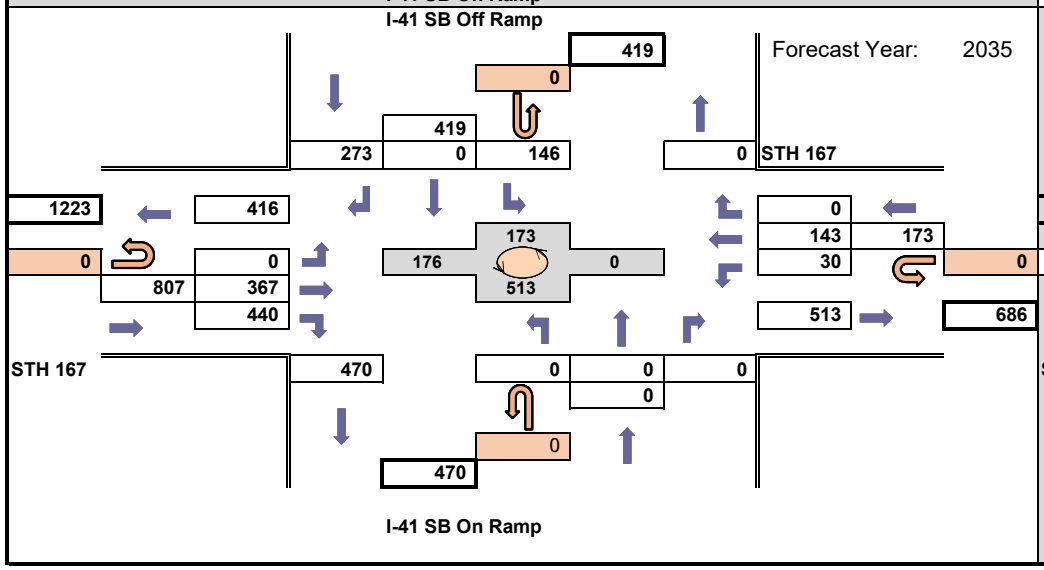

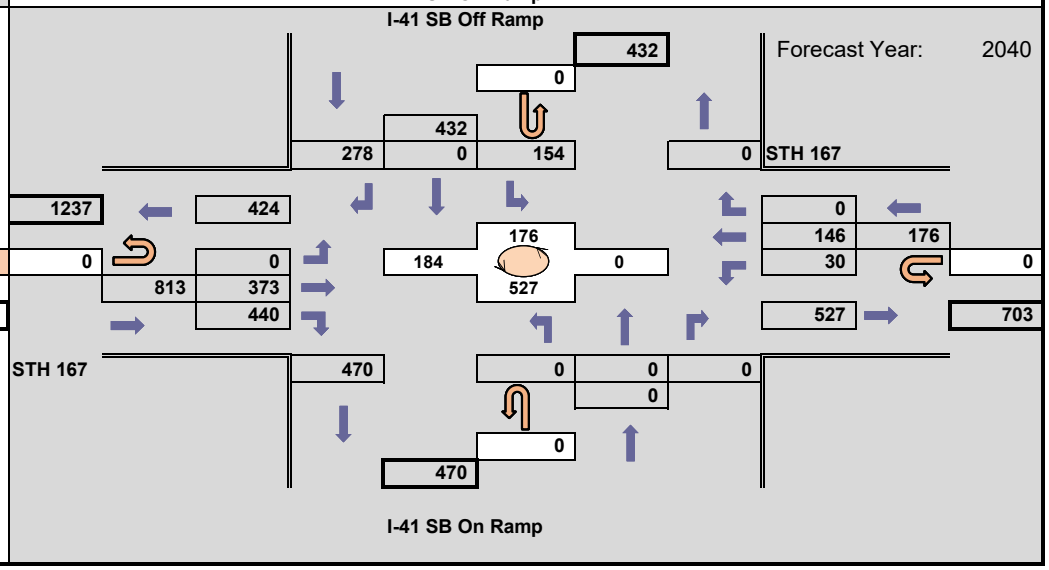

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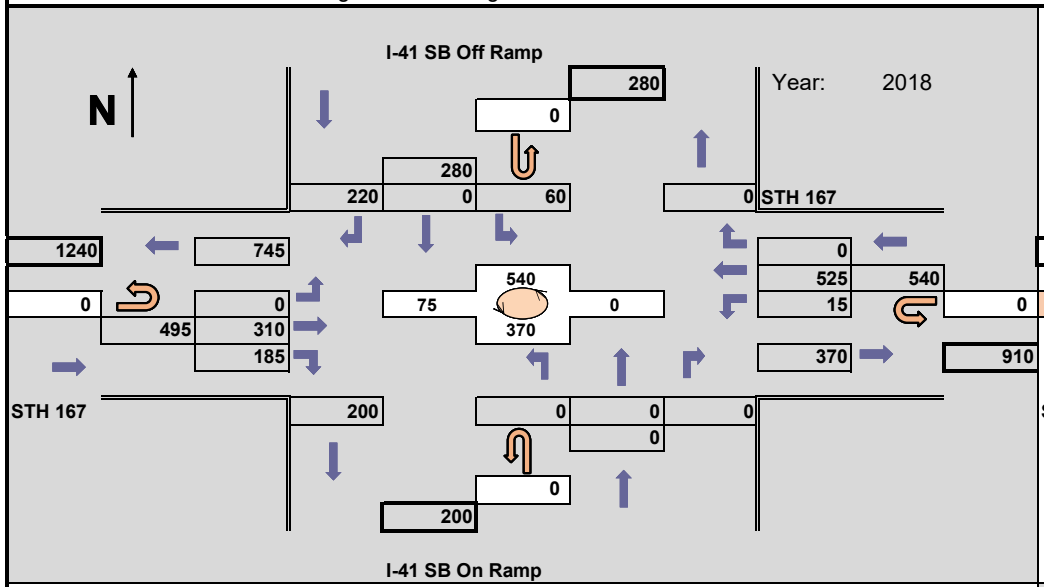

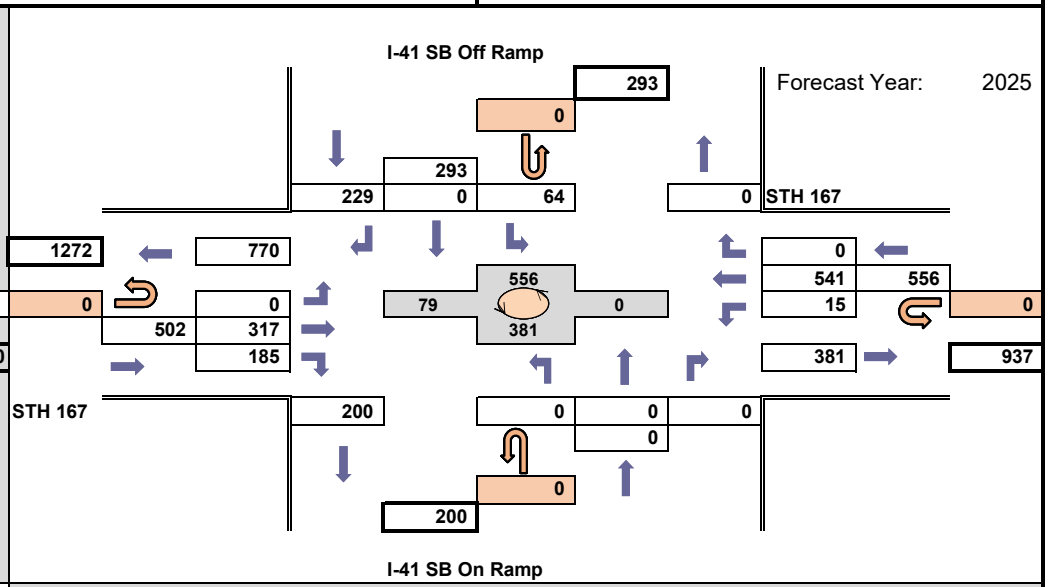

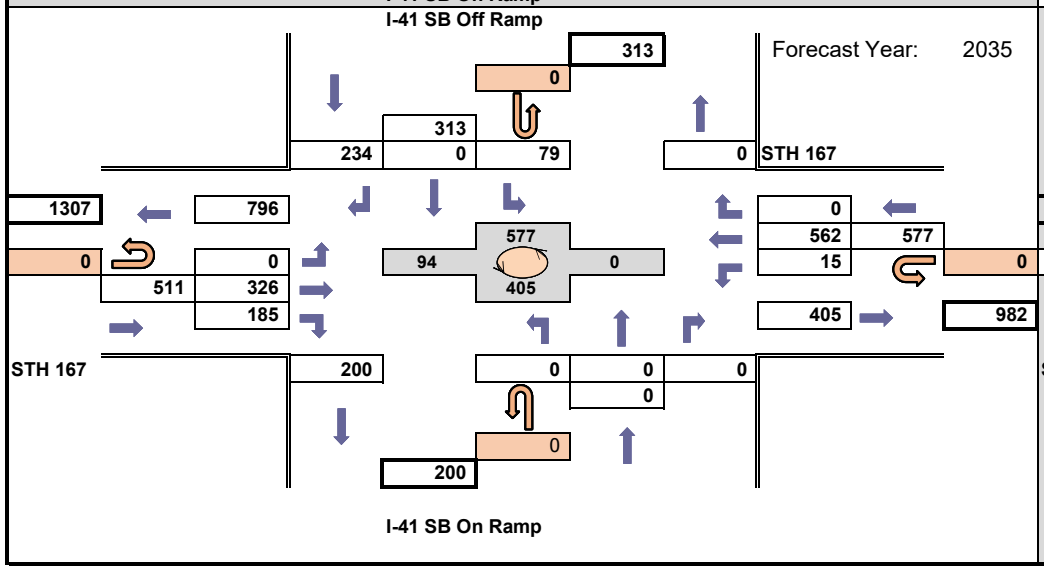

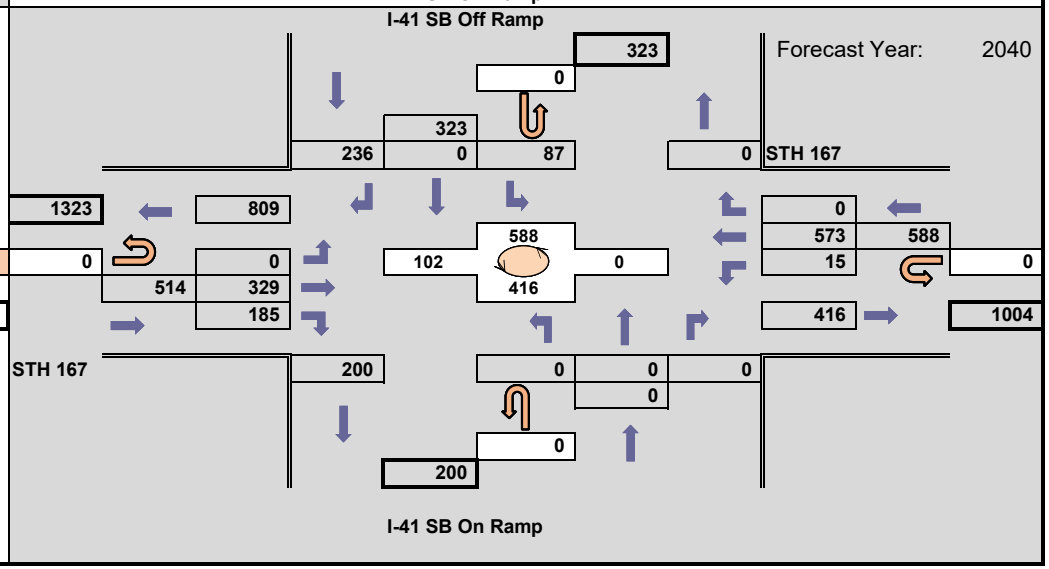

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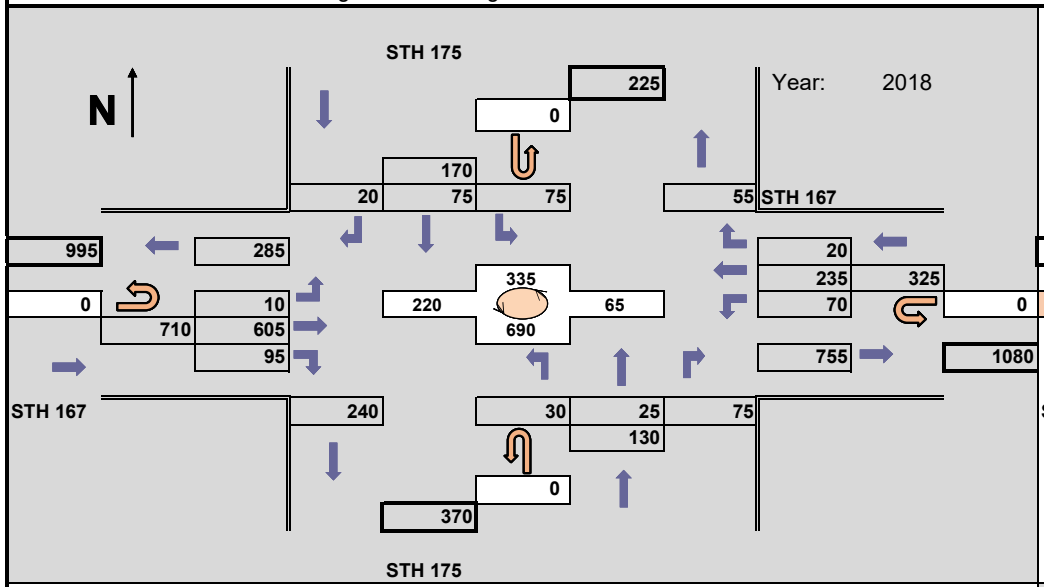

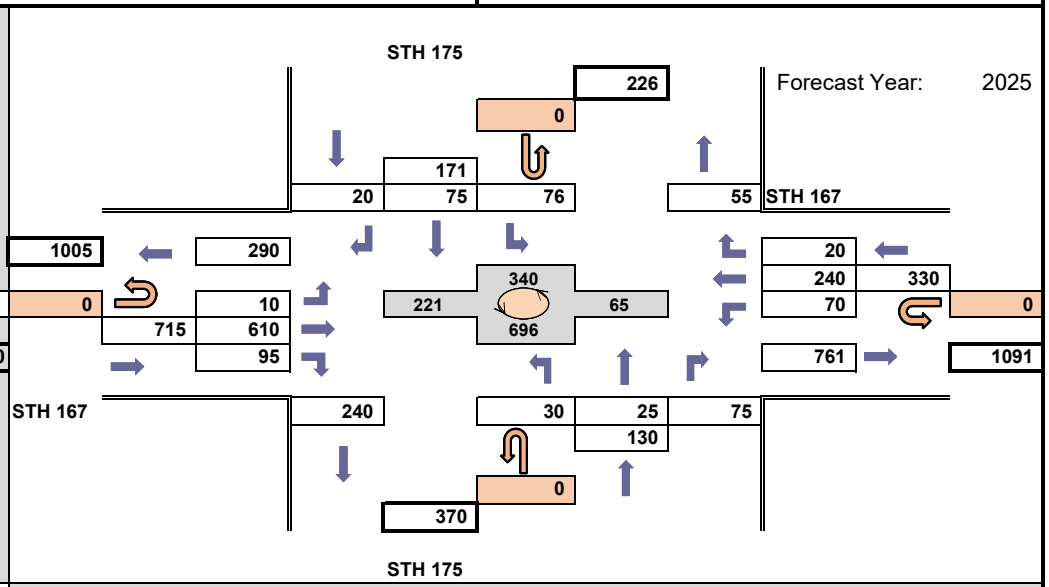

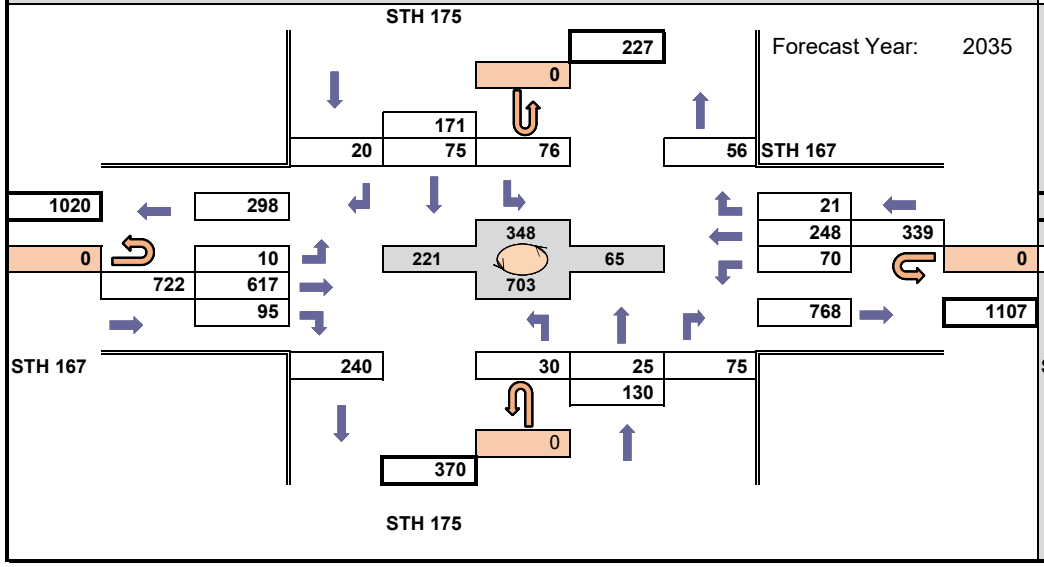

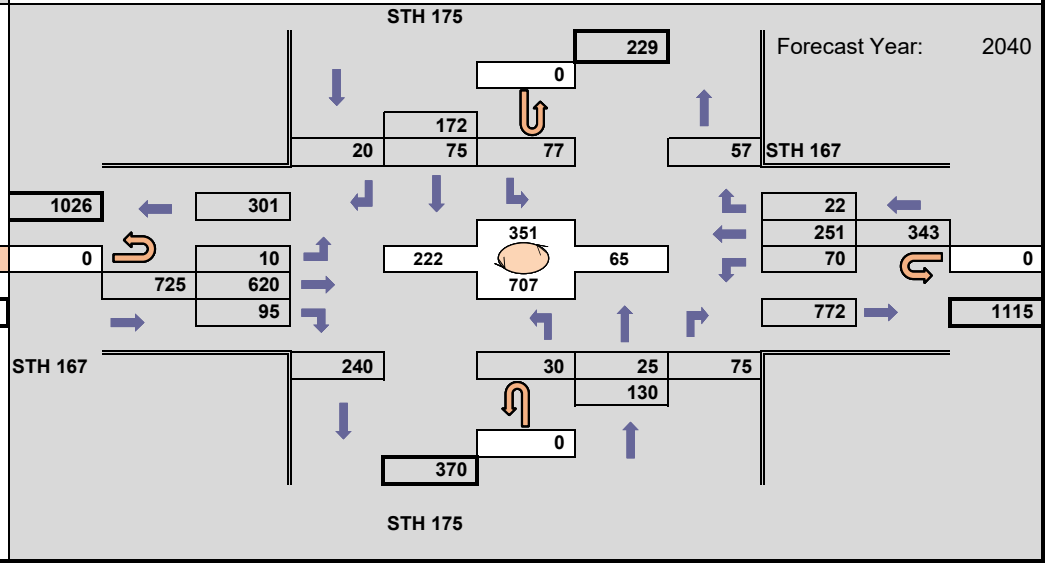

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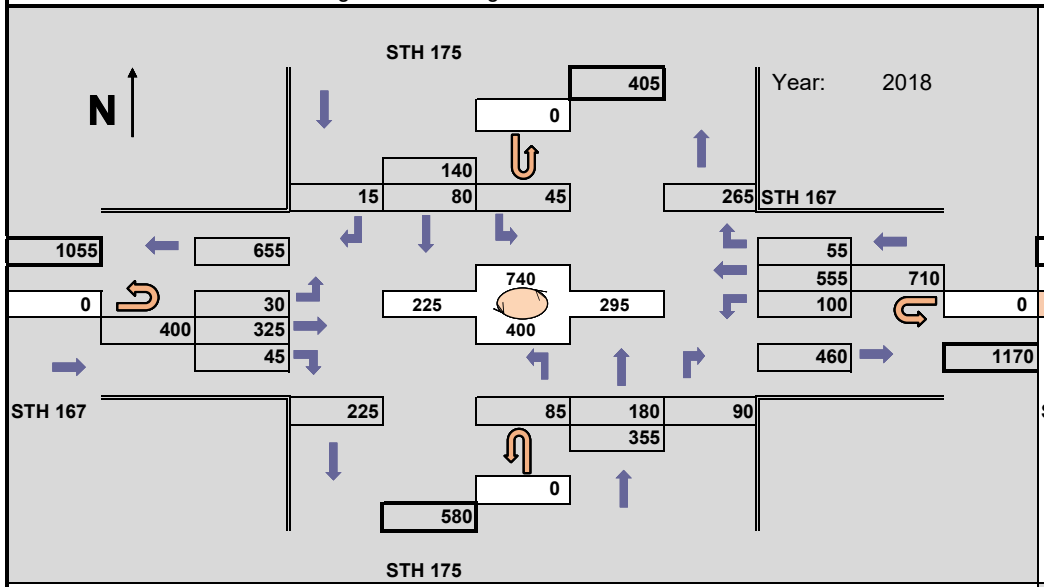
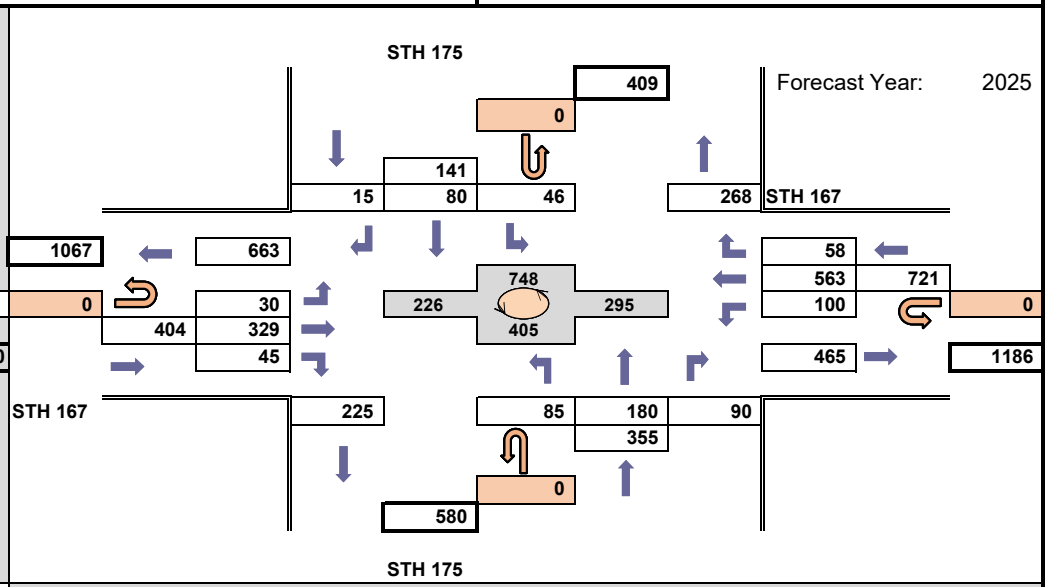
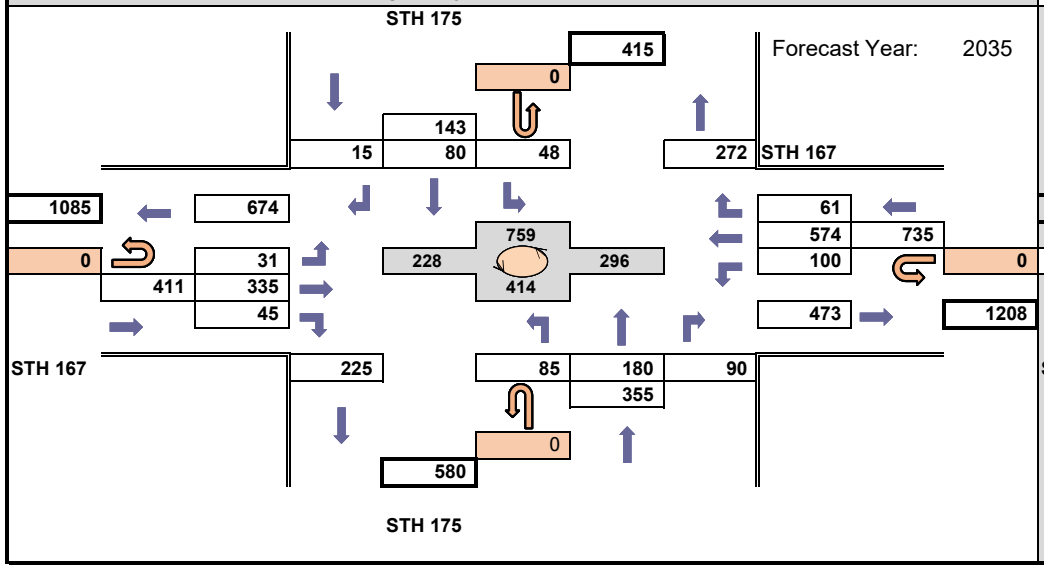
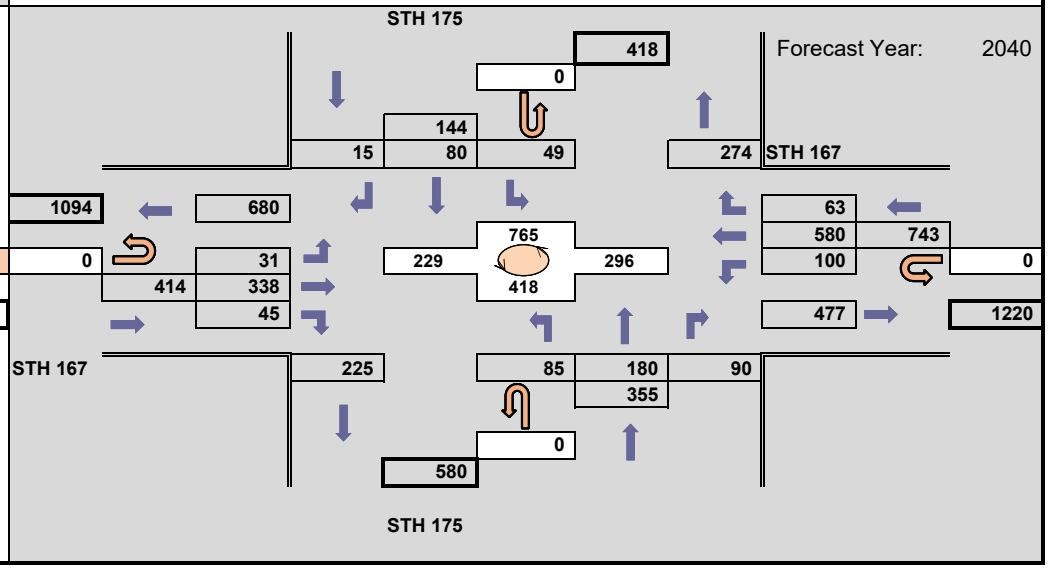








APPENDIX A
Traffic

Existing Signal Timings

LEGEND

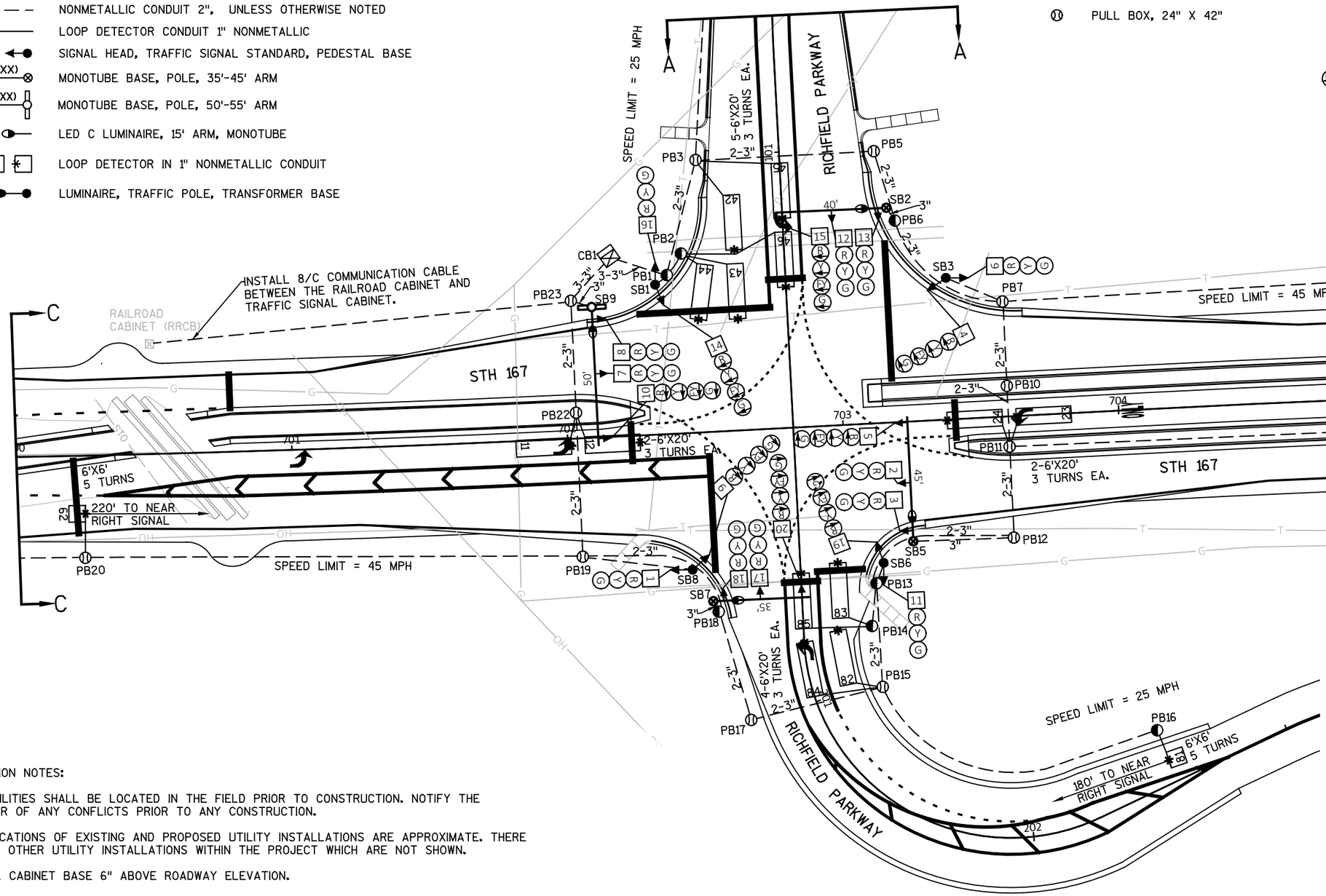
- CONTROL CABINET
- NONMETALLIC CONDUIT 2", UNLESS OTHERWISE NOTED
- LOOP DETECTOR CONDUIT 1" NONMETALLIC
- SIGNAL HEAD, TRAFFIC SIGNAL STANDARD, PEDESTAL BASE
- (XX) MONOTUBE BASE, POLE, 35'-45' ARM
- (XX) MONOTUBE BASE, POLE, 50'-55' ARM
- LED C LUMINAIRE, 15' ARM, MONOTUBE
- LOOP DETECTOR IN 1" NONMETALLIC CONDUIT
- LUMINAIRE, TRAFFIC POLE, TRANSFORMER BASE

LEGEND CONTINUED

- PULL BOX, 24" X 36"
- PULL BOX, 24" X 42"
- (R) RED CIRCULAR INDICATOR
- (Y) YELLOW CIRCULAR INDICATOR
- (G) GREEN CIRCULAR INDICATOR
- RED ARROW
- YELLOW ARROW
- GREEN ARROW
- XX SIGNAL HEAD NUMBER

NOTE: ALL LENSES ARE 12-INCH
GRAYSHADE REPRESENTS EXISTING

N



ALICIA M. DOUGHERTY
E-43022
PEWAUKEE, WI
WISCONSIN PROFESSIONAL ENGINEER

APRIL 5, 2019

CONSTRUCTION NOTES:

1. ALL UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER OF ANY CONFLICTS PRIOR TO ANY CONSTRUCTION.
2. THE LOCATIONS OF EXISTING AND PROPOSED UTILITY INSTALLATIONS ARE APPROXIMATE. THERE MAY BE OTHER UTILITY INSTALLATIONS WITHIN THE PROJECT WHICH ARE NOT SHOWN.
3. INSTALL CABINET BASE 6" ABOVE ROADWAY ELEVATION.
4. ALL LUMINAIRES ARE LED C.
5. THE CONTRACTOR SHALL HAVE THE PULLBOXES AND CONDUIT RUNS INSPECTED 5 WORKING DAYS PRIOR TO PLACING THE SIGNAL CABLE INTO SYSTEM. CONTACT THE WISDOT ELECTRICAL FIELD UNIT TO MAKE ARRANGEMENTS. (414) 266-1170.
6. * LOCATION IS TO FRONT CENTER OF DETECTOR LOOP.

MONOTUBE STRUCTURES
SB2 = S-66-1136
SB5 = S-66-1137
SB7 = S-66-1138
SB9 = S-66-1139

TRAFFIC CONTROL SIGNAL
STH 167 & RICHFIELD PARKWAY
VILLAGE OF RICHFIELD
WASHINGTON COUNTY

SIGNAL NO. S66-1477 CABINET TYPE: ES2-E
CONTROLLER TYPE: ECONOLITE

WISCONSIN DEPARTMENT OF TRANSPORTATION

APPROVAL RECOMMENDED
DATE_____ REGION TRAFFIC ENGINEER
APPROVED
DATE_____ STATE TRAFFIC ENGINEER

REGION CONTACT: D. BRANTNER
DESIGNED BY: TADI
REVISED BY:

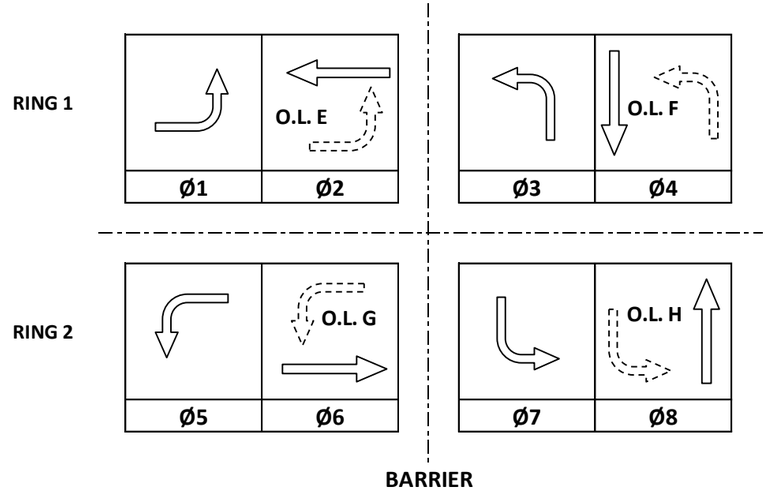
PAGE 1 OF 3

PROJECT NO:	HWY: STH 167	COUNTY: WASHINGTON	TRAFFIC SIGNAL PLAN	SHEET	E

FILE NAME : C:\EGNYTE\SHARED\WI\2247 STH 167 RICHFIELD KWIK TRIP SIGNALS\CAD\STH 167 KWIK TRIP TRAFFIC SIGNAL PLAN.DWG
LAYOUT NAME - 024201_sp
PLOT DATE : 4/5/2019 11:31 AM PLOT BY : ALICIA DOUGHERTY PLOT NAME : PLOT SCALE : 1:40

WISDOT/CADDS SHEET 42

	HEAD NUMBERS	FLASH
Ø1	4,5	R ←
Ø2	6,7,8	R
Ø3	14,15	R ←
Ø4	16,17,18	R
Ø5	9,10	R ←
Ø6	1,2,3	R
Ø7	19,20	R ←
Ø8	11,12,13	R
Ø2P		
Ø4P		
Ø6P		
Ø8P		
OLE	4,5	-
OLF	14,15	-
OLG	9,10	-
OLH	19,20	-



N

CONTROLLER LOGIC

PHASE NUMBER	PHASE LOCKING	DUAL ENTRY W / Ø	PHASE RECALL	PHASE ACTIVE
1		6		X
2	X	6	MIN	X
3		8		X
4		8		X
5		2		X
6	X	2	MIN	X
7		4		X
8		4		X

TYPE OF INTERCONNECT/COMMUNICATION	
NONE	
CLOSED LOOP	
TWISTED PAIR	
FIBER OPTIC*	
FIBER OPTIC (ETHERNET)	
RADIO	
CELL MODEM	X

TYPE OF COORDINATION	
NONE	X
TBC	
TRAFFIC RESPONSIVE	
ADAPTIVE	
*LOCATION OF MASTER CONTROLLER NO: S-	
SIGNAL SYSTEM NO: SS-	

TYPE OF LIGHTING	
BY OTHER AGENCY	
IN TRAFFIC CABINET	X
IN SEPARATE DOT LIGHTING CABINET	

TYPE OF PRE-EMPT	
NONE	
RAILROAD	X
EMERGENCY VEHICLE	
GTT	
TOMAR	
HARDWIRE	
OTHER	
LIFT BRIDGE	
QUEUE DETECTION	

GENERAL NOTES:

1. IN THE EVENT OF A RAILROAD PREEMPTION CALL, PHASE 6 SHALL RECEIVE A GREEN INDICATION AND PHASE 1 SHALL RECEIVE A GREEN ARROW INDICATION TO CLEAR THE WEST APPROACH. FOLLOWING THE TRACK CLEARANCE INTERVAL AND AFTER RECEIPT OF GATE DOWN, THE CONTROLLER SHALL ADVANCE TO PHASES 4 & 8 GREEN. DURING PREEMPTION, PHASE 5 GREEN ARROW MAY ALTERNATE WITH PHASES 4 & 8 GREEN PROVIDED THERE IS A CALL FOR PHASE 5. AT THE END OF PREEMPTION, THE CONTROLLER SHALL RETURN TO PHASES 2 & 6.
2. OMIT O.L.F AND ILLUMINATE PHASE 3 RED ARROW DURING RAILROAD PREEMPTION .
3. TRAFFIC SIGNAL CABINET SHALL BE EQUIPPED WITH BATTERY BACKUP UNIT.
4. OMIT PHASES 3, 5, AND 7 DURING NORMAL OPERATION.

DETECTOR LOGIC

DETECTOR INPUT	3	1	7	5	11	9	15	13	19	17	23	21	27	25	31	29	DETECTOR INPUT
PLAN LOOP DETECTOR*(S)	11	21	23	41	43	45	61	81	83	85							PLAN LOOP DETECTOR*(S)
CALLED PHASE	1	2	2	4	4	4	6	8	8	8							CALLED PHASE
CALL OPTION	X	X	X		X	X	X		X	X							CALL OPTION
DELAY TIME									X								DELAY TIME
EXTENTION OPTION	X	X	X	X	X	X	X	X	X	X							EXTENTION OPTION
EXTEND TIME				X				X									EXTEND TIME
USE ADDED INITIAL		X					X										USE ADDED INITIAL
CROSS SWITCH PHASE	2																CROSS SWITCH PHASE

DETECTOR INPUT	4	2	8	6	12	10	16	14	20	18	24	22	28	26	32	30	DETECTOR INPUT
PLAN LOOP DETECTOR*(S)	12	22	24	42	44	46	62	82	84								PLAN LOOP DETECTOR*(S)
CALLED PHASE	1	2	2	4	4	4	6	8	8								CALLED PHASE
CALL OPTION	X	X	X	X	X	X	X	X	X								CALL OPTION
DELAY TIME					X												DELAY TIME
EXTENTION OPTION	X	X	X	X	X	X	X	X	X								EXTENTION OPTION
EXTEND TIME																	EXTEND TIME
USE ADDED INITIAL		X					X										USE ADDED INITIAL
CROSS SWITCH PHASE	2																CROSS SWITCH PHASE

STH 167 & RICHFIELD PARKWAY
VILLAGE OF RICHFIELD
WASHINGTON COUNTY

SIGNAL NO: S66-1477 CABINET TYPE: TS2
CONTROLLER TYPE: ECONOLITE
DATE: 04/19 PAGE NO. 3 OF 3

PROJECT NO:	HWY: STH 167	COUNTY: WASHINGTON	SEQUENCE OF OPERATIONS	SHEET NO:	E

FILE NAME : _____ PLOT DATE : _____ PLOT BY : _____ PLOT NAME : _____ PLOT SCALE : 1:1

Timing Cover Sheet for Signal: S1477 HWY: 167 and Richfield Pkwy

Date:	7/28/2020	Changes Made By:	J. Murphy
Signal No:		Highway:	167
County:	WAS	Local Hwy:	
Controller:	ECONOLITE	Location:	Richfield Pkwy
School:	None	Ped:	None

Pre-emption

Preemption:	Type:	Phases:
Rail Road	Hardwire	

Coordination

System No:

Coordination Type: None

Comm Type: Cell Modem

Cell Modem IP Address: 172.22.248.21

Comments:

	Length	Split 1	Split 2	Split 3	Split 4
Cycle 1=					
Cycle 2=					
Cycle 3=					
Cycle 4=					

Cabinet Type: TS2

☑ Battery Backup

Part of a Local System: No

Local Contact:

Phone Number:

Overlaps

Overlap A = Phases:

Overlap B = Phases:

Overlap C = Phases:

Overlap D = Phases:

Turn Operations

Phases with

FYA TOD	☐		Phase Omit	☑	3,5,7
5 Section Head	☐		Dynamic FYA	☐	
Lead/Lag	☐		Split Phase	☐	

Detector Timing

Dilemma Zone: No Bike Detection ☐ Detection Type(s): Loop

Detector Number	41	44	81	83										
Stretch	*		*											
Right Turn Delay		*		*										
Left Turn Delay														

Unique Features

*See program for detector settings. Phase 3,5, and 7 are omitted except during RR Pre-emption.

DB Editor Report

Wisconsin DOT

ECONOLITE

MC

S 66-1477 - STH 167 & Richfield Pkwy - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Direction	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Min Green	6	15	6	10	6	15	6	10	0	0	0
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0	0	0	0	0	0
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	1.5	3.3	1.5	3.0	1.5	3.3	1.5	1.5	0.0	0.0	0.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	20	40	20	30	20	40	20	30	0	0	0
Max2	20	40	20	30	20	40	20	30	0	0	0
Max3	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.5	4.3	3.5	3.0	3.5	4.3	3.5	3.0	0.0	0.0	0.0
Red Clear	1.0	1.6	1.0	2.9	1.0	1.6	1.0	2.9	0.0	0.0	0.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	1.2	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Max Int	6	21	6	10	6	21	6	10	0	0	0
Time B4	20	21	20	30	20	21	20	30	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	10	0	0	0	10	0	0	0	0	0
Min Gap	1.5	2.3	1.5	2.5	1.5	2.3	1.5	1.5	0.0	0.0	0.0

Wisconsin DOT

ECONOLITE

MC

S 66-1477 - STH 167 & Richfield Pkwy - Econolite Type - Cobalt

Coordination Options

Options (MM) 3-1

Manual Pattern	Free	ECPI Coord	Yes
System Source	SYS	System Format	STD
Splits In	Seconds	Offsets In	Seconds
Transition	Smooth	Max Select	MAXINH
Dwell / Add Time	0		
Delay Coord Wk-LZ	No	Force Off	Fixed
Offset Reference	Lead	Use Ped Time	No
Ped Recall	No	Ped Reservice	No
Local Zero Override	No	FO Added Ini Green	Yes
Re-sync Count	3	Multisync	No

Auto Perm Minimum Green (Seconds) (MM) 3-4

Phase	1	2	3	4	5	6	7	8	9	10
Minimum Green	0	0	0	0	0	0	0	0	0	0

Split Demand (MM) 3-5

Phase	1	2	3	4	5	6	7	8	9	10
Demand 1										
Demand 2										

Demand	1	2
Detector	0	0
Call Time (Sec)	0	0
Cycle Count	0	0

APPENDIX B
Existing Transportation System with Background Traffic Operational Analysis

Year 2025 Background Traffic

Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	630	95	75	260	25	30	25	85	85	75	20
Future Volume (vph)	10	630	95	75	260	25	30	25	85	85	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	807	0	0	395	0	0	153	0	0	197	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	795	1	20	360	25	1	1	10	5	1	1
Future Volume (vph)	5	795	1	20	360	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	915	0	23	443	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	795	1	20	360	25	1	1	10	5	1	1
Future Vol, veh/h	5	795	1	20	360	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	914	1	23	414	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	443	0	0	915	0	0	1403	1416	915	1408	1402	429
Stage 1	-	-	-	-	-	-	927	927	-	475	475	-
Stage 2	-	-	-	-	-	-	476	489	-	933	927	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1096	-	-	702	-	-	96	113	280	109	132	601
Stage 1	-	-	-	-	-	-	274	299	-	548	538	-
Stage 2	-	-	-	-	-	-	501	488	-	304	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1096	-	-	702	-	-	92	109	280	101	127	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	109	-	101	127	-
Stage 1	-	-	-	-	-	-	273	298	-	545	520	-
Stage 2	-	-	-	-	-	-	483	472	-	289	330	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	22.9	37.4
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	215	1096	-	-	702	-	-	119
HCM Lane V/C Ratio	0.064	0.005	-	-	0.033	-	-	0.068
HCM Control Delay (s)	22.9	8.3	-	-	10.3	-	-	37.4
HCM Lane LOS	C	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

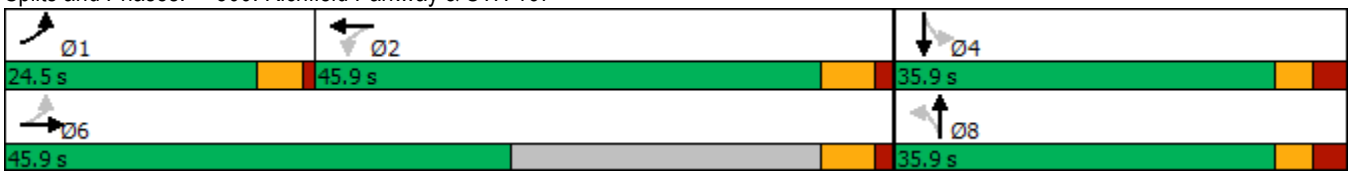
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	760	1	5	365	1	1	1	1	180	1	40
Future Volume (vph)	50	760	1	5	365	1	1	1	1	180	1	40
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	855	0	6	411	0	1	2	0	202	46	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.12	0.87		0.04	0.51		0.00	0.00		0.65	0.14	
Control Delay	8.2	26.4		15.8	18.1		18.0	18.5		33.2	20.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.2	26.4		15.8	18.1		18.0	18.5		33.2	20.5	
Queue Length 50th (ft)	9	259		1	121		0	1		78	15	
Queue Length 95th (ft)	30	#640		10	249		4	5		149	40	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	700	1647		215	1104		638	753		546	571	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.52		0.03	0.37		0.00	0.00		0.37	0.08	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 65.9	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	760	1	5	365	1	1	1	1	180	1	40
Future Volume (veh/h)	50	760	1	5	365	1	1	1	1	180	1	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	56	854	1	6	410	1	1	1	1	202	1	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	460	1003	1	234	718	2	392	173	173	391	6	259
Arrive On Green	0.06	0.56	0.56	0.40	0.40	0.40	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1711	1807	2	610	1775	4	1360	796	796	1168	26	1191
Grp Volume(v), veh/h	56	0	855	6	0	411	1	0	2	202	0	46
Grp Sat Flow(s),veh/h/ln	1711	0	1809	610	0	1779	1360	0	1591	1168	0	1218
Q Serve(g_s), s	0.9	0.0	20.7	0.4	0.0	9.3	0.0	0.0	0.1	8.5	0.0	1.6
Cycle Q Clear(g_c), s	0.9	0.0	20.7	13.3	0.0	9.3	1.6	0.0	0.1	8.5	0.0	1.6
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	460	0	1005	234	0	719	392	0	346	391	0	264
V/C Ratio(X)	0.12	0.00	0.85	0.03	0.00	0.57	0.00	0.00	0.01	0.52	0.00	0.17
Avail Cap(c_a), veh/h	1010	0	1396	458	0	1372	884	0	921	814	0	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	9.7	18.6	0.0	12.0	17.2	0.0	15.9	19.3	0.0	16.5
Incr Delay (d2), s/veh	0.0	0.0	4.0	0.0	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(50%),veh/ln	0.2	0.0	5.7	0.1	0.0	2.8	0.0	0.0	0.0	2.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	0.0	13.7	18.7	0.0	12.8	17.2	0.0	15.9	20.3	0.0	16.8
LnGrp LOS	A	A	B	B	A	B	B	A	B	C	A	B
Approach Vol, veh/h		911			417			3			248	
Approach Delay, s/veh		13.4			12.9			16.3			19.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.8	26.9		17.2		34.7		17.2
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.9	15.3		10.5		22.7		3.6
Green Ext Time (p_c), s	0.0	2.7		1.0		6.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	940	370	170	0	0
Future Volume (vph)	0	940	370	170	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1056	416	191	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	430	510	30	210	0	0	0	0	135	0	330
Future Volume (vph)	0	430	510	30	210	0	0	0	0	135	0	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	537	32	221	0	0	0	0	0	142	347
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	430	510	30	210	0	0	0	0	135	0	330
Future Vol, veh/h	0	430	510	30	210	0	0	0	0	135	0	330
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	453	537	32	221	0	0	0	0	142	0	347

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	990	0	0	1007	1275	221
Stage 1	-	-	-	-	-	-	285	285	-
Stage 2	-	-	-	-	-	-	722	990	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	668	-	0	262	164	809
Stage 1	0	-	-	-	-	0	754	668	-
Stage 2	0	-	-	-	-	0	474	319	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	668	-	-	249	0	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	0	-
Stage 1	-	-	-	-	-	-	754	0	-
Stage 2	-	-	-	-	-	-	451	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.3	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	668	-	249	809
HCM Lane V/C Ratio	-	-	0.047	-	0.571	0.429
HCM Control Delay (s)	-	-	10.7	-	37.1	12.8
HCM Lane LOS	-	-	B	-	E	B
HCM 95th %tile Q(veh)	-	-	0.1	-	3.2	2.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	280	0	0	100	65	140	0	20	0	0	0
Future Volume (vph)	285	280	0	0	100	65	140	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	288	283	0	0	101	66	0	141	20	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	285	280	0	0	100	65	140	0	20	0	0	0
Future Vol, veh/h	285	280	0	0	100	65	140	0	20	0	0	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	288	283	0	0	101	66	141	0	20	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	12.8	9.3	11.9
HCM LOS	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	20	285	280	100	65
LT Vol	140	0	285	0	0	0
Through Vol	0	0	0	280	100	0
RT Vol	0	20	0	0	0	65
Lane Flow Rate	141	20	288	283	101	66
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.275	0.033	0.465	0.417	0.166	0.095
Departure Headway (Hd)	7.003	5.792	5.814	5.31	5.914	5.206
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	516	621	613	670	609	691
Service Time	4.71	3.498	3.601	3.097	3.625	2.917
HCM Lane V/C Ratio	0.273	0.032	0.47	0.422	0.166	0.096
HCM Control Delay	12.3	8.7	13.6	11.9	9.8	8.5
HCM Lane LOS	B	A	B	B	A	A
HCM 95th-tile Q	1.1	0.1	2.5	2.1	0.6	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	275	5	1	140	5	1	1	1	5	1	25
Future Volume (vph)	20	275	5	1	140	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	5	0	155	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	275	5	1	140	5	1	1	1	5	1	25
Future Vol, veh/h	20	275	5	1	140	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	293	5	1	149	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	154	0	0	298	0	0	503	491	293	493	494	152
Stage 1	-	-	-	-	-	-	335	335	-	154	154	-
Stage 2	-	-	-	-	-	-	168	156	-	339	340	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1391	-	-	1235	-	-	479	478	746	458	451	849
Stage 1	-	-	-	-	-	-	679	643	-	808	737	-
Stage 2	-	-	-	-	-	-	834	769	-	640	608	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1391	-	-	1235	-	-	456	469	746	450	442	849
Mov Cap-2 Maneuver	-	-	-	-	-	-	456	469	-	450	442	-
Stage 1	-	-	-	-	-	-	667	631	-	793	736	-
Stage 2	-	-	-	-	-	-	806	768	-	627	597	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	11.8	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	530	1391	-	-	1235	-	-	724
HCM Lane V/C Ratio	0.006	0.015	-	-	0.001	-	-	0.046
HCM Control Delay (s)	11.8	7.6	0	-	7.9	0	-	10.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	270	140	1	1	5
Future Volume (vph)	10	270	140	1	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	308	155	0	6	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	270	140	1	1	5
Future Vol, veh/h	10	270	140	1	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	11	297	154	1	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	155	0	-	0	474	155
Stage 1	-	-	-	-	155	-
Stage 2	-	-	-	-	319	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1339	-	-	-	448	745
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	444	745
Mov Cap-2 Maneuver	-	-	-	-	444	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	611	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1339	-	-	-	669
HCM Lane V/C Ratio	0.008	-	-	-	0.01
HCM Control Delay (s)	7.7	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	155	105	5	75	1	45	15	1	1	75	20
Future Volume (vph)	10	155	105	5	75	1	45	15	1	1	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	310	0	0	93	0	0	70	0	0	110	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	155	105	5	75	1	45	15	1	1	75	20
Future Vol, veh/h	10	155	105	5	75	1	45	15	1	1	75	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	11	178	121	6	86	1	52	17	1	1	86	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	87	0	0	299	0	0	414	360	239	369	420	87
Stage 1	-	-	-	-	-	-	261	261	-	99	99	-
Stage 2	-	-	-	-	-	-	153	99	-	270	321	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1478	-	-	1251	-	-	525	545	767	586	523	969
Stage 1	-	-	-	-	-	-	714	667	-	905	811	-
Stage 2	-	-	-	-	-	-	817	787	-	734	650	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1478	-	-	1251	-	-	442	537	767	565	516	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	537	-	565	516	-
Stage 1	-	-	-	-	-	-	708	661	-	897	807	-
Stage 2	-	-	-	-	-	-	709	783	-	707	644	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	14.1	12.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	465	1478	-	-	1251	-	-	572
HCM Lane V/C Ratio	0.151	0.008	-	-	0.005	-	-	0.193
HCM Control Delay (s)	14.1	7.5	0	-	7.9	0	-	12.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.7

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Background AM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	630	95	0	75	260	25	0	30	25	85	0	85	75	20
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	11	720	109	0	91	314	30	0	36	30	102	0	105	92	25
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		840.00			435.00			168.00			222.00	
Entry Volume veh/h		807.69			395.45			154.13			198.21	
Circulating Flow (v_c), pc/h	288			77			836			441		
Exiting Flow (v_{ex}), pc/h	927			375			71			292		
Capacity (c_{pce}), pc/h		1027.69			1210.97			671.05			912.39	
Capacity (c), veh/h		988.16			1100.89			615.64			814.64	
v/c Ratio (x)		0.82			0.36			0.25			0.24	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		21.7			6.9			9.0			7.1	
Lane LOS		C			A			A			A	
95% Queue, veh		9.5			1.7			1.0			1.0	
Approach Delay, s/veh	21.7			6.9			9.0			7.1		
Approach LOS	C			A			A			A		
Intersection Delay, s/veh | LOS	14.8						B					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	350	45	110	575	70	85	180	100	55	80	15
Future Volume (vph)	30	350	45	110	575	70	85	180	100	55	80	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	452	0	0	803	0	0	387	0	0	160	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	500	1	5	745	10	5	1	10	10	1	5
Future Volume (vph)	5	500	1	5	745	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	527	0	5	795	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	500	1	5	745	10	5	1	10	10	1	5
Future Vol, veh/h	5	500	1	5	745	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	526	1	5	784	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	795	0	0	527	0	0	1340	1342	527	1343	1337	790
Stage 1	-	-	-	-	-	-	537	537	-	800	800	-
Stage 2	-	-	-	-	-	-	803	805	-	543	537	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	805	-	-	1030	-	-	119	140	517	129	153	390
Stage 1	-	-	-	-	-	-	497	495	-	379	397	-
Stage 2	-	-	-	-	-	-	352	371	-	524	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	805	-	-	1030	-	-	116	138	517	125	151	390
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	138	-	125	151	-
Stage 1	-	-	-	-	-	-	494	492	-	377	395	-
Stage 2	-	-	-	-	-	-	345	369	-	509	520	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	21.9	30
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	230	805	-	-	1030	-	-	161
HCM Lane V/C Ratio	0.073	0.007	-	-	0.005	-	-	0.105
HCM Control Delay (s)	21.9	9.5	-	-	8.5	-	-	30
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

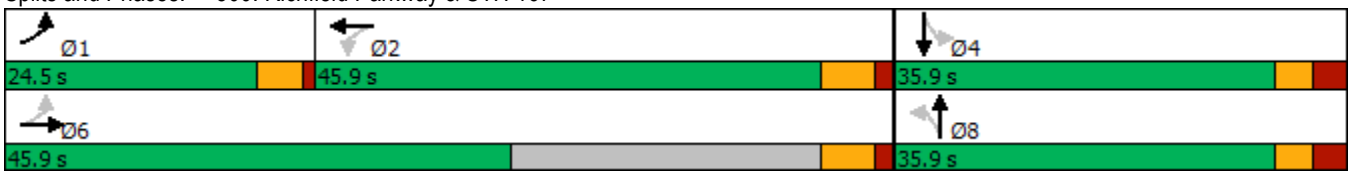
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	485	1	5	705	1	1	1	1	100	1	55
Future Volume (vph)	35	485	1	5	705	1	1	1	1	100	1	55
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	528	0	5	767	0	1	2	0	109	61	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.10	0.40		0.01	0.65		0.00	0.01		0.50	0.27	
Control Delay	4.7	6.8		9.2	16.2		25.0	25.0		36.0	29.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.7	6.8		9.2	16.2		25.0	25.0		36.0	29.7	
Queue Length 50th (ft)	4	90		1	256		0	1		47	25	
Queue Length 95th (ft)	15	182		6	#526		4	6		95	58	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	659	1638		550	1185		576	689		539	563	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.32		0.01	0.65		0.00	0.00		0.20	0.11	

Intersection Summary

Area Type: Other
Cycle Length: 106.3
Actuated Cycle Length: 70.3
Natural Cycle: 60
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	485	1	5	705	1	1	1	1	100	1	55
Future Volume (veh/h)	35	485	1	5	705	1	1	1	1	100	1	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	38	527	1	5	766	1	1	1	1	109	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	302	1129	2	530	910	1	300	133	133	341	4	218
Arrive On Green	0.05	0.62	0.62	0.49	0.49	0.49	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1725	1820	3	861	1851	2	1341	796	796	1269	22	1300
Grp Volume(v), veh/h	38	0	528	5	0	767	1	0	2	109	0	61
Grp Sat Flow(s),veh/h/ln	1725	0	1824	861	0	1854	1341	0	1591	1269	0	1322
Q Serve(g_s), s	0.5	0.0	8.6	0.2	0.0	20.0	0.0	0.0	0.1	4.4	0.0	2.2
Cycle Q Clear(g_c), s	0.5	0.0	8.6	1.6	0.0	20.0	2.3	0.0	0.1	4.4	0.0	2.2
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	302	0	1131	530	0	911	300	0	266	341	0	221
V/C Ratio(X)	0.13	0.00	0.47	0.01	0.00	0.84	0.00	0.00	0.01	0.32	0.00	0.28
Avail Cap(c_a), veh/h	840	0	1313	727	0	1334	800	0	859	813	0	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	5.6	8.0	0.0	12.3	21.2	0.0	19.3	21.1	0.0	20.2
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	3.6	0.0	0.0	0.0	0.5	0.0	0.7
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.3	0.0	0.0	10.7	0.0	0.0	0.0	2.3	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.8	0.0	6.0	8.0	0.0	15.8	21.2	0.0	19.3	21.7	0.0	20.9
LnGrp LOS	A	A	A	A	A	B	C	A	B	C	A	C
Approach Vol, veh/h		566			772			3			170	
Approach Delay, s/veh		6.2			15.8			19.9			21.4	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.2	33.2		15.2		40.4		15.2
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.5	22.0		6.4		10.6		4.3
Green Ext Time (p_c), s	0.0	5.4		0.7		3.7		0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	585	710	115	0	0
Future Volume (vph)	0	585	710	115	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	622	755	122	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	220	20	560	0	0	0	0	65	0	265
Future Volume (vph)	0	365	220	20	560	0	0	0	0	65	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	253	23	644	0	0	0	0	0	75	305
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	365	220	20	560	0	0	0	0	65	0	265
Future Vol, veh/h	0	365	220	20	560	0	0	0	0	65	0	265
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	420	253	23	644	0	0	0	0	75	0	305

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	673	0	0	1237	1363	644
Stage 1	-	-	-	-	-	-	690	690	-
Stage 2	-	-	-	-	-	-	547	673	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	908	-	0	191	146	468
Stage 1	0	-	-	-	-	0	492	442	-
Stage 2	0	-	-	-	-	0	574	449	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	908	-	-	186	0	468
Mov Cap-2 Maneuver	-	-	-	-	-	-	186	0	-
Stage 1	-	-	-	-	-	-	492	0	-
Stage 2	-	-	-	-	-	-	560	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	28
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	908	-	186	468
HCM Lane V/C Ratio	-	-	0.025	-	0.402	0.651
HCM Control Delay (s)	-	-	9.1	-	36.8	25.9
HCM Lane LOS	-	-	A	-	E	D
HCM 95th %tile Q(veh)	-	-	0.1	-	1.8	4.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	110	0	0	135	175	445	0	45	0	0	0
Future Volume (vph)	320	110	0	0	135	175	445	0	45	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	368	126	0	0	155	201	0	511	52	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	48.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	320	110	0	0	135	175	445	0	45	0	0	0
Future Vol, veh/h	320	110	0	0	135	175	445	0	45	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	368	126	0	0	155	201	511	0	52	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	29.8	14.2	85.7
HCM LOS	D	B	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	445	45	320	110	135	175
LT Vol	445	0	320	0	0	0
Through Vol	0	0	0	110	135	0
RT Vol	0	45	0	0	0	175
Lane Flow Rate	511	52	368	126	155	201
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.084	0.092	0.794	0.255	0.323	0.38
Departure Headway (Hd)	7.632	6.411	8.135	7.62	7.878	7.152
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	476	558	449	474	459	507
Service Time	5.383	4.161	5.835	5.32	5.578	4.852
HCM Lane V/C Ratio	1.074	0.093	0.82	0.266	0.338	0.396
HCM Control Delay	93.4	9.8	35.6	12.9	14.3	14.2
HCM Lane LOS	F	A	E	B	B	B
HCM 95th-tile Q	16.5	0.3	7.1	1	1.4	1.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	125	5	1	270	20	5	1	1	10	1	35
Future Volume (vph)	25	125	5	1	270	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	182	6	0	354	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	125	5	1	270	20	5	1	1	10	1	35
Future Vol, veh/h	25	125	5	1	270	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	152	6	1	329	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	353	0	0	158	0	0	577	567	152	559	561	341
Stage 1	-	-	-	-	-	-	212	212	-	343	343	-
Stage 2	-	-	-	-	-	-	365	355	-	216	218	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	1398	-	-	428	433	894	440	436	701
Stage 1	-	-	-	-	-	-	790	727	-	672	637	-
Stage 2	-	-	-	-	-	-	654	630	-	786	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1157	-	-	1398	-	-	392	420	894	429	423	701
Mov Cap-2 Maneuver	-	-	-	-	-	-	392	420	-	429	423	-
Stage 1	-	-	-	-	-	-	768	707	-	653	636	-
Stage 2	-	-	-	-	-	-	612	629	-	762	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0	13.5	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	1157	-	-	1398	-	-	608
HCM Lane V/C Ratio	0.02	0.026	-	-	0.001	-	-	0.092
HCM Control Delay (s)	13.5	8.2	0	-	7.6	0	-	11.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	135	280	1	1	10
Future Volume (vph)	1	135	280	1	1	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	160	330	0	13	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	135	280	1	1	10
Future Vol, veh/h	1	135	280	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	1	159	329	1	1	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	330	0	-	0	491	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	1145	-	-	-	524	696
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1145	-	-	-	523	696
Mov Cap-2 Maneuver	-	-	-	-	523	-
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	851	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1145	-	-	-	676
HCM Lane V/C Ratio	0.001	-	-	-	0.019
HCM Control Delay (s)	8.1	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	55	40	5	110	1	155	90	5	1	20	15
Future Volume (vph)	40	55	40	5	110	1	155	90	5	1	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	143	0	0	308	0	0	45	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	55	40	5	110	1	155	90	5	1	20	15
Future Vol, veh/h	40	55	40	5	110	1	155	90	5	1	20	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	49	68	49	6	136	1	191	111	6	1	25	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	117	0	0	362	340	93	398	364	137
Stage 1	-	-	-	-	-	-	191	191	-	149	149	-
Stage 2	-	-	-	-	-	-	171	149	-	249	215	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1393	-	-	1447	-	-	592	580	961	540	544	878
Stage 1	-	-	-	-	-	-	808	740	-	824	750	-
Stage 2	-	-	-	-	-	-	829	772	-	727	701	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1447	-	-	541	556	961	440	521	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	541	556	-	440	521	-
Stage 1	-	-	-	-	-	-	777	712	-	793	747	-
Stage 2	-	-	-	-	-	-	782	769	-	586	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.3	19.5	11.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	551	1393	-	-	1447	-	-	623
HCM Lane V/C Ratio	0.56	0.035	-	-	0.004	-	-	0.071
HCM Control Delay (s)	19.5	7.7	0	-	7.5	0	-	11.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	3.4	0.1	-	-	0	-	-	0.2

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Background PM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	30	350	45	0	110	575	70	0	85	180	100	0	55	80	15
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	35	406	52	0	121	630	77	0	93	197	110	0	64	93	17
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		493.00			828.00			400.00			174.00	
Entry Volume veh/h		452.29			803.88			388.35			159.63	
Circulating Flow (v_c), pc/h	278			325			505			844		
Exiting Flow (v_{ex}), pc/h	580			740			309			266		
Capacity (c_{pce}), pc/h		1035.72			998.54			868.09			666.89	
Capacity (c), veh/h		950.20			969.45			842.80			611.83	
v/c Ratio (x)		0.48			0.83			0.46			0.26	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.6			22.9			10.2			9.3	
Lane LOS		A			C			B			A	
95% Queue, veh		2.6			9.9			2.5			1.0	
Approach Delay, s/veh	9.6			22.9			10.2			9.3		
Approach LOS	A			C			B			A		
Intersection Delay, s/veh | LOS	15.6						C					

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APPENDIX B
Existing Transportation System with Background Traffic Operational Analysis

Year 2040 Background Traffic Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	645	95	75	275	25	30	25	85	85	75	20
Future Volume (vph)	10	645	95	75	275	25	30	25	85	85	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	824	0	0	411	0	0	153	0	0	197	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	810	1	20	375	25	1	1	10	5	1	1
Future Volume (vph)	5	810	1	20	375	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	932	0	23	460	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	810	1	20	375	25	1	1	10	5	1	1
Future Vol, veh/h	5	810	1	20	375	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	931	1	23	431	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	460	0	0	932	0	0	1437	1450	932	1442	1436	446
Stage 1	-	-	-	-	-	-	944	944	-	492	492	-
Stage 2	-	-	-	-	-	-	493	506	-	950	944	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1080	-	-	691	-	-	91	108	273	104	126	588
Stage 1	-	-	-	-	-	-	268	293	-	537	528	-
Stage 2	-	-	-	-	-	-	490	479	-	297	325	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1080	-	-	691	-	-	88	104	273	96	121	588
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	104	-	96	121	-
Stage 1	-	-	-	-	-	-	266	291	-	534	511	-
Stage 2	-	-	-	-	-	-	472	463	-	282	323	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	23.5	39.3
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	1080	-	-	691	-	-	113
HCM Lane V/C Ratio	0.066	0.005	-	-	0.033	-	-	0.071
HCM Control Delay (s)	23.5	8.4	-	-	10.4	-	-	39.3
HCM Lane LOS	C	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

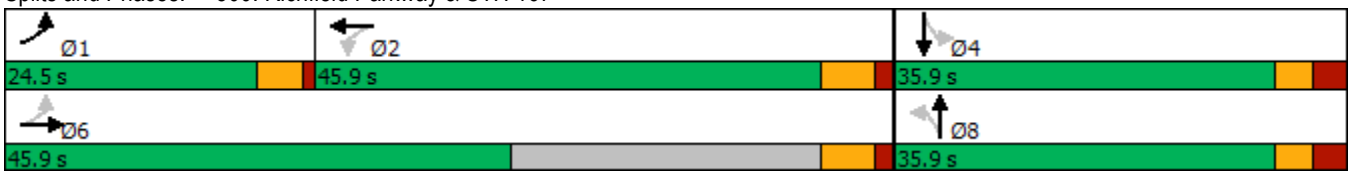
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	775	1	5	380	1	1	1	1	180	1	40
Future Volume (vph)	50	775	1	5	380	1	1	1	1	180	1	40
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	872	0	6	428	0	1	2	0	202	46	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.12	0.89		0.04	0.53		0.00	0.00		0.65	0.14	
Control Delay	8.3	27.5		15.8	18.5		19.0	19.0		33.5	20.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.3	27.5		15.8	18.5		19.0	19.0		33.5	20.7	
Queue Length 50th (ft)	9	269		1	128		0	1		78	15	
Queue Length 95th (ft)	30	#668		10	264		4	5		152	40	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	692	1639		199	1090		630	744		540	564	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.53		0.03	0.39		0.00	0.00		0.37	0.08	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 66.8	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	775	1	5	380	1	1	1	1	180	1	40
Future Volume (veh/h)	50	775	1	5	380	1	1	1	1	180	1	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	56	871	1	6	427	1	1	1	1	202	1	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	453	1014	1	227	733	2	388	172	172	387	6	258
Arrive On Green	0.06	0.56	0.56	0.41	0.41	0.41	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1711	1807	2	600	1775	4	1360	796	796	1168	26	1191
Grp Volume(v), veh/h	56	0	872	6	0	428	1	0	2	202	0	46
Grp Sat Flow(s),veh/h/ln	1711	0	1809	600	0	1779	1360	0	1591	1168	0	1218
Q Serve(g_s), s	0.9	0.0	21.7	0.5	0.0	9.9	0.0	0.0	0.1	8.7	0.0	1.6
Cycle Q Clear(g_c), s	0.9	0.0	21.7	14.2	0.0	9.9	1.7	0.0	0.1	8.8	0.0	1.6
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	453	0	1015	227	0	734	388	0	344	387	0	264
V/C Ratio(X)	0.12	0.00	0.86	0.03	0.00	0.58	0.00	0.00	0.01	0.52	0.00	0.17
Avail Cap(c_a), veh/h	990	0	1364	432	0	1341	863	0	900	795	0	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.9	0.0	9.9	19.2	0.0	12.0	17.6	0.0	16.3	19.7	0.0	16.9
Incr Delay (d2), s/veh	0.0	0.0	4.6	0.1	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(50%),veh/ln	0.2	0.0	6.2	0.1	0.0	3.0	0.0	0.0	0.0	2.3	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	0.0	14.4	19.3	0.0	12.9	17.6	0.0	16.3	20.8	0.0	17.2
LnGrp LOS	A	A	B	B	A	B	B	A	B	C	A	B
Approach Vol, veh/h		928			434			3			248	
Approach Delay, s/veh		14.0			13.0			16.7			20.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.9	27.8		17.4		35.7		17.4
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.9	16.2		10.8		23.7		3.7
Green Ext Time (p_c), s	0.0	2.8		1.0		6.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	955	385	170	0	0
Future Volume (vph)	0	955	385	170	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1073	433	191	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	445	510	30	210	0	0	0	0	160	0	345
Future Volume (vph)	0	445	510	30	210	0	0	0	0	160	0	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	468	537	32	221	0	0	0	0	0	168	363
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	445	510	30	210	0	0	0	0	160	0	345
Future Vol, veh/h	0	445	510	30	210	0	0	0	0	160	0	345
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	468	537	32	221	0	0	0	0	168	0	363

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1005	0	0	1022	1290	221
Stage 1	-	-	-	-	-	-	285	285	-
Stage 2	-	-	-	-	-	-	737	1005	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	659	-	0	257	160	809
Stage 1	0	-	-	-	-	0	754	668	-
Stage 2	0	-	-	-	-	0	466	314	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	659	-	-	244	0	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	0	-
Stage 1	-	-	-	-	-	-	754	0	-
Stage 2	-	-	-	-	-	-	443	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.3	23.8
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	659	-	244	809
HCM Lane V/C Ratio	-	-	0.048	-	0.69	0.449
HCM Control Delay (s)	-	-	10.7	-	47.2	13
HCM Lane LOS	-	-	B	-	E	B
HCM 95th %tile Q(veh)	-	-	0.2	-	4.5	2.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	305	0	0	100	70	140	0	20	0	0	0
Future Volume (vph)	300	305	0	0	100	70	140	0	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	308	0	0	101	71	0	141	20	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	300	305	0	0	100	70	140	0	20	0	0	0
Future Vol, veh/h	300	305	0	0	100	70	140	0	20	0	0	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	303	308	0	0	101	71	141	0	20	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	13.4	9.4	12
HCM LOS	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	20	300	305	100	70
LT Vol	140	0	300	0	0	0
Through Vol	0	0	0	305	100	0
RT Vol	0	20	0	0	0	70
Lane Flow Rate	141	20	303	308	101	71
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.279	0.033	0.49	0.455	0.168	0.103
Departure Headway (Hd)	7.095	5.883	5.826	5.322	5.973	5.264
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	612	612	669	603	683
Service Time	4.801	3.59	3.617	3.113	3.686	2.977
HCM Lane V/C Ratio	0.277	0.033	0.495	0.46	0.167	0.104
HCM Control Delay	12.5	8.8	14.2	12.6	9.9	8.6
HCM Lane LOS	B	A	B	B	A	A
HCM 95th-tile Q	1.1	0.1	2.7	2.4	0.6	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	300	5	1	145	5	1	1	1	5	1	25
Future Volume (vph)	20	300	5	1	145	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	5	0	160	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	300	5	1	145	5	1	1	1	5	1	25
Future Vol, veh/h	20	300	5	1	145	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	319	5	1	154	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	159	0	0	324	0	0	534	522	319	524	525	157
Stage 1	-	-	-	-	-	-	361	361	-	159	159	-
Stage 2	-	-	-	-	-	-	173	161	-	365	366	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1385	-	-	1208	-	-	457	459	722	437	433	843
Stage 1	-	-	-	-	-	-	657	626	-	802	733	-
Stage 2	-	-	-	-	-	-	829	765	-	619	592	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1208	-	-	435	450	722	429	424	843
Mov Cap-2 Maneuver	-	-	-	-	-	-	435	450	-	429	424	-
Stage 1	-	-	-	-	-	-	645	614	-	787	732	-
Stage 2	-	-	-	-	-	-	801	764	-	605	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	12.1	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	508	1385	-	-	1208	-	-	710
HCM Lane V/C Ratio	0.006	0.015	-	-	0.001	-	-	0.046
HCM Control Delay (s)	12.1	7.6	0	-	8	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	295	145	1	1	5
Future Volume (vph)	10	295	145	1	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	335	160	0	6	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	295	145	1	1	5
Future Vol, veh/h	10	295	145	1	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	11	324	159	1	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	160	0	-	0	506	160
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1333	-	-	-	427	740
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	592	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1333	-	-	-	423	740
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1333	-	-	-	658
HCM Lane V/C Ratio	0.008	-	-	-	0.01
HCM Control Delay (s)	7.7	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	155	125	5	70	1	50	15	1	1	75	25
Future Volume (vph)	15	155	125	5	70	1	50	15	1	1	75	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	339	0	0	87	0	0	75	0	0	116	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	155	125	5	70	1	50	15	1	1	75	25
Future Vol, veh/h	15	155	125	5	70	1	50	15	1	1	75	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	17	178	144	6	80	1	57	17	1	1	86	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	81	0	0	322	0	0	434	377	250	386	449	81
Stage 1	-	-	-	-	-	-	284	284	-	93	93	-
Stage 2	-	-	-	-	-	-	150	93	-	293	356	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1486	-	-	1227	-	-	509	533	756	571	504	976
Stage 1	-	-	-	-	-	-	694	652	-	912	816	-
Stage 2	-	-	-	-	-	-	820	791	-	713	627	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1486	-	-	1227	-	-	422	523	756	548	494	976
Mov Cap-2 Maneuver	-	-	-	-	-	-	422	523	-	548	494	-
Stage 1	-	-	-	-	-	-	684	643	-	899	812	-
Stage 2	-	-	-	-	-	-	708	787	-	683	618	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	14.8	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	444	1486	-	-	1227	-	-	563
HCM Lane V/C Ratio	0.171	0.012	-	-	0.005	-	-	0.206
HCM Control Delay (s)	14.8	7.5	0	-	7.9	0	-	13
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.8

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Background AM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	645	95	0	75	275	25	0	30	25	85	0	85	75	20
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	11	737	109	0	91	332	30	0	36	30	102	0	105	92	25
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		857.00			453.00			168.00			222.00	
Entry Volume veh/h		824.04			411.82			154.13			198.21	
Circulating Flow (v_c), pc/h	288			77			853			459		
Exiting Flow (v_{ex}), pc/h	944			393			71			292		
Capacity (c_{pce}), pc/h		1027.69			1210.97			662.24			899.71	
Capacity (c), veh/h		988.16			1100.89			607.56			803.31	
v/c Ratio (x)		0.83			0.37			0.25			0.25	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		23.0			7.1			9.2			7.2	
Lane LOS		C			A			A			A	
95% Queue, veh		10.1			1.8			1.0			1.0	
Approach Delay, s/veh	23.0			7.1			9.2			7.2		
Approach LOS	C			A			A			A		
Intersection Delay, s/veh | LOS	15.6						C					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	355	45	110	595	75	85	180	100	60	80	15
Future Volume (vph)	30	355	45	110	595	75	85	180	100	60	80	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	830	0	0	387	0	0	165	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	510	1	5	770	10	5	1	10	10	1	5
Future Volume (vph)	5	510	1	5	770	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	538	0	5	822	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	510	1	5	770	10	5	1	10	10	1	5
Future Vol, veh/h	5	510	1	5	770	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	537	1	5	811	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	822	0	0	538	0	0	1378	1380	538	1381	1375	817
Stage 1	-	-	-	-	-	-	548	548	-	827	827	-
Stage 2	-	-	-	-	-	-	830	832	-	554	548	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	786	-	-	1020	-	-	112	132	510	121	145	376
Stage 1	-	-	-	-	-	-	490	489	-	366	386	-
Stage 2	-	-	-	-	-	-	340	360	-	517	517	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	786	-	-	1020	-	-	109	131	510	117	143	376
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	131	-	117	143	-
Stage 1	-	-	-	-	-	-	487	486	-	364	384	-
Stage 2	-	-	-	-	-	-	333	358	-	502	514	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	22.8	31.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	786	-	-	1020	-	-	151
HCM Lane V/C Ratio	0.077	0.007	-	-	0.005	-	-	0.112
HCM Control Delay (s)	22.8	9.6	-	-	8.5	-	-	31.8
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

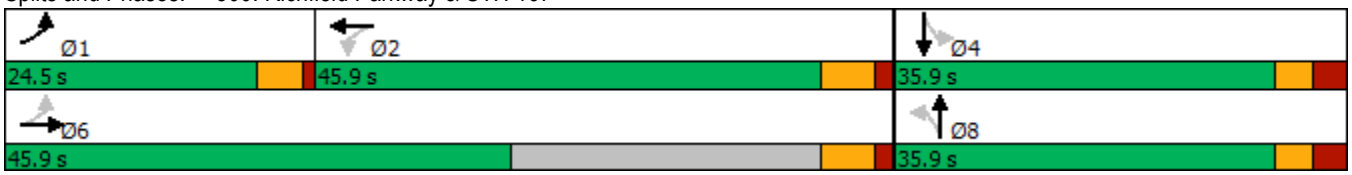
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	495	1	5	730	1	1	1	1	100	1	55
Future Volume (vph)	35	495	1	5	730	1	1	1	1	100	1	55
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	539	0	5	794	0	1	2	0	109	61	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.10	0.41		0.01	0.67		0.00	0.01		0.50	0.27	
Control Delay	4.8	6.8		9.2	16.9		25.0	25.0		36.0	29.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.8	6.8		9.2	16.9		25.0	25.0		36.0	29.7	
Queue Length 50th (ft)	4	93		1	271		0	1		47	25	
Queue Length 95th (ft)	15	187		6	#556		4	6		95	58	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	647	1638		544	1185		576	689		539	563	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.33		0.01	0.67		0.00	0.00		0.20	0.11	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 70.3	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	495	1	5	730	1	1	1	1	100	1	55
Future Volume (veh/h)	35	495	1	5	730	1	1	1	1	100	1	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	38	538	1	5	793	1	1	1	1	109	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	294	1145	2	530	931	1	292	130	130	333	4	213
Arrive On Green	0.05	0.63	0.63	0.50	0.50	0.50	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1725	1820	3	853	1852	2	1341	796	796	1269	22	1300
Grp Volume(v), veh/h	38	0	539	5	0	794	1	0	2	109	0	61
Grp Sat Flow(s),veh/h/ln	1725	0	1824	853	0	1854	1341	0	1591	1269	0	1322
Q Serve(g_s), s	0.5	0.0	8.9	0.2	0.0	21.3	0.0	0.0	0.1	4.5	0.0	2.3
Cycle Q Clear(g_c), s	0.5	0.0	8.9	1.8	0.0	21.3	2.3	0.0	0.1	4.5	0.0	2.3
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	294	0	1148	530	0	932	292	0	261	333	0	217
V/C Ratio(X)	0.13	0.00	0.47	0.01	0.00	0.85	0.00	0.00	0.01	0.33	0.00	0.28
Avail Cap(c_a), veh/h	817	0	1279	699	0	1300	777	0	837	792	0	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	5.6	7.9	0.0	12.3	21.9	0.0	20.0	21.9	0.0	20.9
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	4.3	0.0	0.0	0.0	0.6	0.0	0.7
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.4	0.0	0.0	11.5	0.0	0.0	0.0	2.4	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	0.0	5.9	8.0	0.0	16.6	21.9	0.0	20.0	22.4	0.0	21.6
LnGrp LOS	B	A	A	A	A	B	C	A	B	C	A	C
Approach Vol, veh/h		577			799			3			170	
Approach Delay, s/veh		6.2			16.6			20.6			22.1	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.2	34.6		15.3		41.8		15.3
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.5	23.3		6.5		10.9		4.3
Green Ext Time (p_c), s	0.0	5.4		0.7		3.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	595	735	115	0	0
Future Volume (vph)	0	595	735	115	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	633	782	122	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	375	220	20	580	0	0	0	0	85	0	270
Future Volume (vph)	0	375	220	20	580	0	0	0	0	85	0	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	253	23	667	0	0	0	0	0	98	310
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						↰↑	↱
Traffic Vol, veh/h	0	375	220	20	580	0	0	0	0	85	0	270
Future Vol, veh/h	0	375	220	20	580	0	0	0	0	85	0	270
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	431	253	23	667	0	0	0	0	98	0	310

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	684	0	0	1271	1397	667
Stage 1	-	-	-	-	-	-	713	713	-
Stage 2	-	-	-	-	-	-	558	684	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	900	-	0	183	139	454
Stage 1	0	-	-	-	-	0	480	431	-
Stage 2	0	-	-	-	-	0	567	444	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	900	-	-	178	0	454
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	0	-
Stage 1	-	-	-	-	-	-	480	0	-
Stage 2	-	-	-	-	-	-	552	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	32.9
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	900	-	178	454
HCM Lane V/C Ratio	-	-	0.026	-	0.549	0.684
HCM Control Delay (s)	-	-	9.1	-	47.4	28.4
HCM Lane LOS	-	-	A	-	E	D
HCM 95th %tile Q(veh)	-	-	0.1	-	2.8	5.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	120	0	0	155	185	445	0	45	0	0	0
Future Volume (vph)	340	120	0	0	155	185	445	0	45	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	391	138	0	0	178	213	0	511	52	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	52.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	340	120	0	0	155	185	445	0	45	0	0	0
Future Vol, veh/h	340	120	0	0	155	185	445	0	45	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	391	138	0	0	178	213	511	0	52	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	35.2	15.1	93.6
HCM LOS	E	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	445	45	340	120	155	185
LT Vol	445	0	340	0	0	0
Through Vol	0	0	0	120	155	0
RT Vol	0	45	0	0	0	185
Lane Flow Rate	511	52	391	138	178	213
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.108	0.095	0.851	0.281	0.374	0.406
Departure Headway (Hd)	7.801	6.578	8.258	7.741	8.001	7.274
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	465	544	442	468	453	498
Service Time	5.549	4.325	5.958	5.441	5.701	4.974
HCM Lane V/C Ratio	1.099	0.096	0.885	0.295	0.393	0.428
HCM Control Delay	102	10	42.9	13.4	15.4	14.9
HCM Lane LOS	F	A	E	B	C	B
HCM 95th-tile Q	17.2	0.3	8.4	1.1	1.7	1.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	135	5	1	300	20	5	1	1	10	1	35
Future Volume (vph)	25	135	5	1	300	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	195	6	0	391	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	135	5	1	300	20	5	1	1	10	1	35
Future Vol, veh/h	25	135	5	1	300	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	165	6	1	366	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	171	0	0	627	617	165	609	611	378
Stage 1	-	-	-	-	-	-	225	225	-	380	380	-
Stage 2	-	-	-	-	-	-	402	392	-	229	231	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1121	-	-	1382	-	-	396	405	879	407	409	669
Stage 1	-	-	-	-	-	-	778	718	-	642	614	-
Stage 2	-	-	-	-	-	-	625	606	-	774	713	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1121	-	-	1382	-	-	361	392	879	396	396	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	361	392	-	396	396	-
Stage 1	-	-	-	-	-	-	755	696	-	623	613	-
Stage 2	-	-	-	-	-	-	583	605	-	748	692	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0	14.2	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	399	1121	-	-	1382	-	-	574
HCM Lane V/C Ratio	0.021	0.027	-	-	0.001	-	-	0.098
HCM Control Delay (s)	14.2	8.3	0	-	7.6	0	-	12
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	145	310	1	1	10
Future Volume (vph)	1	145	310	1	1	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	172	366	0	13	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	145	310	1	1	10
Future Vol, veh/h	1	145	310	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	1	171	365	1	1	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	366	0	-	0	539	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	173	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	1110	-	-	-	492	664
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1110	-	-	-	492	664
Mov Cap-2 Maneuver	-	-	-	-	492	-
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	841	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1110	-	-	-	644
HCM Lane V/C Ratio	0.001	-	-	-	0.02
HCM Control Delay (s)	8.2	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	55	40	5	110	1	180	90	5	1	20	20
Future Volume (vph)	50	55	40	5	110	1	180	90	5	1	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	143	0	0	339	0	0	51	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	55	40	5	110	1	180	90	5	1	20	20
Future Vol, veh/h	50	55	40	5	110	1	180	90	5	1	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	62	68	49	6	136	1	222	111	6	1	25	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	117	0	0	391	366	93	424	390	137
Stage 1	-	-	-	-	-	-	217	217	-	149	149	-
Stage 2	-	-	-	-	-	-	174	149	-	275	241	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1393	-	-	1447	-	-	566	561	961	518	526	878
Stage 1	-	-	-	-	-	-	783	721	-	824	750	-
Stage 2	-	-	-	-	-	-	825	772	-	704	683	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1447	-	-	508	532	961	415	499	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	508	532	-	415	499	-
Stage 1	-	-	-	-	-	-	745	686	-	784	747	-
Stage 2	-	-	-	-	-	-	772	769	-	558	650	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.3	24	11.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	520	1393	-	-	1447	-	-	628
HCM Lane V/C Ratio	0.653	0.044	-	-	0.004	-	-	0.081
HCM Control Delay (s)	24	7.7	0	-	7.5	0	-	11.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	4.7	0.1	-	-	0	-	-	0.3

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Background PM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	30	355	45	0	110	595	75	0	85	180	100	0	60	80	15
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	35	412	52	0	121	652	82	0	93	197	110	0	70	93	17
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		499.00			855.00			400.00			180.00	
Entry Volume veh/h		457.80			830.10			388.35			165.14	
Circulating Flow (v_c), pc/h	284			325			517			866		
Exiting Flow (v_{ex}), pc/h	592			762			314			266		
Capacity (c_{pce}), pc/h		1030.89			998.54			860.02			655.58	
Capacity (c), veh/h		945.77			969.45			834.97			601.45	
v/c Ratio (x)		0.48			0.86			0.47			0.27	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		9.7			25.4			10.3			9.6	
Lane LOS		A			D			B			A	
95% Queue, veh		2.7			11.0			2.5			1.1	
Approach Delay, s/veh	9.7			25.4			10.3			9.6		
Approach LOS	A			D			B			A		
Intersection Delay, s/veh | LOS	16.9						C					

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APPENDIX C
Existing Transportation System with Build Traffic Operational Analysis

Year 2025 Build Traffic
Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	720	100	85	280	30	30	25	130	110	80	20
Future Volume (vph)	10	720	100	85	280	30	30	25	130	110	80	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	912	0	0	434	0	0	203	0	0	231	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	955	1	20	395	25	1	1	10	5	1	1
Future Volume (vph)	5	955	1	20	395	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	1099	0	23	483	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	955	1	20	395	25	1	1	10	5	1	1
Future Vol, veh/h	5	955	1	20	395	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	1098	1	23	454	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	483	0	0	1099	0	0	1627	1640	1099	1632	1626	469
Stage 1	-	-	-	-	-	-	1111	1111	-	515	515	-
Stage 2	-	-	-	-	-	-	516	529	-	1117	1111	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1059	-	-	596	-	-	66	81	216	76	96	570
Stage 1	-	-	-	-	-	-	213	241	-	521	516	-
Stage 2	-	-	-	-	-	-	475	467	-	239	271	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1059	-	-	596	-	-	63	77	216	69	92	570
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	77	-	69	92	-
Stage 1	-	-	-	-	-	-	212	240	-	518	496	-
Stage 2	-	-	-	-	-	-	455	449	-	224	269	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	29.6	53.6
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	1059	-	-	596	-	-	82
HCM Lane V/C Ratio	0.086	0.005	-	-	0.039	-	-	0.098
HCM Control Delay (s)	29.6	8.4	-	-	11.3	-	-	53.6
HCM Lane LOS	D	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

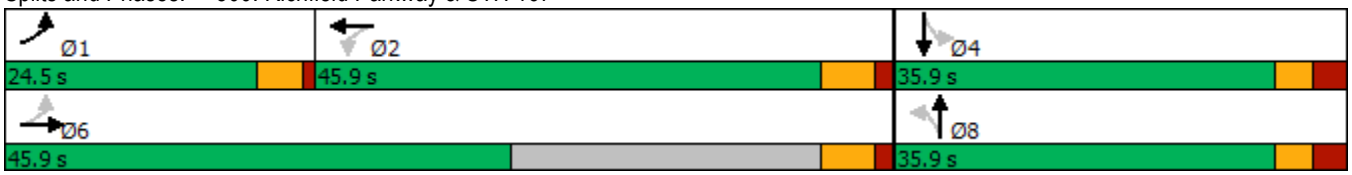
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	860	1	5	390	140	1	1	1	240	1	50
Future Volume (vph)	110	860	1	5	390	140	1	1	1	240	1	50
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	967	0	6	595	0	1	2	0	270	57	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.39	0.96		0.07	0.83		0.00	0.00		0.79	0.16	
Control Delay	12.6	39.9		19.4	34.8		23.0	22.5		46.9	24.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.6	39.9		19.4	34.8		23.0	22.5		46.9	24.7	
Queue Length 50th (ft)	30	491		2	284		0	1		141	24	
Queue Length 95th (ft)	57	#810		11	#483		4	6		#264	54	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	522	1383		92	810		483	575		417	436	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.70		0.07	0.73		0.00	0.00		0.65	0.13	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 85.2	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	860	1	5	390	140	1	1	1	240	1	50
Future Volume (veh/h)	110	860	1	5	390	140	1	1	1	240	1	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	124	966	1	6	438	157	1	1	1	270	1	56
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	332	1035	1	144	544	195	407	211	211	408	6	317
Arrive On Green	0.08	0.57	0.57	0.43	0.43	0.43	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1711	1807	2	549	1251	448	1346	796	796	1168	21	1196
Grp Volume(v), veh/h	124	0	967	6	0	595	1	0	2	270	0	57
Grp Sat Flow(s),veh/h/ln	1711	0	1809	549	0	1699	1346	0	1591	1168	0	1217
Q Serve(g_s), s	2.6	0.0	35.7	0.7	0.0	22.1	0.0	0.0	0.1	16.1	0.0	2.6
Cycle Q Clear(g_c), s	2.6	0.0	35.7	26.4	0.0	22.1	2.7	0.0	0.1	16.1	0.0	2.6
Prop In Lane	1.00		0.00	1.00		0.26	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	332	0	1036	144	0	739	407	0	422	408	0	323
V/C Ratio(X)	0.37	0.00	0.93	0.04	0.00	0.81	0.00	0.00	0.00	0.66	0.00	0.18
Avail Cap(c_a), veh/h	673	0	1036	207	0	935	606	0	657	580	0	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	14.3	31.0	0.0	17.9	21.6	0.0	19.7	25.6	0.0	20.6
Incr Delay (d2), s/veh	0.3	0.0	14.7	0.1	0.0	4.3	0.0	0.0	0.0	1.8	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(50%),veh/ln	0.8	0.0	14.8	0.1	0.0	8.1	0.0	0.0	0.0	4.5	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	0.0	29.0	31.1	0.0	22.2	21.6	0.0	19.7	27.4	0.0	20.9
LnGrp LOS	B	A	C	C	A	C	C	A	B	C	A	C
Approach Vol, veh/h		1091			601			3			327	
Approach Delay, s/veh		27.2			22.3			20.3			26.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.0	37.5		25.2		47.5		25.2
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	4.6	28.4		18.1		37.7		4.7
Green Ext Time (p_c), s	0.1	3.2		1.2		1.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1100	535	190	0	0
Future Volume (vph)	0	1100	535	190	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1236	601	213	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	565	535	55	330	0	0	0	0	315	0	395
Future Volume (vph)	0	565	535	55	330	0	0	0	0	315	0	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	595	563	58	347	0	0	0	0	0	332	416
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	93.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	565	535	55	330	0	0	0	0	315	0	395
Future Vol, veh/h	0	565	535	55	330	0	0	0	0	315	0	395
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	595	563	58	347	0	0	0	0	332	0	416

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1158	0	0	1340	1621	347
Stage 1	-	-	-	-	-	-	463	463	-
Stage 2	-	-	-	-	-	-	877	1158	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	575	-	0	~ 165	101	687
Stage 1	0	-	-	-	-	0	625	557	-
Stage 2	0	-	-	-	-	0	400	266	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	575	-	-	~ 148	0	687
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 148	0	-
Stage 1	-	-	-	-	-	-	625	0	-
Stage 2	-	-	-	-	-	-	360	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.7	288.8
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	575	-	148	687
HCM Lane V/C Ratio	-	-	0.101	-	2.24	0.605
HCM Control Delay (s)	-	-	12	-	$ 628.4	17.9
HCM Lane LOS	-	-	B	-	F	C
HCM 95th %tile Q(veh)	-	-	0.3	-	27.5	4.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	310	570	0	0	180	105	205	0	150	0	0	0
Future Volume (vph)	310	570	0	0	180	105	205	0	150	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	576	0	0	182	106	0	207	152	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	35.4
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	310	570	0	0	180	105	205	0	150	0	0	0
Future Vol, veh/h	310	570	0	0	180	105	205	0	150	0	0	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	313	576	0	0	182	106	207	0	152	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	50.6	13	15.5
HCM LOS	F	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	150	310	570	180	105
LT Vol	205	0	310	0	0	0
Through Vol	0	0	0	570	180	0
RT Vol	0	150	0	0	0	105
Lane Flow Rate	207	152	313	576	182	106
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.464	0.288	0.598	1.018	0.366	0.192
Departure Headway (Hd)	8.059	6.837	6.873	6.364	7.24	6.523
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	445	523	523	570	495	546
Service Time	5.83	4.608	4.637	4.128	5.027	4.31
HCM Lane V/C Ratio	0.465	0.291	0.598	1.011	0.368	0.194
HCM Control Delay	17.7	12.4	19.4	67.6	14.2	10.9
HCM Lane LOS	C	B	C	F	B	B
HCM 95th-tile Q	2.4	1.2	3.9	15.3	1.7	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	695	5	1	260	5	1	1	1	5	1	25
Future Volume (vph)	20	695	5	1	260	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	5	0	283	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	695	5	1	260	5	1	1	1	5	1	25
Future Vol, veh/h	20	695	5	1	260	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	739	5	1	277	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	282	0	0	744	0	0	1077	1065	739	1067	1068	280
Stage 1	-	-	-	-	-	-	781	781	-	282	282	-
Stage 2	-	-	-	-	-	-	296	284	-	785	786	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1247	-	-	841	-	-	197	223	417	185	206	718
Stage 1	-	-	-	-	-	-	388	405	-	687	646	-
Stage 2	-	-	-	-	-	-	712	676	-	360	378	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	841	-	-	185	216	417	180	200	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	216	-	180	200	-
Stage 1	-	-	-	-	-	-	377	393	-	667	645	-
Stage 2	-	-	-	-	-	-	684	675	-	348	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	20.1	13.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	241	1247	-	-	841	-	-	459
HCM Lane V/C Ratio	0.013	0.017	-	-	0.001	-	-	0.072
HCM Control Delay (s)	20.1	7.9	0	-	9.3	0	-	13.4
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	210	490	210	65	15	55
Future Volume (vph)	210	490	210	65	15	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	1664		1026	
Travel Time (s)		26.0	25.2		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	769	302	0	76	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	210	490	210	65	15	55
Future Vol, veh/h	210	490	210	65	15	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	231	538	231	71	16	60

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	302	0	-	0	1267	267
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	1000	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1178	-	-	-	138	638
Stage 1	-	-	-	-	649	-
Stage 2	-	-	-	-	272	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1178	-	-	-	99	638
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	272	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	21.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1178	-	-	-	294
HCM Lane V/C Ratio	0.196	-	-	-	0.262
HCM Control Delay (s)	8.8	0	-	-	21.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	435	255	25	10	20
Future Volume (vph)	70	435	255	25	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		30	30		30	
Link Distance (ft)		1664	640		615	
Travel Time (s)		37.8	14.5		14.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	555	307	0	33	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	435	255	25	10	20
Future Vol, veh/h	70	435	255	25	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	2	2
Mvmt Flow	77	478	280	27	11	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	307	0	-	0	926	294
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	632	-
Critical Hdwy	4.27	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.353	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1173	-	-	-	298	745
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1173	-	-	-	271	745
Mov Cap-2 Maneuver	-	-	-	-	271	-
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	530	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1173	-	-	-	471
HCM Lane V/C Ratio	0.066	-	-	-	0.07
HCM Control Delay (s)	8.3	0	-	-	13.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	170	160	5	120	15	95	30	1	5	85	65
Future Volume (vph)	115	170	160	5	120	15	95	30	1	5	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	511	0	0	161	0	0	144	0	0	179	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	14.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	170	160	5	120	15	95	30	1	5	85	65
Future Vol, veh/h	115	170	160	5	120	15	95	30	1	5	85	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	132	195	184	6	138	17	109	34	1	6	98	75

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	155	0	0	379	0	0	796	718	287	728	802	147
Stage 1	-	-	-	-	-	-	551	551	-	159	159	-
Stage 2	-	-	-	-	-	-	245	167	-	569	643	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1395	-	-	1169	-	-	289	338	720	338	316	897
Stage 1	-	-	-	-	-	-	494	493	-	841	764	-
Stage 2	-	-	-	-	-	-	729	734	-	505	467	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1395	-	-	1169	-	-	174	295	720	277	276	897
Mov Cap-2 Maneuver	-	-	-	-	-	-	174	295	-	277	276	-
Stage 1	-	-	-	-	-	-	433	432	-	738	759	-
Stage 2	-	-	-	-	-	-	579	730	-	407	410	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0.3	63.9	21.8
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	194	1395	-	-	1169	-	-	389
HCM Lane V/C Ratio	0.747	0.095	-	-	0.005	-	-	0.458
HCM Control Delay (s)	63.9	7.9	0	-	8.1	0	-	21.8
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	4.9	0.3	-	-	0	-	-	2.3

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Build AM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	720	100	0	85	280	30	0	30	25	130	0	110	80	20
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	11	823	114	0	103	338	36	0	36	30	156	0	135	98	25
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		948.00			477.00			222.00			258.00	
Entry Volume veh/h		911.54			433.64			203.67			230.36	
Circulating Flow (v_c), pc/h	336			77			969			477		
Exiting Flow (v_{ex}), pc/h	1114			399			77			315		
Capacity (c_{pce}), pc/h		990.03			1210.97			605.11			887.20	
Capacity (c), veh/h		951.95			1100.89			555.14			792.14	
v/c Ratio (x)		0.96			0.39			0.37			0.29	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		40.5			7.3			12.0			7.9	
Lane LOS		E			A			B			A	
95% Queue, veh		16.1			1.9			1.7			1.2	
Approach Delay, s/veh	40.5			7.3			12.0			7.9		
Approach LOS	E			A			B			A		
Intersection Delay, s/veh | LOS	24.9						C					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	380	45	155	655	95	90	185	115	65	85	15
Future Volume (vph)	30	380	45	155	655	95	90	185	115	65	85	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	484	0	0	963	0	0	415	0	0	175	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	555	1	5	895	10	5	1	10	10	1	5
Future Volume (vph)	5	555	1	5	895	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	585	0	5	953	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	555	1	5	895	10	5	1	10	10	1	5
Future Vol, veh/h	5	555	1	5	895	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	584	1	5	942	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	953	0	0	585	0	0	1556	1558	585	1559	1553	948
Stage 1	-	-	-	-	-	-	595	595	-	958	958	-
Stage 2	-	-	-	-	-	-	961	963	-	601	595	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	701	-	-	980	-	-	83	103	479	91	113	316
Stage 1	-	-	-	-	-	-	461	465	-	309	336	-
Stage 2	-	-	-	-	-	-	286	311	-	487	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	701	-	-	980	-	-	80	102	479	87	112	316
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	102	-	87	112	-
Stage 1	-	-	-	-	-	-	458	462	-	307	334	-
Stage 2	-	-	-	-	-	-	279	309	-	472	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	28.2	41.6
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	172	701	-	-	980	-	-	115
HCM Lane V/C Ratio	0.098	0.008	-	-	0.005	-	-	0.146
HCM Control Delay (s)	28.2	10.2	-	-	8.7	-	-	41.6
HCM Lane LOS	D	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	525	1	5	800	40	1	1	1	265	1	110
Future Volume (vph)	50	525	1	5	800	40	1	1	1	265	1	110
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	572	0	5	913	0	1	2	0	288	121	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.26	0.55		0.01	1.05		0.00	0.00		0.80	0.32	
Control Delay	11.8	14.8		15.2	70.1		21.0	21.5		46.4	26.7	

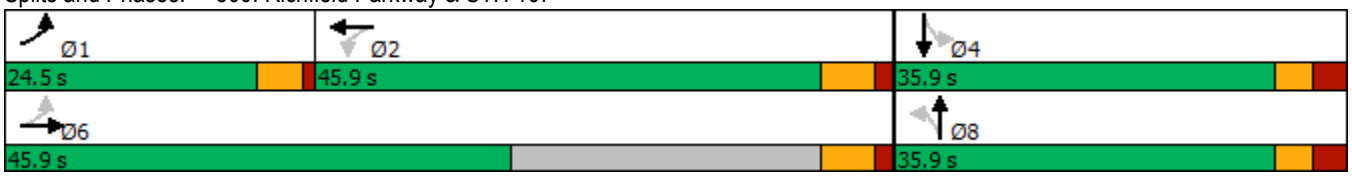
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.8	14.8		15.2	70.1		21.0	21.5		46.4	26.7	
Queue Length 50th (ft)	12	188		2	~593		0	1		146	52	
Queue Length 95th (ft)	30	308		8	#877		4	6		#265	100	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	462	1389		374	871		452	571		447	466	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.41		0.01	1.05		0.00	0.00		0.64	0.26	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 85.1	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	525	1	5	800	40	1	1	1	265	1	110
Future Volume (veh/h)	50	525	1	5	800	40	1	1	1	265	1	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	54	571	1	5	870	43	1	1	1	288	1	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	178	1085	2	428	857	42	323	206	206	416	3	340
Arrive On Green	0.05	0.60	0.60	0.49	0.49	0.49	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1725	1821	3	827	1752	87	1270	796	796	1269	11	1309
Grp Volume(v), veh/h	54	0	572	5	0	913	1	0	2	288	0	121
Grp Sat Flow(s),veh/h/ln	1725	0	1824	827	0	1839	1270	0	1591	1269	0	1320
Q Serve(g_s), s	1.1	0.0	15.1	0.3	0.0	40.0	0.1	0.0	0.1	17.8	0.0	6.1
Cycle Q Clear(g_c), s	1.1	0.0	15.1	6.6	0.0	40.0	6.2	0.0	0.1	17.9	0.0	6.1
Prop In Lane	1.00		0.00	1.00		0.05	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	178	0	1087	428	0	900	323	0	413	416	0	343
V/C Ratio(X)	0.30	0.00	0.53	0.01	0.00	1.01	0.00	0.00	0.00	0.69	0.00	0.35
Avail Cap(c_a), veh/h	510	0	1087	428	0	900	459	0	584	553	0	484
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	0.0	9.7	14.2	0.0	20.9	27.2	0.0	22.4	29.1	0.0	24.7
Incr Delay (d2), s/veh	0.4	0.0	0.5	0.0	0.0	33.8	0.0	0.0	0.0	2.4	0.0	0.6
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.8	0.0	8.4	0.1	0.0	30.7	0.0	0.0	0.1	9.4	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	0.0	10.2	14.3	0.0	54.7	27.2	0.0	22.4	31.4	0.0	25.3
LnGrp LOS	B	A	B	B	A	F	C	A	C	C	A	C
Approach Vol, veh/h		626			918			3			409	
Approach Delay, s/veh		11.0			54.4			24.0			29.6	
Approach LOS		B			D			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	8.7	45.9		27.1		54.6		27.1
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	3.1	42.0		19.9		17.1		8.2
Green Ext Time (p_c), s	0.0	0.0		1.4		3.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.3
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	790	845	145	0	0
Future Volume (vph)	0	790	845	145	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	840	899	154	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	495	295	135	705	0	0	0	0	125	0	285
Future Volume (vph)	0	495	295	135	705	0	0	0	0	125	0	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	569	339	155	810	0	0	0	0	0	144	328
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	53.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	495	295	135	705	0	0	0	0	125	0	285
Future Vol, veh/h	0	495	295	135	705	0	0	0	0	125	0	285
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	569	339	155	810	0	0	0	0	144	0	328

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	908	0	0	1859	2028	810
Stage 1	-	-	-	-	-	-	1120	1120	-
Stage 2	-	-	-	-	-	-	739	908	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	741	-	0	~ 79	56	375
Stage 1	0	-	-	-	-	0	308	278	-
Stage 2	0	-	-	-	-	0	467	350	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	741	-	-	~ 62	0	375
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 62	0	-
Stage 1	-	-	-	-	-	-	308	0	-
Stage 2	-	-	-	-	-	-	369	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.8	264.5
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	741	-	62	375
HCM Lane V/C Ratio	-	-	0.209	-	2.317	0.874
HCM Control Delay (s)	-	-	11.1	-	$ 744.7	53.9
HCM Lane LOS	-	-	B	-	F	F
HCM 95th %tile Q(veh)	-	-	0.8	-	14	8.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	225	0	0	375	340	465	0	85	0	0	0
Future Volume (vph)	395	225	0	0	375	340	465	0	85	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	259	0	0	431	391	0	534	98	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	86.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	395	225	0	0	375	340	465	0	85	0	0	0
Future Vol, veh/h	395	225	0	0	375	340	465	0	85	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	454	259	0	0	431	391	534	0	98	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	70.7	47.9	155.3
HCM LOS	F	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	465	85	395	225	375	340
LT Vol	465	0	395	0	0	0
Through Vol	0	0	0	225	375	0
RT Vol	0	85	0	0	0	340
Lane Flow Rate	534	98	454	259	431	391
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.307	0.206	1.075	0.576	0.944	0.78
Departure Headway (Hd)	9.082	7.844	9.304	8.781	8.707	7.975
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	406	460	395	414	418	457
Service Time	6.782	5.544	7.004	6.481	6.407	5.675
HCM Lane V/C Ratio	1.315	0.213	1.149	0.626	1.031	0.856
HCM Control Delay	181.4	12.6	98.1	22.7	60.9	33.6
HCM Lane LOS	F	B	F	C	F	D
HCM 95th-tile Q	23.5	0.8	14.4	3.5	10.7	6.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	280	5	1	675	20	5	1	1	10	1	35
Future Volume (vph)	25	280	5	1	675	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	371	6	0	848	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	280	5	1	675	20	5	1	1	10	1	35
Future Vol, veh/h	25	280	5	1	675	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	341	6	1	823	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	847	0	0	347	0	0	1260	1250	341	1242	1244	835
Stage 1	-	-	-	-	-	-	401	401	-	837	837	-
Stage 2	-	-	-	-	-	-	859	849	-	405	407	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	753	-	-	1190	-	-	147	173	701	152	174	368
Stage 1	-	-	-	-	-	-	626	601	-	361	382	-
Stage 2	-	-	-	-	-	-	351	377	-	622	597	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	753	-	-	1190	-	-	124	164	701	145	165	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	124	164	-	145	165	-
Stage 1	-	-	-	-	-	-	595	572	-	343	381	-
Stage 2	-	-	-	-	-	-	309	376	-	589	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	31.2	21.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	146	753	-	-	1190	-	-	270
HCM Lane V/C Ratio	0.058	0.04	-	-	0.001	-	-	0.208
HCM Control Delay (s)	31.2	10	0	-	8	0	-	21.8
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.8

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	235	480	25	60	215
Future Volume (vph)	55	235	480	25	60	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	1664		1026	
Travel Time (s)		26.0	25.2		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	341	594	0	324	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	10.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	235	480	25	60	215
Future Vol, veh/h	55	235	480	25	60	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	65	276	565	29	71	253

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	594	0	-	0	986	580
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	406	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	908	-	-	-	267	501
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	658	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	908	-	-	-	244	501
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	40.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	908	-	-	-	407
HCM Lane V/C Ratio	0.071	-	-	-	0.795
HCM Control Delay (s)	9.3	0	-	-	40.5
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	7

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	260	435	5	25	70
Future Volume (vph)	35	260	435	5	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		1664	640		615	
Travel Time (s)		25.2	9.7		16.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	347	518	0	111	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	260	435	5	25	70
Future Vol, veh/h	35	260	435	5	25	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	2	2
Mvmt Flow	41	306	512	6	29	82

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	518	0	-	0	903	515
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	388	-
Critical Hdwy	4.28	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.362	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	971	-	-	-	308	560
Stage 1	-	-	-	-	600	-
Stage 2	-	-	-	-	686	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	971	-	-	-	292	560
Mov Cap-2 Maneuver	-	-	-	-	292	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	686	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	451
HCM Lane V/C Ratio	0.042	-	-	-	0.248
HCM Control Delay (s)	8.9	0	-	-	15.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	100	90	5	120	5	205	100	5	15	35	115
Future Volume (vph)	95	100	90	5	120	5	205	100	5	15	35	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	351	0	0	160	0	0	382	0	0	204	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	72.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	100	90	5	120	5	205	100	5	15	35	115
Future Vol, veh/h	95	100	90	5	120	5	205	100	5	15	35	115
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	117	123	111	6	148	6	253	123	6	19	43	142

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	154	0	0	234	0	0	669	579	179	640	631	151
Stage 1	-	-	-	-	-	-	413	413	-	163	163	-
Stage 2	-	-	-	-	-	-	256	166	-	477	468	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1373	-	-	1310	-	-	370	425	861	371	382	862
Stage 1	-	-	-	-	-	-	614	592	-	809	739	-
Stage 2	-	-	-	-	-	-	746	759	-	545	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1373	-	-	1310	-	-	258	381	861	255	342	862
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	381	-	255	342	-
Stage 1	-	-	-	-	-	-	553	533	-	729	735	-
Stage 2	-	-	-	-	-	-	584	755	-	375	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.3	197.5	15.1
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	292	1373	-	-	1310	-	-	560
HCM Lane V/C Ratio	1.311	0.085	-	-	0.005	-	-	0.364
HCM Control Delay (s)	197.5	7.9	0	-	7.8	0	-	15.1
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	18.9	0.3	-	-	0	-	-	1.7

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Build PM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	30	380	45	0	155	655	95	0	90	185	115	0	65	85	15
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	35	441	52	0	170	718	104	0	99	203	126	0	75	99	17
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		528.00			992.00			428.00			191.00	
Entry Volume veh/h		484.40			963.11			415.53			175.23	
Circulating Flow (v_c), pc/h	344			337			551			987		
Exiting Flow (v_{ex}), pc/h	642			834			342			321		
Capacity (c_{pce}), pc/h		983.89			989.26			837.58			596.69	
Capacity (c), veh/h		902.65			960.45			813.18			547.42	
v/c Ratio (x)		0.54			1.00			0.51			0.32	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		11.2			50.5			11.5			11.2	
Lane LOS		B			F			B			B	
95% Queue, veh		3.3			19.2			3.0			1.4	
Approach Delay, s/veh	11.2			50.5			11.5			11.2		
Approach LOS	B			F			B			B		
Intersection Delay, s/veh | LOS	29.8						D					

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APPENDIX C
Existing Transportation System with Build Traffic Operational Analysis

Year 2040 Build Traffic
Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	100	110	325	120	30	60	165	210	90	40
Future Volume (vph)	65	810	100	110	325	120	30	60	165	210	90	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1071	0	0	610	0	0	280	0	0	374	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1180	1	20	555	25	1	1	10	5	1	1
Future Volume (vph)	5	1180	1	20	555	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	1357	0	23	667	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1180	1	20	555	25	1	1	10	5	1	1
Future Vol, veh/h	5	1180	1	20	555	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	1356	1	23	638	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	667	0	0	1357	0	0	2069	2082	1357	2074	2068	653
Stage 1	-	-	-	-	-	-	1369	1369	-	699	699	-
Stage 2	-	-	-	-	-	-	700	713	-	1375	1369	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	904	-	-	473	-	-	31	41	149	37	50	447
Stage 1	-	-	-	-	-	-	149	178	-	412	424	-
Stage 2	-	-	-	-	-	-	372	381	-	169	202	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	904	-	-	473	-	-	29	39	149	32	47	447
Mov Cap-2 Maneuver	-	-	-	-	-	-	29	39	-	32	47	-
Stage 1	-	-	-	-	-	-	148	177	-	409	403	-
Stage 2	-	-	-	-	-	-	352	362	-	154	201	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	49.8	119.9
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	94	904	-	-	473	-	-	39
HCM Lane V/C Ratio	0.147	0.006	-	-	0.049	-	-	0.206
HCM Control Delay (s)	49.8	9	-	-	13	-	-	119.9
HCM Lane LOS	E	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.5	0	-	-	0.2	-	-	0.7

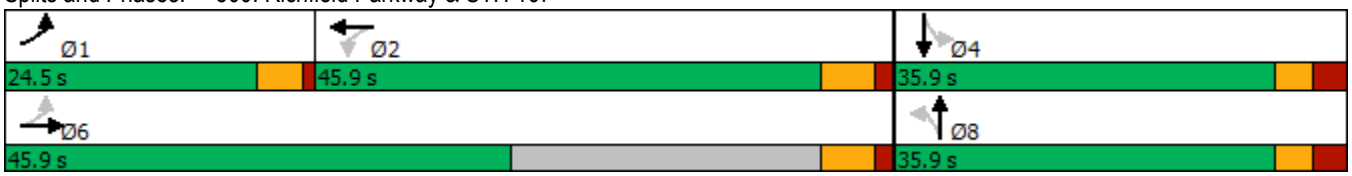
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1040	1	5	525	320	1	1	1	360	1	75
Future Volume (vph)	155	1040	1	5	525	320	1	1	1	360	1	75
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	1170	0	6	950	0	1	2	0	404	85	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.70	1.16		0.08	1.38		0.00	0.00		1.12	0.22	
Control Delay	31.9	105.2		22.4	206.1		25.0	24.5		116.1	27.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.9	105.2		22.4	206.1		25.0	24.5		116.1	27.5	
Queue Length 50th (ft)	51	~847		2	~745		0	1		~281	38	
Queue Length 95th (ft)	119	#1103		12	#1023		5	6		#495	82	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	410	1200		72	689		408	498		362	378	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.42	0.97		0.08	1.38		0.00	0.00		1.12	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 106.3
Actuated Cycle Length: 96.2
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	1040	1	5	525	320	1	1	1	360	1	75
Future Volume (veh/h)	155	1040	1	5	525	320	1	1	1	360	1	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	174	1169	1	6	590	360	1	1	1	404	1	84
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	207	999	1	77	443	270	432	256	256	451	5	386
Arrive On Green	0.08	0.55	0.55	0.43	0.43	0.43	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1711	1808	2	453	1035	631	1313	796	796	1168	14	1202
Grp Volume(v), veh/h	174	0	1170	6	0	950	1	0	2	404	0	85
Grp Sat Flow(s),veh/h/ln	1711	0	1809	453	0	1666	1313	0	1591	1168	0	1216
Q Serve(g_s), s	5.1	0.0	51.6	0.0	0.0	40.0	0.1	0.0	0.1	29.9	0.0	4.8
Cycle Q Clear(g_c), s	5.1	0.0	51.6	40.0	0.0	40.0	4.8	0.0	0.1	30.0	0.0	4.8
Prop In Lane	1.00		0.00	1.00		0.38	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	207	0	1000	77	0	713	432	0	511	451	0	390
V/C Ratio(X)	0.84	0.00	1.17	0.08	0.00	1.33	0.00	0.00	0.00	0.90	0.00	0.22
Avail Cap(c_a), veh/h	443	0	1000	77	0	713	432	0	511	451	0	390
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	20.9	46.7	0.0	26.7	24.9	0.0	21.6	32.8	0.0	23.1
Incr Delay (d2), s/veh	3.5	0.0	87.5	0.5	0.0	158.8	0.0	0.0	0.0	20.0	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	3.4	0.0	59.8	0.3	0.0	67.9	0.0	0.0	0.1	17.4	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	108.4	47.2	0.0	185.5	24.9	0.0	21.6	52.8	0.0	23.4
LnGrp LOS	C	A	F	D	A	F	C	A	C	D	A	C
Approach Vol, veh/h		1344			956			3			489	
Approach Delay, s/veh		97.6			184.6			22.7			47.7	
Approach LOS		F			F			C			D	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	11.6	45.9		35.9		57.5		35.9
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	7.1	42.0		32.0		53.6		6.8
Green Ext Time (p_c), s	0.1	0.0		0.0		0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	118.6
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1400	850	265	0	0
Future Volume (vph)	0	1400	850	265	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1573	955	298	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Future Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	842	632	105	626	0	0	0	0	0	595	547
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	938

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Future Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	842	632	105	626	0	0	0	0	595	0	547

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1474	0	0	1994	2310	626
Stage 1	-	-	-	-	-	-	836	836	-
Stage 2	-	-	-	-	-	-	1158	1474	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	434	-	0	~ 65	37	~ 477
Stage 1	0	-	-	-	-	0	~ 419	377	-
Stage 2	0	-	-	-	-	0	~ 294	187	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	434	-	-	~ 49	0	~ 477
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 49	0	-
Stage 1	-	-	-	-	-	-	~ 419	0	-
Stage 2	-	-	-	-	-	-	~ 223	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.3	$ 2747.6
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	434	-	49	477
HCM Lane V/C Ratio	-	-	0.243	-	12.137	1.148
HCM Control Delay (s)	-	-	15.9		$ 5169.2	116.4
HCM Lane LOS	-	-	C	-	F	F
HCM 95th %tile Q(veh)	-	-	0.9	-	71.3	19.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Future Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	394	985	0	0	384	167	0	318	328	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	233.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Future Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	394	985	0	0	384	167	318	0	328	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	404.2	41.9	32.6
HCM LOS	F	E	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	325	390	975	380	165
LT Vol	315	0	390	0	0	0
Through Vol	0	0	0	975	380	0
RT Vol	0	325	0	0	0	165
Lane Flow Rate	318	328	394	985	384	167
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.769	0.684	0.918	2.153	0.886	0.352
Departure Headway (Hd)	9.619	8.381	8.386	7.87	9.479	8.754
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	379	433	429	463	384	413
Service Time	7.319	6.081	6.175	5.658	7.179	6.454
HCM Lane V/C Ratio	0.839	0.758	0.918	2.127	1	0.404
HCM Control Delay	38	27.4	54.7	544	53.1	16.1
HCM Lane LOS	E	D	F	F	F	C
HCM 95th-tile Q	6.3	5	10.1	70.4	8.8	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	995	130	75	365	75	90	1	45	50	1	90
Future Volume (vph)	175	995	130	75	365	75	90	1	45	50	1	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1245	138	0	548	0	0	145	0	0	150	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	293

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	175	995	130	75	365	75	90	1	45	50	1	90
Future Vol, veh/h	175	995	130	75	365	75	90	1	45	50	1	90
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	186	1059	138	80	388	80	96	1	48	53	1	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	468	0	0	1197	0	0	2068	2059	1059	2113	2157	428
Stage 1	-	-	-	-	-	-	1431	1431	-	588	588	-
Stage 2	-	-	-	-	-	-	637	628	-	1525	1569	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1063	-	-	566	-	-	~ 40	55	273	~ 33	42	590
Stage 1	-	-	-	-	-	-	167	200	-	465	468	-
Stage 2	-	-	-	-	-	-	465	476	-	134	156	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1063	-	-	566	-	-	~ 16	20	273	~ 13	15	590
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 16	20	-	~ 13	15	-
Stage 1	-	-	-	-	-	-	~ 76	91	-	211	378	-
Stage 2	-	-	-	-	-	-	313	384	-	~ 49	71	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1.8	$ 2715.7	$ 1710.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	23	1063	-	-	566	-	-	35
HCM Lane V/C Ratio	6.29	0.175	-	-	0.141	-	-	4.286
HCM Control Delay (s)	$ 2715.7	9.1	0	-	12.4	0		$ 1710.2
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	18.2	0.6	-	-	0.5	-	-	17.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	800	80	20	440	65	15	1	10	10	1	60
Future Volume (vph)	210	800	80	20	440	65	15	1	10	10	1	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1713			1664			527			1026	
Travel Time (s)		26.0			25.2			12.0			23.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	17%	19%	19%	19%	2%	2%	2%	67%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1198	0	0	577	0	0	28	0	0	78	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	11.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	210	800	80	20	440	65	15	1	10	10	1	60
Future Vol, veh/h	210	800	80	20	440	65	15	1	10	10	1	60
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	17	17	17	19	19	19	2	2	2	67	67	67
Mvmt Flow	231	879	88	22	484	71	16	1	11	11	1	66

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	555	0	0	967	0	0	1982	1984	923	1955	1993	520
Stage 1	-	-	-	-	-	-	1385	1385	-	564	564	-
Stage 2	-	-	-	-	-	-	597	599	-	1391	1429	-
Critical Hdwy	4.27	-	-	4.29	-	-	7.12	6.52	6.22	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.77	6.17	-
Follow-up Hdwy	2.353	-	-	2.371	-	-	3.518	4.018	3.318	4.103	4.603	3.903
Pot Cap-1 Maneuver	944	-	-	648	-	-	46	61	327	32	41	447
Stage 1	-	-	-	-	-	-	177	211	-	412	418	-
Stage 2	-	-	-	-	-	-	490	490	-	128	147	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	944	-	-	648	-	-	21	27	327	17	18	447
Mov Cap-2 Maneuver	-	-	-	-	-	-	21	27	-	17	18	-
Stage 1	-	-	-	-	-	-	81	97	-	190	397	-
Stage 2	-	-	-	-	-	-	396	466	-	56	68	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0.4	292.3	140.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	33	944	-	-	648	-	-	91
HCM Lane V/C Ratio	0.866	0.244	-	-	0.034	-	-	0.857
HCM Control Delay (s)	292.3	10	0	-	10.8	0	-	140.1
HCM Lane LOS	F	B	A	-	B	A	-	F
HCM 95th %tile Q(veh)	3	1	-	-	0.1	-	-	4.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	695	60	30	490	30	15	0	1	10	0	20
Future Volume (vph)	65	695	60	30	490	30	15	0	1	10	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1664			640			717			1215	
Travel Time (s)		37.8			14.5			19.6			33.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	17%	19%	19%	19%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	901	0	0	604	0	0	17	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	695	60	30	490	30	15	0	1	10	0	20
Future Vol, veh/h	65	695	60	30	490	30	15	0	1	10	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	17	17	17	19	19	19	2	2	2	2	2	2
Mvmt Flow	71	764	66	33	538	33	16	0	1	11	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	571	0	0	830	0	0	1571	1576	797	1561	1593	555
Stage 1	-	-	-	-	-	-	939	939	-	621	621	-
Stage 2	-	-	-	-	-	-	632	637	-	940	972	-
Critical Hdwy	4.27	-	-	4.29	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.353	-	-	2.371	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	931	-	-	733	-	-	90	110	387	91	107	531
Stage 1	-	-	-	-	-	-	317	343	-	475	479	-
Stage 2	-	-	-	-	-	-	468	471	-	316	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	931	-	-	733	-	-	73	88	387	77	86	531
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	88	-	77	86	-
Stage 1	-	-	-	-	-	-	272	294	-	407	447	-
Stage 2	-	-	-	-	-	-	419	440	-	270	284	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.6	65.1	29.6
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	77	931	-	-	733	-	-	179
HCM Lane V/C Ratio	0.228	0.077	-	-	0.045	-	-	0.184
HCM Control Delay (s)	65.1	9.2	0	-	10.1	0	-	29.6
HCM Lane LOS	F	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	0.8	0.2	-	-	0.1	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	270	220	15	265	30	170	50	5	20	90	115
Future Volume (vph)	215	270	220	15	265	30	170	50	5	20	90	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	810	0	0	356	0	0	258	0	0	258	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	63.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	215	270	220	15	265	30	170	50	5	20	90	115
Future Vol, veh/h	215	270	220	15	265	30	170	50	5	20	90	115
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	247	310	253	17	305	34	195	57	6	23	103	132

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	339	0	0	563	0	0	1405	1304	437	1318	1413	322
Stage 1	-	-	-	-	-	-	931	931	-	356	356	-
Stage 2	-	-	-	-	-	-	474	373	-	962	1057	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1193	-	-	999	-	-	~ 109	150	591	134	137	717
Stage 1	-	-	-	-	-	-	302	328	-	659	627	-
Stage 2	-	-	-	-	-	-	545	594	-	306	301	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1193	-	-	999	-	-	-	101	591	56	~ 92	717
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	101	-	56	~ 92	-
Stage 1	-	-	-	-	-	-	207	225	-	452	614	-
Stage 2	-	-	-	-	-	-	362	582	-	155	206	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.4		$ 404.5
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1193	-	-	999	-	-	150
HCM Lane V/C Ratio	-	0.207	-	-	0.017	-	-	1.724
HCM Control Delay (s)	-	8.8	0	-	8.7	0	-	$ 404.5
HCM Lane LOS	-	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	-	0.8	-	-	0.1	-	-	18.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Build AM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	65	810	100	0	110	325	120	0	30	60	165	0	210	90	40
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	74	926	114	0	133	393	145	0	36	72	198	0	258	111	49
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		1114.00			671.00			306.00			418.00	
Entry Volume veh/h		1071.15			610.00			280.73			373.21	
Circulating Flow (v_c), pc/h	502			182			1258			562		
Exiting Flow (v_{ex}), pc/h	1382			478			291			358		
Capacity (c_{pce}), pc/h		870.11			1116.01			483.29			830.44	
Capacity (c), veh/h		836.65			1014.55			443.39			741.47	
v/c Ratio (x)		1.28			0.60			0.63			0.50	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		152.7			11.8			24.3			12.2	
Lane LOS		F			B			C			B	
95% Queue, veh		39.5			4.2			4.3			2.9	
Approach Delay, s/veh	152.7			11.8			24.3			12.2		
Approach LOS	F			B			C			B		
Intersection Delay, s/veh | LOS	78.0						F					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	425	45	190	760	205	90	200	135	145	120	70
Future Volume (vph)	50	425	45	190	760	205	90	200	135	145	120	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	553	0	0	1229	0	0	453	0	0	356	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	700	1	5	1145	10	5	1	10	10	1	5
Future Volume (vph)	5	700	1	5	1145	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	738	0	5	1216	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	700	1	5	1145	10	5	1	10	10	1	5
Future Vol, veh/h	5	700	1	5	1145	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	737	1	5	1205	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1216	0	0	738	0	0	1972	1974	738	1975	1969	1211
Stage 1	-	-	-	-	-	-	748	748	-	1221	1221	-
Stage 2	-	-	-	-	-	-	1224	1226	-	754	748	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	556	-	-	859	-	-	42	56	390	46	63	222
Stage 1	-	-	-	-	-	-	378	394	-	220	252	-
Stage 2	-	-	-	-	-	-	201	232	-	401	420	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	556	-	-	859	-	-	40	55	390	44	62	222
Mov Cap-2 Maneuver	-	-	-	-	-	-	40	55	-	44	62	-
Stage 1	-	-	-	-	-	-	375	390	-	218	250	-
Stage 2	-	-	-	-	-	-	194	231	-	386	416	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	50.9	86.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	95	556	-	-	859	-	-	60
HCM Lane V/C Ratio	0.177	0.009	-	-	0.006	-	-	0.281
HCM Control Delay (s)	50.9	11.5	-	-	9.2	-	-	86.9
HCM Lane LOS	F	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	655	1	5	1010	90	1	1	1	530	1	150
Future Volume (vph)	65	655	1	5	1010	90	1	1	1	530	1	150
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	713	0	5	1196	0	1	2	0	576	164	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.36	0.74		0.02	1.49		0.00	0.00		1.39	0.38	
Control Delay	14.4	21.4		16.0	250.3		22.0	21.5		217.4	27.3	

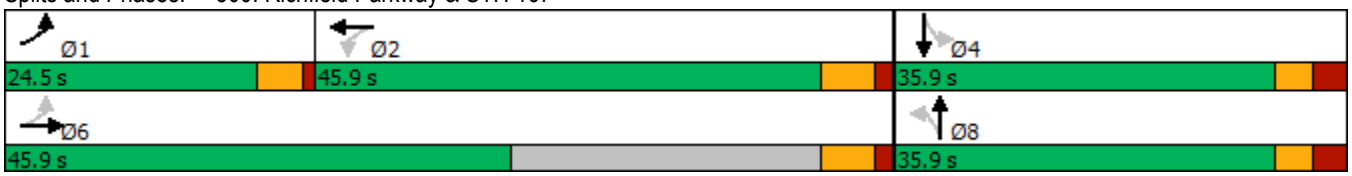
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.4	21.4		16.0	250.3		22.0	21.5		217.4	27.3	
Queue Length 50th (ft)	18	293		2	~987		0	1		~457	73	
Queue Length 95th (ft)	37	433		9	#1259		4	6		#672	134	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	430	1289		222	804		400	530		415	433	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.55		0.02	1.49		0.00	0.00		1.39	0.38	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 90.6	
Natural Cycle: 150	
Control Type: Semi Act-Uncoord	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	655	1	5	1010	90	1	1	1	530	1	150
Future Volume (veh/h)	65	655	1	5	1010	90	1	1	1	530	1	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	71	712	1	5	1098	98	1	1	1	576	1	163
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	173	988	1	259	735	66	364	261	261	495	3	431
Arrive On Green	0.05	0.54	0.54	0.44	0.44	0.44	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1725	1821	3	725	1678	150	1222	796	796	1269	8	1312
Grp Volume(v), veh/h	71	0	713	5	0	1196	1	0	2	576	0	164
Grp Sat Flow(s),veh/h/ln	1725	0	1824	725	0	1827	1222	0	1591	1269	0	1320
Q Serve(g_s), s	1.9	0.0	26.8	0.5	0.0	40.0	0.1	0.0	0.1	29.9	0.0	8.7
Cycle Q Clear(g_c), s	1.9	0.0	26.8	17.8	0.0	40.0	8.8	0.0	0.1	30.0	0.0	8.7
Prop In Lane	1.00		0.00	1.00		0.08	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	173	0	989	259	0	801	364	0	523	495	0	434
V/C Ratio(X)	0.41	0.00	0.72	0.02	0.00	1.49	0.00	0.00	0.00	1.16	0.00	0.38
Avail Cap(c_a), veh/h	457	0	989	259	0	801	364	0	523	495	0	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	15.7	26.0	0.0	25.7	26.9	0.0	20.6	33.1	0.0	23.5
Incr Delay (d2), s/veh	0.6	0.0	2.7	0.0	0.0	228.9	0.0	0.0	0.0	94.1	0.0	0.5
Initial Q Delay(d3),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
%ile BackOfQ(50%),veh/ln	0.7	0.0	10.2	0.1	0.0	66.1	0.0	0.0	0.0	24.2	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	0.0	18.4	26.0	0.0	254.6	26.9	0.0	20.6	127.2	0.0	24.0
LnGrp LOS	C	A	B	C	A	F	C	A	C	F	A	C
Approach Vol, veh/h		784			1201			3			740	
Approach Delay, s/veh		18.6			253.6			22.7			104.3	
Approach LOS		B			F			C			F	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.5	45.9		35.9		55.4		35.9
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	3.9	42.0		32.0		28.8		10.8
Green Ext Time (p_c), s	0.0	0.0		0.0		3.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	145.3
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1185	1105	225	0	0
Future Volume (vph)	0	1185	1105	225	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1261	1176	239	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	335
Future Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	862	500	339	1144	0	0	0	0	0	305	385
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2485.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	750	435	295	995	0	0	0	0	265	0	335
Future Vol, veh/h	0	750	435	295	995	0	0	0	0	265	0	335
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	862	500	339	1144	0	0	0	0	305	0	385

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1362	0	0	2934	3184	1144
Stage 1	-	-	-	-	-	-	1822	1822	-
Stage 2	-	-	-	-	-	-	1112	1362	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	498	-	0	~ 16	10	~ 240
Stage 1	0	-	-	-	-	0	~ 139	126	-
Stage 2	0	-	-	-	-	0	310	213	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	498	-	-	~ 5	0	~ 240
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 5	0	-
Stage 1	-	-	-	-	-	-	~ 139	0	-
Stage 2	-	-	-	-	-	-	~ 99	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6	$ 12726.9
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	498	-	5	240
HCM Lane V/C Ratio	-	-	0.681	-	60.92	1.604
HCM Control Delay (s)	-	-	26.3	$ 28401.9	$ 327.2	
HCM Lane LOS	-	-	D	-	F	F
HCM 95th %tile Q(veh)	-	-	5.1	-	40.3	24.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Future Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	632	534	0	0	897	632	0	586	213	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	298.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Future Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	632	534	0	0	897	632	586	0	213	0	0	0
Number of Lanes	1	1	0	0	1	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	235.7	382	231.6
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	510	185	550	465	780	550
LT Vol	510	0	550	0	0	0
Through Vol	0	0	0	465	780	0
RT Vol	0	185	0	0	0	550
Lane Flow Rate	586	213	632	534	897	632
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.56	0.495	1.567	1.251	2.073	1.339
Departure Headway (Hd)	14.682	13.458	10.888	10.369	9.935	9.205
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	252	270	341	353	377	398
Service Time	12.382	11.158	8.588	8.069	7.635	6.905
HCM Lane V/C Ratio	2.325	0.789	1.853	1.513	2.379	1.588
HCM Control Delay	305.2	28.7	295.9	164.6	514	194.8
HCM Lane LOS	F	D	F	F	F	F
HCM 95th-tile Q	23.3	2.6	29.9	19.3	53.8	24.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	405	130	80	995	70	150	1	80	80	1	185
Future Volume (vph)	115	405	130	80	995	70	150	1	80	80	1	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	159	0	1396	0	0	282	0	0	325	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	608.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	405	130	80	995	70	150	1	80	80	1	185
Future Vol, veh/h	115	405	130	80	995	70	150	1	80	80	1	185
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	140	494	159	98	1213	85	183	1	98	98	1	226

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1298	0	0	653	0	0	2339	2268	494	2355	2385	1256
Stage 1	-	-	-	-	-	-	774	774	-	1452	1452	-
Stage 2	-	-	-	-	-	-	1565	1494	-	903	933	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	505	-	-	915	-	-	~ 26	41	575	~ 25	34	~ 209
Stage 1	-	-	-	-	-	-	391	408	-	162	195	-
Stage 2	-	-	-	-	-	-	~ 140	186	-	332	345	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	505	-	-	915	-	-	-	14	575	~ 9	11	~ 209
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	14	-	~ 9	11	-
Stage 1	-	-	-	-	-	-	216	226	-	~ 90	117	-
Stage 2	-	-	-	-	-	-	-	112	-	152	191	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.7		$ 5236.2
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	505	-	-	915	-	-	27
HCM Lane V/C Ratio	-	0.278	-	-	0.107	-	-	12.014
HCM Control Delay (s)	-	14.8	0	-	9.4	0		$ 5236.2
HCM Lane LOS	-	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	-	1.1	-	-	0.4	-	-	40.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	500	10	15	845	25	85	1	20	60	1	215
Future Volume (vph)	55	500	10	15	845	25	85	1	20	60	1	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1713			1664			527			1026	
Travel Time (s)		26.0			25.2			12.0			23.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	665	0	0	1041	0	0	125	0	0	325	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	687.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	500	10	15	845	25	85	1	20	60	1	215
Future Vol, veh/h	55	500	10	15	845	25	85	1	20	60	1	215
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	18	18	18	5	5	5	2	2	2	9	9	9
Mvmt Flow	65	588	12	18	994	29	100	1	24	71	1	253

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1023	0	0	600	0	0	1896	1783	594	1782	1775	1009
Stage 1	-	-	-	-	-	-	724	724	-	1045	1045	-
Stage 2	-	-	-	-	-	-	1172	1059	-	737	730	-
Critical Hdwy	4.28	-	-	4.15	-	-	7.12	6.52	6.22	7.19	6.59	6.29
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.19	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.19	5.59	-
Follow-up Hdwy	2.362	-	-	2.245	-	-	3.518	4.018	3.318	3.581	4.081	3.381
Pot Cap-1 Maneuver	620	-	-	963	-	-	~ 53	82	505	~ 61	80	283
Stage 1	-	-	-	-	-	-	417	430	-	268	297	-
Stage 2	-	-	-	-	-	-	234	301	-	399	417	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	620	-	-	963	-	-	~ 5	66	505	~ 49	64	283
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 5	66	-	~ 49	64	-
Stage 1	-	-	-	-	-	-	351	362	-	226	284	-
Stage 2	-	-	-	-	-	-	~ 24	288	-	319	351	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.1	$ 10099	$ 682.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	6	620	-	-	963	-	-	138
HCM Lane V/C Ratio	20.784	0.104	-	-	0.018	-	-	2.353
HCM Control Delay (s)	$ 10099	11.5	0	-	8.8	0	-	$ 682.3
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	17.5	0.3	-	-	0.1	-	-	27.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	530	15	1	755	5	60	0	15	25	0	70
Future Volume (vph)	35	530	15	1	755	5	60	0	15	25	0	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1664			640			717			1215	
Travel Time (s)		25.2			9.7			19.6			33.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	683	0	0	895	0	0	89	0	0	111	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	19.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	530	15	1	755	5	60	0	15	25	0	70
Future Vol, veh/h	35	530	15	1	755	5	60	0	15	25	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	18	18	18	5	5	5	2	2	2	2	2	2
Mvmt Flow	41	624	18	1	888	6	71	0	18	29	0	82

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	894	0	0	642	0	0	1649	1611	633	1617	1617	891
Stage 1	-	-	-	-	-	-	715	715	-	893	893	-
Stage 2	-	-	-	-	-	-	934	896	-	724	724	-
Critical Hdwy	4.28	-	-	4.15	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.362	-	-	2.245	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	696	-	-	928	-	-	79	104	480	83	103	341
Stage 1	-	-	-	-	-	-	422	434	-	336	360	-
Stage 2	-	-	-	-	-	-	319	359	-	417	430	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	696	-	-	928	-	-	~ 56	94	480	74	93	341
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 56	94	-	74	93	-
Stage 1	-	-	-	-	-	-	383	394	-	305	359	-
Stage 2	-	-	-	-	-	-	241	358	-	365	390	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	$ 313	56.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	68	696	-	-	928	-	-	175
HCM Lane V/C Ratio	1.298	0.059	-	-	0.001	-	-	0.639
HCM Control Delay (s)	$ 313	10.5	0	-	8.9	0	-	56.2
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	7.2	0.2	-	-	0	-	-	3.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	255	160	15	250	15	295	100	15	30	45	215
Future Volume (vph)	155	255	160	15	250	15	295	100	15	30	45	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	704	0	0	347	0	0	506	0	0	358	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1104.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	155	255	160	15	250	15	295	100	15	30	45	215
Future Vol, veh/h	155	255	160	15	250	15	295	100	15	30	45	215
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	191	315	198	19	309	19	364	123	19	37	56	265

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	328	0	0	513	0	0	1313	1162	414	1224	1252	319
Stage 1	-	-	-	-	-	-	796	796	-	357	357	-
Stage 2	-	-	-	-	-	-	517	366	-	867	895	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1183	-	-	1032	-	-	~ 135	194	636	147	163	693
Stage 1	-	-	-	-	-	-	379	398	-	635	606	-
Stage 2	-	-	-	-	-	-	539	621	-	330	342	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1183	-	-	1032	-	-	~ 44	145	636	~ 34	122	693
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 44	145	-	~ 34	122	-
Stage 1	-	-	-	-	-	-	~ 291	305	-	487	592	-
Stage 2	-	-	-	-	-	-	~ 294	607	-	146	262	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.5	$ 3833.9	$ 477.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	55	1183	-	-	1032	-	-	186
HCM Lane V/C Ratio	9.203	0.162	-	-	0.018	-	-	1.925
HCM Control Delay (s)	$ 3833.9	8.6	0	-	8.6	0	-	$ 477.5
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	59.6	0.6	-	-	0.1	-	-	26.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Build PM Peak Hour
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	50	425	45	0	190	760	205	0	90	200	135	0	145	120	70
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	58	493	52	0	208	833	225	0	99	219	148	0	168	139	81
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.2000			4.2000			4.2000			4.2000	
Follow-Up Headway (s)		2.8000			2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		603.00			1266.00			466.00			388.00	
Entry Volume veh/h		553.21			1229.13			452.43			355.96	
Circulating Flow (v_c), pc/h	515			376			719			1140		
Exiting Flow (v_{ex}), pc/h	809			1013			502			399		
Capacity (c_{pce}), pc/h		861.36			959.70			734.98			529.75	
Capacity (c), veh/h		790.24			931.75			713.58			486.01	
v/c Ratio (x)		0.70			1.32			0.63			0.73	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		18.0			167.0			16.5			28.7	
Lane LOS		C			F			C			D	
95% Queue, veh		5.8			47.0			4.6			6.0	
Approach Delay, s/veh	18.0			167.0			16.5			28.7		
Approach LOS	C			F			C			D		
Intersection Delay, s/veh | LOS	89.9						F					

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APPENDIX E
Transportation System Improvements with Background Traffic Operational Analysis

Year 2025 Background Traffic
Synchro Worksheets
With Modifications

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	630	95	75	260	25	30	25	85	85	75	20
Future Volume (vph)	10	630	95	75	260	25	30	25	85	85	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	807	0	0	395	0	0	153	0	0	197	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	795	1	20	360	25	1	1	10	5	1	1
Future Volume (vph)	5	795	1	20	360	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	915	0	23	443	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	795	1	20	360	25	1	1	10	5	1	1
Future Vol, veh/h	5	795	1	20	360	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	914	1	23	414	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	443	0	0	915	0	0	1403	1416	915	1408	1402	429
Stage 1	-	-	-	-	-	-	927	927	-	475	475	-
Stage 2	-	-	-	-	-	-	476	489	-	933	927	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1096	-	-	702	-	-	96	113	280	109	132	601
Stage 1	-	-	-	-	-	-	274	299	-	548	538	-
Stage 2	-	-	-	-	-	-	501	488	-	304	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1096	-	-	702	-	-	92	109	280	101	127	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	109	-	101	127	-
Stage 1	-	-	-	-	-	-	273	298	-	545	520	-
Stage 2	-	-	-	-	-	-	483	472	-	289	330	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	22.9	37.4
HCM LOS			C	E

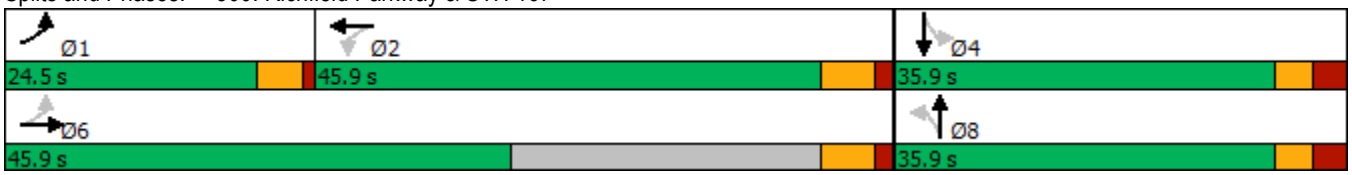
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	215	1096	-	-	702	-	-	119
HCM Lane V/C Ratio	0.064	0.005	-	-	0.033	-	-	0.068
HCM Control Delay (s)	22.9	8.3	-	-	10.3	-	-	37.4
HCM Lane LOS	C	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	760	1	5	365	1	1	1	1	180	1	40
Future Volume (vph)	50	760	1	5	365	1	1	1	1	180	1	40
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	855	0	6	411	0	1	2	0	202	46	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.12	0.87		0.04	0.51		0.00	0.00		0.65	0.14	
Control Delay	8.2	26.4		15.8	18.2		18.0	18.5		33.2	20.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.2	26.4		15.8	18.2		18.0	18.5		33.2	20.5	
Queue Length 50th (ft)	9	259		1	124		0	1		78	15	
Queue Length 95th (ft)	30	#640		10	261		4	5		149	40	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	700	1647		215	1104		638	753		546	571	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.52		0.03	0.37		0.00	0.00		0.37	0.08	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 65.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	760	1	5	365	1	1	1	1	180	1	40
Future Volume (veh/h)	50	760	1	5	365	1	1	1	1	180	1	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	56	854	1	6	410	1	1	1	1	202	1	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	460	1003	1	234	718	2	392	173	173	391	6	259
Arrive On Green	0.06	0.56	0.56	0.40	0.40	0.40	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1711	1807	2	610	1775	4	1360	796	796	1168	26	1191
Grp Volume(v), veh/h	56	0	855	6	0	411	1	0	2	202	0	46
Grp Sat Flow(s),veh/h/ln	1711	0	1809	610	0	1779	1360	0	1591	1168	0	1218
Q Serve(g_s), s	0.9	0.0	20.7	0.4	0.0	9.3	0.0	0.0	0.1	8.5	0.0	1.6
Cycle Q Clear(g_c), s	0.9	0.0	20.7	13.3	0.0	9.3	1.6	0.0	0.1	8.5	0.0	1.6
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	460	0	1005	234	0	719	392	0	346	391	0	264
V/C Ratio(X)	0.12	0.00	0.85	0.03	0.00	0.57	0.00	0.00	0.01	0.52	0.00	0.17
Avail Cap(c_a), veh/h	1010	0	1396	458	0	1372	884	0	921	814	0	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	9.7	18.6	0.0	12.0	17.2	0.0	15.9	19.3	0.0	16.5
Incr Delay (d2), s/veh	0.0	0.0	4.0	0.0	0.0	0.8	0.0	0.0	0.0	1.1	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.4	0.0	9.6	0.1	0.0	5.1	0.0	0.0	0.0	4.0	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.9	0.0	13.7	18.7	0.0	12.8	17.2	0.0	15.9	20.3	0.0	16.8
LnGrp LOS	A	A	B	B	A	B	B	A	B	C	A	B
Approach Vol, veh/h		911			417			3			248	
Approach Delay, s/veh		13.4			12.9			16.3			19.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.8	26.9		17.2		34.7		17.2
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.9	15.3		10.5		22.7		3.6
Green Ext Time (p_c), s	0.0	2.7		1.0		6.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	940	370	170	0	0
Future Volume (vph)	0	940	370	170	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1056	416	191	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	430	510	30	210	0	0	0	0	135	0	330
Future Volume (vph)	0	430	510	30	210	0	0	0	0	135	0	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	453	537	32	221	0	0	0	0	0	142	347
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	430	510	30	210	0	0	0	0	135	0	330
Future Vol, veh/h	0	430	510	30	210	0	0	0	0	135	0	330
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	453	537	32	221	0	0	0	0	142	0	347

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	990	0	0	1007	1275	221
Stage 1	-	-	-	-	-	-	285	285	-
Stage 2	-	-	-	-	-	-	722	990	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	668	-	0	262	164	809
Stage 1	0	-	-	-	-	0	754	668	-
Stage 2	0	-	-	-	-	0	474	319	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	668	-	-	249	0	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	249	0	-
Stage 1	-	-	-	-	-	-	754	0	-
Stage 2	-	-	-	-	-	-	451	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.3	19.9
HCM LOS			C

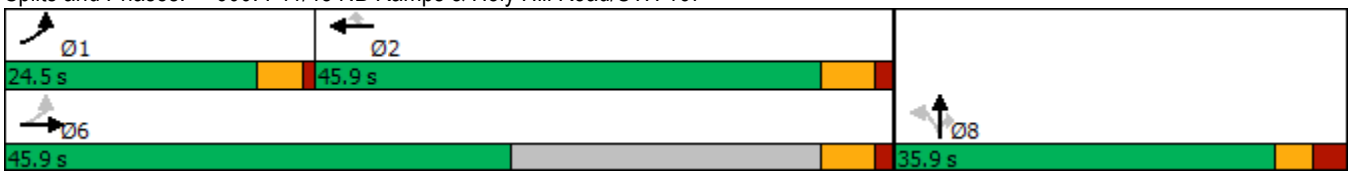
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	668	-	249	809
HCM Lane V/C Ratio	-	-	0.047	-	0.571	0.429
HCM Control Delay (s)	-	-	10.7	-	37.1	12.8
HCM Lane LOS	-	-	B	-	E	B
HCM 95th %tile Q(veh)	-	-	0.1	-	3.2	2.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	280	0	0	100	65	140	0	7	0	0	0
Future Volume (vph)	285	280	0	0	100	65	140	0	7	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	288	283	0	0	101	41	0	141	7	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	24.5	45.9			45.9	45.9	35.9	35.9	35.9			
Total Split (%)	23.0%	43.2%			43.2%	43.2%	33.8%	33.8%	33.8%			
Maximum Green (s)	20.0	40.0			40.0	40.0	30.0	30.0	30.0			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	Min			Min	Min	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.37	0.24			0.18	0.09		0.38	0.02			
Control Delay	6.7	6.4			17.0	16.4		22.4	17.7			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	6.7	6.4			17.0	16.4		22.4	17.7			
Queue Length 50th (ft)	34	37			23	9		38	2			
Queue Length 95th (ft)	78	83			63	33		87	11			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	936	1806			1407	1187		1020	913			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.31	0.16			0.07	0.03		0.14	0.01			

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 49.9	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	285	280	0	0	100	65	140	0	7	0	0	0
Future Volume (veh/h)	285	280	0	0	100	65	140	0	7	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1824	0	0	1795	1781	1737	1737	1737			
Adj Flow Rate, veh/h	288	283	0	0	101	41	141	0	7			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	6	6	0	0	8	8	11	11	11			
Cap, veh/h	764	1034	0	0	573	482	301	0	268			
Arrive On Green	0.15	0.57	0.00	0.00	0.32	0.32	0.18	0.00	0.18			
Sat Flow, veh/h	1725	1824	0	0	1795	1510	1654	0	1472			
Grp Volume(v), veh/h	288	283	0	0	101	41	141	0	7			
Grp Sat Flow(s),veh/h/ln	1725	1824	0	0	1795	1510	1654	0	1472			
Q Serve(g_s), s	4.6	3.7	0.0	0.0	1.9	0.9	3.6	0.0	0.2			
Cycle Q Clear(g_c), s	4.6	3.7	0.0	0.0	1.9	0.9	3.6	0.0	0.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	764	1034	0	0	573	482	301	0	268			
V/C Ratio(X)	0.38	0.27	0.00	0.00	0.18	0.09	0.47	0.00	0.03			
Avail Cap(c_a), veh/h	1237	1554	0	0	1528	1286	1056	0	940			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	6.9	5.2	0.0	0.0	11.5	11.2	17.2	0.0	15.8			
Incr Delay (d2), s/veh	0.3	0.1	0.0	0.0	0.1	0.1	1.1	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	2.2	1.7	0.0	0.0	1.2	0.5	2.3	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.2	5.4	0.0	0.0	11.7	11.3	18.3	0.0	15.8			
LnGrp LOS	A	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		571			142			148				
Approach Delay, s/veh		6.3			11.6			18.2				
Approach LOS		A			B			B				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	11.6	20.9				32.5		14.5				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	20.0	* 40				* 40		30.0				
Max Q Clear Time (g_c+I1), s	6.6	3.9				5.7		5.6				
Green Ext Time (p_c), s	0.7	0.7				1.8		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	275	5	1	140	5	1	1	1	5	1	25
Future Volume (vph)	20	275	5	1	140	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	5	0	155	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	275	5	1	140	5	1	1	1	5	1	25
Future Vol, veh/h	20	275	5	1	140	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	293	5	1	149	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	154	0	0	298	0	0	503	491	293	493	494	152
Stage 1	-	-	-	-	-	-	335	335	-	154	154	-
Stage 2	-	-	-	-	-	-	168	156	-	339	340	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1391	-	-	1235	-	-	479	478	746	458	451	849
Stage 1	-	-	-	-	-	-	679	643	-	808	737	-
Stage 2	-	-	-	-	-	-	834	769	-	640	608	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1391	-	-	1235	-	-	456	469	746	450	442	849
Mov Cap-2 Maneuver	-	-	-	-	-	-	456	469	-	450	442	-
Stage 1	-	-	-	-	-	-	667	631	-	793	736	-
Stage 2	-	-	-	-	-	-	806	768	-	627	597	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	11.8	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	530	1391	-	-	1235	-	-	724
HCM Lane V/C Ratio	0.006	0.015	-	-	0.001	-	-	0.046
HCM Control Delay (s)	11.8	7.6	0	-	7.9	0	-	10.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	270	140	1	1	5
Future Volume (vph)	10	270	140	1	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	308	155	0	6	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	270	140	1	1	5
Future Vol, veh/h	10	270	140	1	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	11	297	154	1	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	155	0	-	0	474	155
Stage 1	-	-	-	-	155	-
Stage 2	-	-	-	-	319	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1339	-	-	-	448	745
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	444	745
Mov Cap-2 Maneuver	-	-	-	-	444	-
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	611	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1339	-	-	-	669
HCM Lane V/C Ratio	0.008	-	-	-	0.01
HCM Control Delay (s)	7.7	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	155	105	5	75	1	45	15	1	1	75	20
Future Volume (vph)	10	155	105	5	75	1	45	15	1	1	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	310	0	0	93	0	0	70	0	0	110	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	155	105	5	75	1	45	15	1	1	75	20
Future Vol, veh/h	10	155	105	5	75	1	45	15	1	1	75	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	11	178	121	6	86	1	52	17	1	1	86	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	87	0	0	299	0	0	414	360	239	369	420	87
Stage 1	-	-	-	-	-	-	261	261	-	99	99	-
Stage 2	-	-	-	-	-	-	153	99	-	270	321	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1478	-	-	1251	-	-	525	545	767	586	523	969
Stage 1	-	-	-	-	-	-	714	667	-	905	811	-
Stage 2	-	-	-	-	-	-	817	787	-	734	650	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1478	-	-	1251	-	-	442	537	767	565	516	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	537	-	565	516	-
Stage 1	-	-	-	-	-	-	708	661	-	897	807	-
Stage 2	-	-	-	-	-	-	709	783	-	707	644	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.5	14.1	12.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	465	1478	-	-	1251	-	-	572
HCM Lane V/C Ratio	0.151	0.008	-	-	0.005	-	-	0.193
HCM Control Delay (s)	14.1	7.5	0	-	7.9	0	-	12.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	350	45	110	575	70	85	180	100	55	80	15
Future Volume (vph)	30	350	45	110	575	70	85	180	100	55	80	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	452	0	0	803	0	0	387	0	0	160	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	500	1	5	745	10	5	1	10	10	1	5
Future Volume (vph)	5	500	1	5	745	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	527	0	5	795	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	500	1	5	745	10	5	1	10	10	1	5
Future Vol, veh/h	5	500	1	5	745	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	526	1	5	784	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	795	0	0	527	0	0	1340	1342	527	1343	1337	790
Stage 1	-	-	-	-	-	-	537	537	-	800	800	-
Stage 2	-	-	-	-	-	-	803	805	-	543	537	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	805	-	-	1030	-	-	119	140	517	129	153	390
Stage 1	-	-	-	-	-	-	497	495	-	379	397	-
Stage 2	-	-	-	-	-	-	352	371	-	524	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	805	-	-	1030	-	-	116	138	517	125	151	390
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	138	-	125	151	-
Stage 1	-	-	-	-	-	-	494	492	-	377	395	-
Stage 2	-	-	-	-	-	-	345	369	-	509	520	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	21.9	30
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	230	805	-	-	1030	-	-	161
HCM Lane V/C Ratio	0.073	0.007	-	-	0.005	-	-	0.105
HCM Control Delay (s)	21.9	9.5	-	-	8.5	-	-	30
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

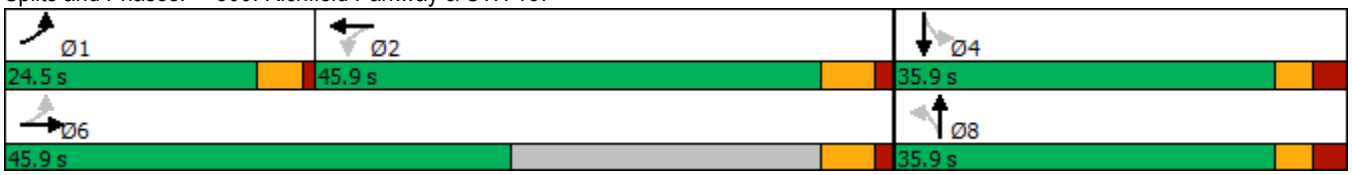
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	485	1	5	705	1	1	1	1	100	1	55
Future Volume (vph)	35	485	1	5	705	1	1	1	1	100	1	55
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	528	0	5	767	0	1	2	0	109	61	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.10	0.40		0.01	0.65		0.00	0.01		0.50	0.27	
Control Delay	4.7	6.8		9.2	16.2		25.0	25.0		36.0	29.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.7	6.8		9.2	16.2		25.0	25.0		36.0	29.7	
Queue Length 50th (ft)	4	90		1	255		0	1		47	25	
Queue Length 95th (ft)	15	182		6	#524		4	6		95	58	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	659	1638		550	1185		576	689		539	563	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.32		0.01	0.65		0.00	0.00		0.20	0.11	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 70.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	485	1	5	705	1	1	1	1	100	1	55
Future Volume (veh/h)	35	485	1	5	705	1	1	1	1	100	1	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	38	527	1	5	766	1	1	1	1	109	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	302	1129	2	530	910	1	300	133	133	341	4	218
Arrive On Green	0.05	0.62	0.62	0.49	0.49	0.49	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1725	1820	3	861	1851	2	1341	796	796	1269	22	1300
Grp Volume(v), veh/h	38	0	528	5	0	767	1	0	2	109	0	61
Grp Sat Flow(s),veh/h/ln	1725	0	1824	861	0	1854	1341	0	1591	1269	0	1322
Q Serve(g_s), s	0.5	0.0	8.6	0.2	0.0	20.0	0.0	0.0	0.1	4.4	0.0	2.2
Cycle Q Clear(g_c), s	0.5	0.0	8.6	1.6	0.0	20.0	2.3	0.0	0.1	4.4	0.0	2.2
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	302	0	1131	530	0	911	300	0	266	341	0	221
V/C Ratio(X)	0.13	0.00	0.47	0.01	0.00	0.84	0.00	0.00	0.01	0.32	0.00	0.28
Avail Cap(c_a), veh/h	840	0	1313	727	0	1334	800	0	859	813	0	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	5.6	8.0	0.0	12.3	21.2	0.0	19.3	21.1	0.0	20.2
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	3.6	0.0	0.0	0.0	0.5	0.0	0.7
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.3	0.0	0.0	10.7	0.0	0.0	0.0	2.3	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.8	0.0	6.0	8.0	0.0	15.8	21.2	0.0	19.3	21.7	0.0	20.9
LnGrp LOS	A	A	A	A	A	B	C	A	B	C	A	C
Approach Vol, veh/h		566			772			3			170	
Approach Delay, s/veh		6.2			15.8			19.9			21.4	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.2	33.2		15.2		40.4		15.2
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.5	22.0		6.4		10.6		4.3
Green Ext Time (p_c), s	0.0	5.4		0.7		3.7		0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	585	710	115	0	0
Future Volume (vph)	0	585	710	115	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	622	755	122	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	220	20	560	0	0	0	0	65	0	265
Future Volume (vph)	0	365	220	20	560	0	0	0	0	65	0	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	253	23	644	0	0	0	0	0	75	305
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	365	220	20	560	0	0	0	0	65	0	265
Future Vol, veh/h	0	365	220	20	560	0	0	0	0	65	0	265
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	420	253	23	644	0	0	0	0	75	0	305

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	673	0	0	1237	1363	644
Stage 1	-	-	-	-	-	-	690	690	-
Stage 2	-	-	-	-	-	-	547	673	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	908	-	0	191	146	468
Stage 1	0	-	-	-	-	0	492	442	-
Stage 2	0	-	-	-	-	0	574	449	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	908	-	-	186	0	468
Mov Cap-2 Maneuver	-	-	-	-	-	-	186	0	-
Stage 1	-	-	-	-	-	-	492	0	-
Stage 2	-	-	-	-	-	-	560	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	28
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	908	-	186	468
HCM Lane V/C Ratio	-	-	0.025	-	0.402	0.651
HCM Control Delay (s)	-	-	9.1	-	36.8	25.9
HCM Lane LOS	-	-	A	-	E	D
HCM 95th %tile Q(veh)	-	-	0.1	-	1.8	4.6

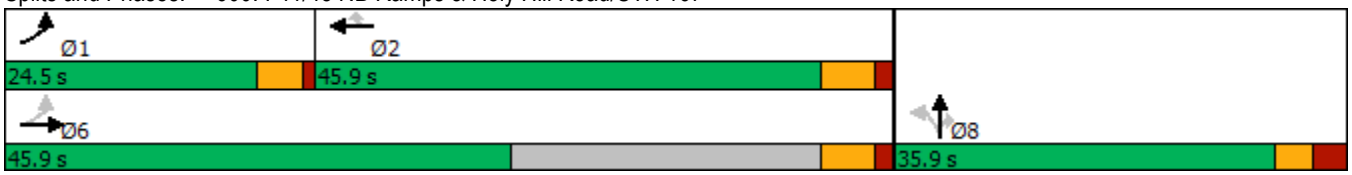
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	110	0	0	135	175	445	0	15	0	0	0
Future Volume (vph)	320	110	0	0	135	175	445	0	15	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	368	126	0	0	155	125	0	511	17	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	24.5	45.9			45.9	45.9	35.9	35.9	35.9			
Total Split (%)	23.0%	43.2%			43.2%	43.2%	33.8%	33.8%	33.8%			
Maximum Green (s)	20.0	40.0			40.0	40.0	30.0	30.0	30.0			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	Min			Min	Min	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.62	0.15			0.42	0.41		0.77	0.03			
Control Delay	18.5	12.4			32.5	32.9		31.6	16.5			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	18.5	12.4			32.5	32.9		31.6	16.5			
Queue Length 50th (ft)	113	34			67	54		213	5			
Queue Length 95th (ft)	172	61			123	104		#375	18			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	629	1468			963	813		662	592			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.59	0.09			0.16	0.15		0.77	0.03			

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 78	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	110	0	0	135	175	445	0	15	0	0	0
Future Volume (veh/h)	320	110	0	0	135	175	445	0	15	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1781	1795	0	0	1884	1870	1826	1826	1826			
Adj Flow Rate, veh/h	368	126	0	0	155	125	511	0	17			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	8	8	0	0	2	2	5	5	5			
Cap, veh/h	597	869	0	0	421	354	591	0	526			
Arrive On Green	0.19	0.48	0.00	0.00	0.22	0.22	0.34	0.00	0.34			
Sat Flow, veh/h	1697	1795	0	0	1884	1585	1739	0	1547			
Grp Volume(v), veh/h	368	126	0	0	155	125	511	0	17			
Grp Sat Flow(s),veh/h/ln	1697	1795	0	0	1884	1585	1739	0	1547			
Q Serve(g_s), s	10.3	2.6	0.0	0.0	4.7	4.5	18.4	0.0	0.5			
Cycle Q Clear(g_c), s	10.3	2.6	0.0	0.0	4.7	4.5	18.4	0.0	0.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	597	869	0	0	421	354	591	0	526			
V/C Ratio(X)	0.62	0.15	0.00	0.00	0.37	0.35	0.86	0.00	0.03			
Avail Cap(c_a), veh/h	773	1069	0	0	1122	944	777	0	691			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	13.6	9.6	0.0	0.0	22.1	22.0	20.7	0.0	14.8			
Incr Delay (d2), s/veh	1.0	0.1	0.0	0.0	0.5	0.6	7.9	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	6.6	1.7	0.0	0.0	3.6	2.9	12.8	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	9.7	0.0	0.0	22.6	22.6	28.6	0.0	14.8			
LnGrp LOS	B	A	A	A	C	C	C	A	B			
Approach Vol, veh/h		494			280			528				
Approach Delay, s/veh		13.4			22.6			28.2				
Approach LOS		B			C			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	17.5	20.9				38.4		28.7				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	20.0	* 40				* 40		30.0				
Max Q Clear Time (g_c+I1), s	12.3	6.7				4.6		20.4				
Green Ext Time (p_c), s	0.7	1.3				0.7		2.4				

Intersection Summary												
HCM 6th Ctrl Delay			21.4									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	125	5	1	270	20	5	1	1	10	1	35
Future Volume (vph)	25	125	5	1	270	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	182	6	0	354	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	125	5	1	270	20	5	1	1	10	1	35
Future Vol, veh/h	25	125	5	1	270	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	152	6	1	329	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	353	0	0	158	0	0	577	567	152	559	561	341
Stage 1	-	-	-	-	-	-	212	212	-	343	343	-
Stage 2	-	-	-	-	-	-	365	355	-	216	218	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	1398	-	-	428	433	894	440	436	701
Stage 1	-	-	-	-	-	-	790	727	-	672	637	-
Stage 2	-	-	-	-	-	-	654	630	-	786	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1157	-	-	1398	-	-	392	420	894	429	423	701
Mov Cap-2 Maneuver	-	-	-	-	-	-	392	420	-	429	423	-
Stage 1	-	-	-	-	-	-	768	707	-	653	636	-
Stage 2	-	-	-	-	-	-	612	629	-	762	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0	13.5	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	1157	-	-	1398	-	-	608
HCM Lane V/C Ratio	0.02	0.026	-	-	0.001	-	-	0.092
HCM Control Delay (s)	13.5	8.2	0	-	7.6	0	-	11.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	135	280	1	1	10
Future Volume (vph)	1	135	280	1	1	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	160	330	0	13	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	135	280	1	1	10
Future Vol, veh/h	1	135	280	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	1	159	329	1	1	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	330	0	-	0	491	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	1145	-	-	-	524	696
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1145	-	-	-	523	696
Mov Cap-2 Maneuver	-	-	-	-	523	-
Stage 1	-	-	-	-	712	-
Stage 2	-	-	-	-	851	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1145	-	-	-	676
HCM Lane V/C Ratio	0.001	-	-	-	0.019
HCM Control Delay (s)	8.1	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	55	40	5	110	1	155	90	5	1	20	15
Future Volume (vph)	40	55	40	5	110	1	155	90	5	1	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	143	0	0	308	0	0	45	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	55	40	5	110	1	155	90	5	1	20	15
Future Vol, veh/h	40	55	40	5	110	1	155	90	5	1	20	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	49	68	49	6	136	1	191	111	6	1	25	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	117	0	0	362	340	93	398	364	137
Stage 1	-	-	-	-	-	-	191	191	-	149	149	-
Stage 2	-	-	-	-	-	-	171	149	-	249	215	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1393	-	-	1447	-	-	592	580	961	540	544	878
Stage 1	-	-	-	-	-	-	808	740	-	824	750	-
Stage 2	-	-	-	-	-	-	829	772	-	727	701	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1447	-	-	541	556	961	440	521	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	541	556	-	440	521	-
Stage 1	-	-	-	-	-	-	777	712	-	793	747	-
Stage 2	-	-	-	-	-	-	782	769	-	586	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.3	19.5	11.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	551	1393	-	-	1447	-	-	623
HCM Lane V/C Ratio	0.56	0.035	-	-	0.004	-	-	0.071
HCM Control Delay (s)	19.5	7.7	0	-	7.5	0	-	11.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	3.4	0.1	-	-	0	-	-	0.2

APPENDIX E
Transportation System Improvements with Background Traffic Operational Analysis

Year 2040 Background Traffic
Synchro Worksheets
With Modifications

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	645	95	75	275	25	30	25	85	85	75	20
Future Volume (vph)	10	645	95	75	275	25	30	25	85	85	75	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	824	0	0	411	0	0	153	0	0	197	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	810	1	20	375	25	1	1	10	5	1	1
Future Volume (vph)	5	810	1	20	375	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	932	0	23	460	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	810	1	20	375	25	1	1	10	5	1	1
Future Vol, veh/h	5	810	1	20	375	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	931	1	23	431	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	460	0	0	932	0	0	1437	1450	932	1442	1436	446
Stage 1	-	-	-	-	-	-	944	944	-	492	492	-
Stage 2	-	-	-	-	-	-	493	506	-	950	944	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1080	-	-	691	-	-	91	108	273	104	126	588
Stage 1	-	-	-	-	-	-	268	293	-	537	528	-
Stage 2	-	-	-	-	-	-	490	479	-	297	325	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1080	-	-	691	-	-	88	104	273	96	121	588
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	104	-	96	121	-
Stage 1	-	-	-	-	-	-	266	291	-	534	511	-
Stage 2	-	-	-	-	-	-	472	463	-	282	323	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	23.5	39.3
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	1080	-	-	691	-	-	113
HCM Lane V/C Ratio	0.066	0.005	-	-	0.033	-	-	0.071
HCM Control Delay (s)	23.5	8.4	-	-	10.4	-	-	39.3
HCM Lane LOS	C	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	775	1	5	380	1	1	1	1	180	1	40
Future Volume (vph)	50	775	1	5	380	1	1	1	1	180	1	40
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	872	0	6	428	0	1	2	0	202	46	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	10.5	55.0		44.5	44.5		25.0	25.0		25.0	25.0	
Total Split (%)	13.1%	68.8%		55.6%	55.6%		31.3%	31.3%		31.3%	31.3%	
Maximum Green (s)	6.0	49.1		38.6	38.6		19.1	19.1		19.1	19.1	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.11	0.84		0.03	0.49		0.00	0.01		0.75	0.16	
Control Delay	6.2	20.4		11.8	15.2		23.0	23.0		44.4	24.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.2	20.4		11.8	15.2		23.0	23.0		44.4	24.5	
Queue Length 50th (ft)	9	278		1	134		0	1		76	15	
Queue Length 95th (ft)	22	457		8	215		4	6		#192	45	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	505	1352		224	1043		398	469		340	356	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.64		0.03	0.41		0.00	0.00		0.59	0.13	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 67.1	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	775	1	5	380	1	1	1	1	180	1	40
Future Volume (veh/h)	50	775	1	5	380	1	1	1	1	180	1	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	56	871	1	6	427	1	1	1	1	202	1	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	466	1034	1	237	756	2	377	167	167	377	6	251
Arrive On Green	0.06	0.57	0.57	0.43	0.43	0.43	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1711	1807	2	600	1775	4	1360	796	796	1168	26	1191
Grp Volume(v), veh/h	56	0	872	6	0	428	1	0	2	202	0	46
Grp Sat Flow(s),veh/h/ln	1711	0	1809	600	0	1779	1360	0	1591	1168	0	1218
Q Serve(g_s), s	0.9	0.0	21.6	0.5	0.0	9.9	0.0	0.0	0.1	9.0	0.0	1.7
Cycle Q Clear(g_c), s	0.9	0.0	21.6	14.1	0.0	9.9	1.7	0.0	0.1	9.0	0.0	1.7
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	466	0	1035	237	0	758	377	0	335	377	0	256
V/C Ratio(X)	0.12	0.00	0.84	0.03	0.00	0.56	0.00	0.00	0.01	0.54	0.00	0.18
Avail Cap(c_a), veh/h	547	0	1638	409	0	1267	570	0	561	543	0	429
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.7	0.0	9.6	18.7	0.0	11.8	18.3	0.0	16.9	20.5	0.0	17.6
Incr Delay (d2), s/veh	0.0	0.0	2.6	0.0	0.0	0.7	0.0	0.0	0.0	1.2	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.4	0.0	9.5	0.1	0.0	5.4	0.0	0.0	0.0	4.3	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	12.2	18.7	0.0	12.5	18.3	0.0	16.9	21.7	0.0	17.9
LnGrp LOS	A	A	B	B	A	B	B	A	B	C	A	B
Approach Vol, veh/h		928			434			3			248	
Approach Delay, s/veh		11.9			12.6			17.4			21.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.9	29.0		17.3		36.9		17.3
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	6.0	* 39		19.1		* 49		19.1
Max Q Clear Time (g_c+I1), s	2.9	16.1		11.0		23.6		3.7
Green Ext Time (p_c), s	0.0	2.7		0.7		7.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	955	385	170	0	0
Future Volume (vph)	0	955	385	170	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1073	433	191	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	445	510	30	210	0	0	0	0	160	0	345
Future Volume (vph)	0	445	510	30	210	0	0	0	0	160	0	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	468	537	32	221	0	0	0	0	0	168	363
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						↰↑	↱
Traffic Vol, veh/h	0	445	510	30	210	0	0	0	0	160	0	345
Future Vol, veh/h	0	445	510	30	210	0	0	0	0	160	0	345
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	468	537	32	221	0	0	0	0	168	0	363

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1005	0	0	1022	1290	221
Stage 1	-	-	-	-	-	-	285	285	-
Stage 2	-	-	-	-	-	-	737	1005	-
Critical Hdwy	-	-	-	4.2	-	-	6.46	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.29	-	-	3.554	4.054	3.354
Pot Cap-1 Maneuver	0	-	-	659	-	0	257	160	809
Stage 1	0	-	-	-	-	0	754	668	-
Stage 2	0	-	-	-	-	0	466	314	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	659	-	-	244	0	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	0	-
Stage 1	-	-	-	-	-	-	754	0	-
Stage 2	-	-	-	-	-	-	443	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.3	23.8
HCM LOS			C

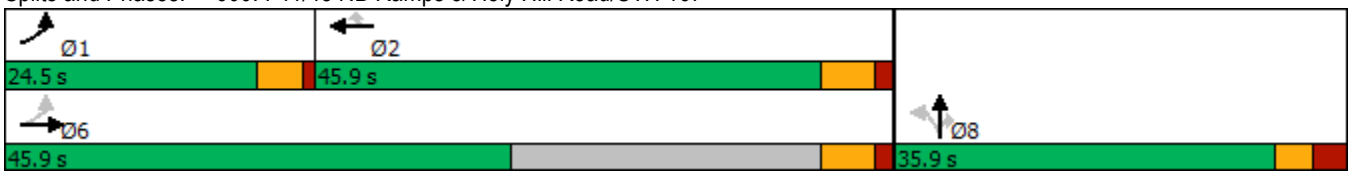
Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	659	-	244	809
HCM Lane V/C Ratio	-	-	0.048	-	0.69	0.449
HCM Control Delay (s)	-	-	10.7	-	47.2	13
HCM Lane LOS	-	-	B	-	E	B
HCM 95th %tile Q(veh)	-	-	0.2	-	4.5	2.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	305	0	0	100	70	140	0	7	0	0	0
Future Volume (vph)	300	305	0	0	100	70	140	0	7	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		10.0			11.5			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	308	0	0	101	44	0	141	7	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	24.5	45.9			45.9	45.9	35.9	35.9	35.9			
Total Split (%)	23.0%	43.2%			43.2%	43.2%	33.8%	33.8%	33.8%			
Maximum Green (s)	20.0	40.0			40.0	40.0	30.0	30.0	30.0			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	Min			Min	Min	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.38	0.26			0.18	0.09		0.38	0.02			
Control Delay	6.8	6.5			17.3	16.7		22.6	18.0			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	6.8	6.5			17.3	16.7		22.6	18.0			
Queue Length 50th (ft)	37	41			23	10		38	2			
Queue Length 95th (ft)	84	90			64	34		88	10			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	936	1806			1400	1181		1013	906			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.32	0.17			0.07	0.04		0.14	0.01			

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 50.2	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	305	0	0	100	70	140	0	7	0	0	0
Future Volume (veh/h)	300	305	0	0	100	70	140	0	7	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1824	0	0	1795	1781	1737	1737	1737			
Adj Flow Rate, veh/h	303	308	0	0	101	44	141	0	7			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	6	6	0	0	8	8	11	11	11			
Cap, veh/h	756	1039	0	0	569	479	300	0	267			
Arrive On Green	0.16	0.57	0.00	0.00	0.32	0.32	0.18	0.00	0.18			
Sat Flow, veh/h	1725	1824	0	0	1795	1510	1654	0	1472			
Grp Volume(v), veh/h	303	308	0	0	101	44	141	0	7			
Grp Sat Flow(s),veh/h/ln	1725	1824	0	0	1795	1510	1654	0	1472			
Q Serve(g_s), s	4.9	4.1	0.0	0.0	1.9	1.0	3.6	0.0	0.2			
Cycle Q Clear(g_c), s	4.9	4.1	0.0	0.0	1.9	1.0	3.6	0.0	0.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	756	1039	0	0	569	479	300	0	267			
V/C Ratio(X)	0.40	0.30	0.00	0.00	0.18	0.09	0.47	0.00	0.03			
Avail Cap(c_a), veh/h	1214	1542	0	0	1517	1276	1049	0	933			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	6.9	5.3	0.0	0.0	11.7	11.4	17.3	0.0	15.9			
Incr Delay (d2), s/veh	0.3	0.2	0.0	0.0	0.1	0.1	1.1	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.9	1.5	0.0	0.0	1.1	0.5	2.4	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	5.4	0.0	0.0	11.8	11.4	18.5	0.0	16.0			
LnGrp LOS	A	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		611			145			148				
Approach Delay, s/veh		6.3			11.7			18.4				
Approach LOS		A			B			B				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	11.9	20.9				32.8		14.5				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	20.0	* 40				* 40		30.0				
Max Q Clear Time (g_c+I1), s	6.9	3.9				6.1		5.6				
Green Ext Time (p_c), s	0.7	0.6				1.7		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	300	5	1	145	5	1	1	1	5	1	25
Future Volume (vph)	20	300	5	1	145	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	340	5	0	160	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	300	5	1	145	5	1	1	1	5	1	25
Future Vol, veh/h	20	300	5	1	145	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	319	5	1	154	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	159	0	0	324	0	0	534	522	319	524	525	157
Stage 1	-	-	-	-	-	-	361	361	-	159	159	-
Stage 2	-	-	-	-	-	-	173	161	-	365	366	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1385	-	-	1208	-	-	457	459	722	437	433	843
Stage 1	-	-	-	-	-	-	657	626	-	802	733	-
Stage 2	-	-	-	-	-	-	829	765	-	619	592	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1208	-	-	435	450	722	429	424	843
Mov Cap-2 Maneuver	-	-	-	-	-	-	435	450	-	429	424	-
Stage 1	-	-	-	-	-	-	645	614	-	787	732	-
Stage 2	-	-	-	-	-	-	801	764	-	605	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	12.1	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	508	1385	-	-	1208	-	-	710
HCM Lane V/C Ratio	0.006	0.015	-	-	0.001	-	-	0.046
HCM Control Delay (s)	12.1	7.6	0	-	8	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	295	145	1	1	5
Future Volume (vph)	10	295	145	1	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	335	160	0	6	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	295	145	1	1	5
Future Vol, veh/h	10	295	145	1	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	11	324	159	1	1	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	160	0	-	0	506	160
Stage 1	-	-	-	-	160	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1333	-	-	-	427	740
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	592	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1333	-	-	-	423	740
Mov Cap-2 Maneuver	-	-	-	-	423	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1333	-	-	-	658
HCM Lane V/C Ratio	0.008	-	-	-	0.01
HCM Control Delay (s)	7.7	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	155	125	5	70	1	50	15	1	1	75	25
Future Volume (vph)	15	155	125	5	70	1	50	15	1	1	75	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	339	0	0	87	0	0	75	0	0	116	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	155	125	5	70	1	50	15	1	1	75	25
Future Vol, veh/h	15	155	125	5	70	1	50	15	1	1	75	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	17	178	144	6	80	1	57	17	1	1	86	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	81	0	0	322	0	0	434	377	250	386	449	81
Stage 1	-	-	-	-	-	-	284	284	-	93	93	-
Stage 2	-	-	-	-	-	-	150	93	-	293	356	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.26	6.66	6.36	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.26	5.66	-	6.13	5.53	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.644	4.144	3.444	3.527	4.027	3.327
Pot Cap-1 Maneuver	1486	-	-	1227	-	-	509	533	756	571	504	976
Stage 1	-	-	-	-	-	-	694	652	-	912	816	-
Stage 2	-	-	-	-	-	-	820	791	-	713	627	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1486	-	-	1227	-	-	422	523	756	548	494	976
Mov Cap-2 Maneuver	-	-	-	-	-	-	422	523	-	548	494	-
Stage 1	-	-	-	-	-	-	684	643	-	899	812	-
Stage 2	-	-	-	-	-	-	708	787	-	683	618	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	14.8	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	444	1486	-	-	1227	-	-	563
HCM Lane V/C Ratio	0.171	0.012	-	-	0.005	-	-	0.206
HCM Control Delay (s)	14.8	7.5	0	-	7.9	0	-	13
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	355	45	110	595	75	85	180	100	60	80	15
Future Volume (vph)	30	355	45	110	595	75	85	180	100	60	80	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	830	0	0	387	0	0	165	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	510	1	5	770	10	5	1	10	10	1	5
Future Volume (vph)	5	510	1	5	770	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	538	0	5	822	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	510	1	5	770	10	5	1	10	10	1	5
Future Vol, veh/h	5	510	1	5	770	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	537	1	5	811	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	822	0	0	538	0	0	1378	1380	538	1381	1375	817
Stage 1	-	-	-	-	-	-	548	548	-	827	827	-
Stage 2	-	-	-	-	-	-	830	832	-	554	548	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	786	-	-	1020	-	-	112	132	510	121	145	376
Stage 1	-	-	-	-	-	-	490	489	-	366	386	-
Stage 2	-	-	-	-	-	-	340	360	-	517	517	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	786	-	-	1020	-	-	109	131	510	117	143	376
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	131	-	117	143	-
Stage 1	-	-	-	-	-	-	487	486	-	364	384	-
Stage 2	-	-	-	-	-	-	333	358	-	502	514	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	22.8	31.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	786	-	-	1020	-	-	151
HCM Lane V/C Ratio	0.077	0.007	-	-	0.005	-	-	0.112
HCM Control Delay (s)	22.8	9.6	-	-	8.5	-	-	31.8
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

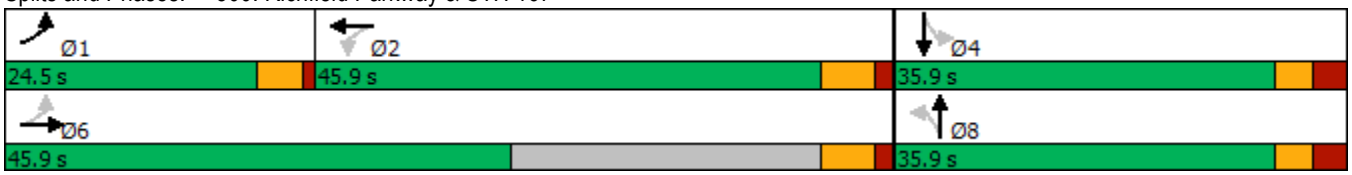
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	495	1	5	730	1	1	1	1	100	1	55
Future Volume (vph)	35	495	1	5	730	1	1	1	1	100	1	55
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	539	0	5	794	0	1	2	0	109	61	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	24.5	45.9		45.9	45.9		35.9	35.9		35.9	35.9	
Total Split (%)	23.0%	43.2%		43.2%	43.2%		33.8%	33.8%		33.8%	33.8%	
Maximum Green (s)	20.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.10	0.41		0.01	0.67		0.00	0.01		0.50	0.27	
Control Delay	4.8	6.8		9.2	16.9		25.0	25.0		36.0	29.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.8	6.8		9.2	16.9		25.0	25.0		36.0	29.7	
Queue Length 50th (ft)	4	93		1	271		0	1		47	25	
Queue Length 95th (ft)	15	187		6	#554		4	6		95	58	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	647	1638		544	1185		576	689		539	563	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.33		0.01	0.67		0.00	0.00		0.20	0.11	

Intersection Summary	
Area Type:	Other
Cycle Length: 106.3	
Actuated Cycle Length: 70.3	
Natural Cycle: 65	
Control Type: Semi Act-Uncoord	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	495	1	5	730	1	1	1	1	100	1	55
Future Volume (veh/h)	35	495	1	5	730	1	1	1	1	100	1	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	38	538	1	5	793	1	1	1	1	109	1	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	294	1145	2	530	931	1	292	130	130	333	4	213
Arrive On Green	0.05	0.63	0.63	0.50	0.50	0.50	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1725	1820	3	853	1852	2	1341	796	796	1269	22	1300
Grp Volume(v), veh/h	38	0	539	5	0	794	1	0	2	109	0	61
Grp Sat Flow(s),veh/h/ln	1725	0	1824	853	0	1854	1341	0	1591	1269	0	1322
Q Serve(g_s), s	0.5	0.0	8.9	0.2	0.0	21.3	0.0	0.0	0.1	4.5	0.0	2.3
Cycle Q Clear(g_c), s	0.5	0.0	8.9	1.8	0.0	21.3	2.3	0.0	0.1	4.5	0.0	2.3
Prop In Lane	1.00		0.00	1.00		0.00	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	294	0	1148	530	0	932	292	0	261	333	0	217
V/C Ratio(X)	0.13	0.00	0.47	0.01	0.00	0.85	0.00	0.00	0.01	0.33	0.00	0.28
Avail Cap(c_a), veh/h	817	0	1279	699	0	1300	777	0	837	792	0	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	5.6	7.9	0.0	12.3	21.9	0.0	20.0	21.9	0.0	20.9
Incr Delay (d2), s/veh	0.1	0.0	0.3	0.0	0.0	4.3	0.0	0.0	0.0	0.6	0.0	0.7
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.4	0.0	0.0	11.5	0.0	0.0	0.0	2.4	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	0.0	5.9	8.0	0.0	16.6	21.9	0.0	20.0	22.4	0.0	21.6
LnGrp LOS	B	A	A	A	A	B	C	A	B	C	A	C
Approach Vol, veh/h		577			799			3			170	
Approach Delay, s/veh		6.2			16.6			20.6			22.1	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	7.2	34.6		15.3		41.8		15.3
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	20.0	* 40		30.0		* 40		30.0
Max Q Clear Time (g_c+I1), s	2.5	23.3		6.5		10.9		4.3
Green Ext Time (p_c), s	0.0	5.4		0.7		3.8		0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	595	735	115	0	0
Future Volume (vph)	0	595	735	115	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	633	782	122	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	375	220	20	580	0	0	0	0	85	0	270
Future Volume (vph)	0	375	220	20	580	0	0	0	0	85	0	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		5.4			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	253	23	667	0	0	0	0	0	98	310
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↰	↱
Traffic Vol, veh/h	0	375	220	20	580	0	0	0	0	85	0	270
Future Vol, veh/h	0	375	220	20	580	0	0	0	0	85	0	270
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	431	253	23	667	0	0	0	0	98	0	310

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	684	0	0	1271	1397	667
Stage 1	-	-	-	-	-	-	713	713	-
Stage 2	-	-	-	-	-	-	558	684	-
Critical Hdwy	-	-	-	4.14	-	-	6.45	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	5.45	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.45	5.55	-
Follow-up Hdwy	-	-	-	2.236	-	-	3.545	4.045	3.345
Pot Cap-1 Maneuver	0	-	-	900	-	0	183	139	454
Stage 1	0	-	-	-	-	0	480	431	-
Stage 2	0	-	-	-	-	0	567	444	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	900	-	-	178	0	454
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	0	-
Stage 1	-	-	-	-	-	-	480	0	-
Stage 2	-	-	-	-	-	-	552	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0.3	32.9
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	900	-	178	454
HCM Lane V/C Ratio	-	-	0.026	-	0.549	0.684
HCM Control Delay (s)	-	-	9.1	-	47.4	28.4
HCM Lane LOS	-	-	A	-	E	D
HCM 95th %tile Q(veh)	-	-	0.1	-	2.8	5.1

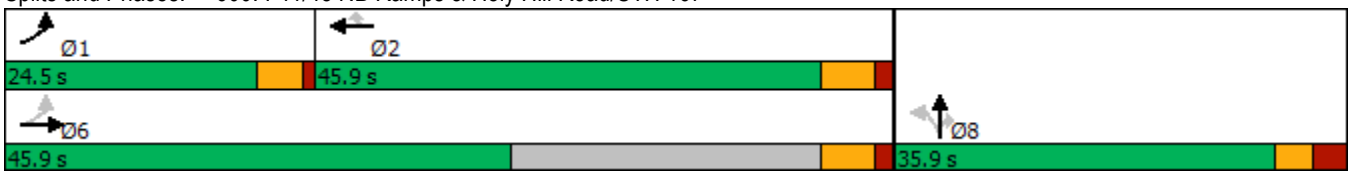
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	120	0	0	155	185	445	0	15	0	0	0
Future Volume (vph)	340	120	0	0	155	185	445	0	15	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	391	138	0	0	178	132	0	511	17	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	24.5	45.9			45.9	45.9	35.9	35.9	35.9			
Total Split (%)	23.0%	43.2%			43.2%	43.2%	33.8%	33.8%	33.8%			
Maximum Green (s)	20.0	40.0			40.0	40.0	30.0	30.0	30.0			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	Min			Min	Min	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.67	0.17			0.48	0.42		0.78	0.03			
Control Delay	19.7	12.4			33.6	33.2		33.0	17.3			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	19.7	12.4			33.6	33.2		33.0	17.3			
Queue Length 50th (ft)	120	38			79	58		218	5			
Queue Length 95th (ft)	178	70			137	108		#393	19			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	616	1448			951	802		653	584			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.63	0.10			0.19	0.16		0.78	0.03			

Intersection Summary

Area Type: Other
Cycle Length: 106.3
Actuated Cycle Length: 79.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	340	120	0	0	155	185	445	0	15	0	0	0
Future Volume (veh/h)	340	120	0	0	155	185	445	0	15	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1781	1795	0	0	1884	1870	1826	1826	1826			
Adj Flow Rate, veh/h	391	138	0	0	178	132	511	0	17			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	8	8	0	0	2	2	5	5	5			
Cap, veh/h	610	877	0	0	413	347	589	0	524			
Arrive On Green	0.20	0.49	0.00	0.00	0.22	0.22	0.34	0.00	0.34			
Sat Flow, veh/h	1697	1795	0	0	1884	1585	1739	0	1547			
Grp Volume(v), veh/h	391	138	0	0	178	132	511	0	17			
Grp Sat Flow(s),veh/h/ln	1697	1795	0	0	1884	1585	1739	0	1547			
Q Serve(g_s), s	11.2	2.9	0.0	0.0	5.6	4.9	18.8	0.0	0.5			
Cycle Q Clear(g_c), s	11.2	2.9	0.0	0.0	5.6	4.9	18.8	0.0	0.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	610	877	0	0	413	347	589	0	524			
V/C Ratio(X)	0.64	0.16	0.00	0.00	0.43	0.38	0.87	0.00	0.03			
Avail Cap(c_a), veh/h	759	1049	0	0	1101	927	762	0	678			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.0	9.7	0.0	0.0	23.0	22.8	21.2	0.0	15.1			
Incr Delay (d2), s/veh	1.3	0.1	0.0	0.0	0.7	0.7	8.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	7.2	1.9	0.0	0.0	4.4	3.2	13.2	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	9.8	0.0	0.0	23.7	23.4	29.7	0.0	15.2			
LnGrp LOS	B	A	A	A	C	C	C	A	B			
Approach Vol, veh/h		529			310			528				
Approach Delay, s/veh		13.8			23.6			29.2				
Approach LOS		B			C			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	18.5	20.9				39.4		29.1				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	20.0	* 40				* 40		30.0				
Max Q Clear Time (g_c+I1), s	13.2	7.6				4.9		20.8				
Green Ext Time (p_c), s	0.7	1.5				0.8		2.3				

Intersection Summary	
HCM 6th Ctrl Delay	22.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	135	5	1	300	20	5	1	1	10	1	35
Future Volume (vph)	25	135	5	1	300	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	195	6	0	391	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	135	5	1	300	20	5	1	1	10	1	35
Future Vol, veh/h	25	135	5	1	300	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	165	6	1	366	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	171	0	0	627	617	165	609	611	378
Stage 1	-	-	-	-	-	-	225	225	-	380	380	-
Stage 2	-	-	-	-	-	-	402	392	-	229	231	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1121	-	-	1382	-	-	396	405	879	407	409	669
Stage 1	-	-	-	-	-	-	778	718	-	642	614	-
Stage 2	-	-	-	-	-	-	625	606	-	774	713	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1121	-	-	1382	-	-	361	392	879	396	396	669
Mov Cap-2 Maneuver	-	-	-	-	-	-	361	392	-	396	396	-
Stage 1	-	-	-	-	-	-	755	696	-	623	613	-
Stage 2	-	-	-	-	-	-	583	605	-	748	692	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0	14.2	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	399	1121	-	-	1382	-	-	574
HCM Lane V/C Ratio	0.021	0.027	-	-	0.001	-	-	0.098
HCM Control Delay (s)	14.2	8.3	0	-	7.6	0	-	12
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.3

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	145	310	1	1	10
Future Volume (vph)	1	145	310	1	1	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	2305		1026	
Travel Time (s)		26.0	34.9		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	172	366	0	13	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	145	310	1	1	10
Future Vol, veh/h	1	145	310	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	1	171	365	1	1	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	366	0	-	0	539	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	173	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	1110	-	-	-	492	664
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	841	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1110	-	-	-	492	664
Mov Cap-2 Maneuver	-	-	-	-	492	-
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	841	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1110	-	-	-	644
HCM Lane V/C Ratio	0.001	-	-	-	0.02
HCM Control Delay (s)	8.2	0	-	-	10.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	55	40	5	110	1	180	90	5	1	20	20
Future Volume (vph)	50	55	40	5	110	1	180	90	5	1	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		2305			1139			840			756	
Travel Time (s)		34.9			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	143	0	0	339	0	0	51	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	55	40	5	110	1	180	90	5	1	20	20
Future Vol, veh/h	50	55	40	5	110	1	180	90	5	1	20	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	62	68	49	6	136	1	222	111	6	1	25	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	117	0	0	391	366	93	424	390	137
Stage 1	-	-	-	-	-	-	217	217	-	149	149	-
Stage 2	-	-	-	-	-	-	174	149	-	275	241	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.13	6.53	6.23	7.25	6.65	6.35
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.25	5.65	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.527	4.027	3.327	3.635	4.135	3.435
Pot Cap-1 Maneuver	1393	-	-	1447	-	-	566	561	961	518	526	878
Stage 1	-	-	-	-	-	-	783	721	-	824	750	-
Stage 2	-	-	-	-	-	-	825	772	-	704	683	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1447	-	-	508	532	961	415	499	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	508	532	-	415	499	-
Stage 1	-	-	-	-	-	-	745	686	-	784	747	-
Stage 2	-	-	-	-	-	-	772	769	-	558	650	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.3	24	11.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	520	1393	-	-	1447	-	-	628
HCM Lane V/C Ratio	0.653	0.044	-	-	0.004	-	-	0.081
HCM Control Delay (s)	24	7.7	0	-	7.5	0	-	11.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	4.7	0.1	-	-	0	-	-	0.3

APPENDIX F
Transportation System Improvements with Build Traffic Operational Analysis

Year 2025 Build Traffic
Synchro Worksheets
With Modifications

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	720	100	85	280	30	30	25	130	110	80	20
Future Volume (vph)	10	720	100	85	280	30	30	25	130	110	80	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		50	50		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	802	110	93	341	0	0	203	0	0	231	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	955	1	20	395	25	1	1	10	5	1	1
Future Volume (vph)	5	955	1	20	395	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	1099	0	23	483	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	955	1	20	395	25	1	1	10	5	1	1
Future Vol, veh/h	5	955	1	20	395	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	1098	1	23	454	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	483	0	0	1099	0	0	1627	1640	1099	1632	1626	469
Stage 1	-	-	-	-	-	-	1111	1111	-	515	515	-
Stage 2	-	-	-	-	-	-	516	529	-	1117	1111	-
Critical Hdwy	4.16	-	-	4.23	-	-	7.52	6.92	6.62	7.24	6.64	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.52	5.92	-	6.24	5.64	-
Follow-up Hdwy	2.254	-	-	2.317	-	-	3.878	4.378	3.678	3.626	4.126	3.426
Pot Cap-1 Maneuver	1059	-	-	596	-	-	66	81	216	76	96	570
Stage 1	-	-	-	-	-	-	213	241	-	521	516	-
Stage 2	-	-	-	-	-	-	475	467	-	239	271	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1059	-	-	596	-	-	63	77	216	69	92	570
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	77	-	69	92	-
Stage 1	-	-	-	-	-	-	212	240	-	518	496	-
Stage 2	-	-	-	-	-	-	455	449	-	224	269	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	29.6	53.6
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	1059	-	-	596	-	-	82
HCM Lane V/C Ratio	0.086	0.005	-	-	0.039	-	-	0.098
HCM Control Delay (s)	29.6	8.4	-	-	11.3	-	-	53.6
HCM Lane LOS	D	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	860	1	5	390	140	1	1	1	240	1	50
Future Volume (vph)	110	860	1	5	390	140	1	1	1	240	1	50
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	967	0	6	595	0	1	2	0	270	57	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	12.0	54.0		42.0	42.0		26.0	26.0		26.0	26.0	
Total Split (%)	15.0%	67.5%		52.5%	52.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	7.5	48.1		36.1	36.1		20.1	20.1		20.1	20.1	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.33	0.89		0.05	0.72		0.00	0.01		0.94	0.19	
Control Delay	8.8	26.8		11.8	19.4		23.0	22.5		72.4	25.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.8	26.8		11.8	19.4		23.0	22.5		72.4	25.6	
Queue Length 50th (ft)	23	379		1	201		0	1		132	22	
Queue Length 95th (ft)	43	#664		m6	#325		4	6		#270	52	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	388	1081		121	829		336	401		291	304	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.89		0.05	0.72		0.00	0.00		0.93	0.19	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 72 (90%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 300: Richfield Parkway & STH 167

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	860	1	5	390	140	1	1	1	240	1	50
Future Volume (veh/h)	110	860	1	5	390	140	1	1	1	240	1	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1810	1810	1767	1780	1780	1870	1735	1735	1544	1432	1432
Adj Flow Rate, veh/h	124	966	1	6	438	157	1	1	1	270	1	56
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	539	1087	1	169	594	213	379	200	200	382	5	300
Arrive On Green	0.07	0.60	0.60	0.95	0.95	0.95	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1711	1807	2	549	1251	448	1346	796	796	1168	21	1196
Grp Volume(v), veh/h	124	0	967	6	0	595	1	0	2	270	0	57
Grp Sat Flow(s),veh/h/ln	1711	0	1809	549	0	1699	1346	0	1591	1168	0	1217
Q Serve(g_s), s	2.7	0.0	36.6	0.6	0.0	4.7	0.0	0.0	0.1	18.0	0.0	2.9
Cycle Q Clear(g_c), s	2.7	0.0	36.6	27.1	0.0	4.7	3.0	0.0	0.1	18.1	0.0	2.9
Prop In Lane	1.00		0.00	1.00		0.26	1.00		0.50	1.00		0.98
Lane Grp Cap(c), veh/h	539	0	1088	169	0	807	379	0	400	382	0	306
V/C Ratio(X)	0.23	0.00	0.89	0.04	0.00	0.74	0.00	0.00	0.01	0.71	0.00	0.19
Avail Cap(c_a), veh/h	579	0	1088	169	0	807	379	0	400	382	0	306
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.3	0.0	13.7	11.4	0.0	1.2	24.7	0.0	22.5	29.2	0.0	23.5
Incr Delay (d2), s/veh	0.1	0.0	10.9	0.4	0.0	6.0	0.0	0.0	0.0	5.8	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	1.5	0.0	20.5	0.1	0.0	3.3	0.0	0.0	0.1	9.4	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	0.0	24.5	11.8	0.0	7.1	24.7	0.0	22.5	35.1	0.0	23.8
LnGrp LOS	A	A	C	B	A	A	C	A	C	D	A	C
Approach Vol, veh/h		1091			601			3			327	
Approach Delay, s/veh		22.7			7.2			23.2			33.1	
Approach LOS		C			A			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.1	43.9		26.0		54.0		26.0
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	7.5	* 36		20.1		* 48		20.1
Max Q Clear Time (g_c+I1), s	4.7	29.1		20.1		38.6		5.0
Green Ext Time (p_c), s	0.0	2.3		0.0		5.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1100	535	190	0	0
Future Volume (vph)	0	1100	535	190	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1236	601	213	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

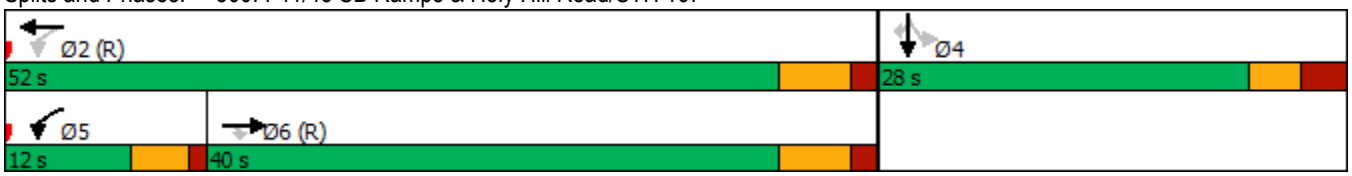
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	565	535	55	330	0	0	0	0	315	0	134
Future Volume (vph)	0	565	535	55	330	0	0	0	0	315	0	134
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			15.1			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	62%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	595	349	58	347	0	0	0	0	0	332	141
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6	2						4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9	20.9	10.5	20.9					15.9	15.9	15.9
Total Split (s)		40.0	40.0	12.0	52.0					28.0	28.0	28.0
Total Split (%)		50.0%	50.0%	15.0%	65.0%					35.0%	35.0%	35.0%
Maximum Green (s)		34.1	34.1	7.5	46.1					22.1	22.1	22.1
Yellow Time (s)		4.3	4.3	3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6	1.6	1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0	0.0	0.0	0.0						0.0	0.0
Total Lost Time (s)		5.9	5.9	4.5	5.9						5.9	5.9
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.62	0.43	0.15	0.33						0.80	0.38
Control Delay		14.2	11.8	10.3	5.5						43.6	27.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		14.2	11.8	10.3	5.5						43.6	27.6
Queue Length 50th (ft)		157	73	21	58						150	57
Queue Length 95th (ft)		m243	m111	28	84						#248	105
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		952	803	391	1060						470	421
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.63	0.43	0.15	0.33						0.71	0.33

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 77 (96%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	565	535	55	330	0	0	0	0	315	0	134
Future Volume (veh/h)	0	565	535	55	330	0	0	0	0	315	0	134
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1839	1826	1752	1765	0				1811	1811	1811
Adj Flow Rate, veh/h	0	595	349	58	347	0				332	0	141
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	5	10	10	0				6	6	6
Cap, veh/h	0	951	800	579	1108	0				388	0	345
Arrive On Green	0.00	1.00	1.00	0.02	0.21	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	1839	1547	1668	1765	0				1725	0	1535
Grp Volume(v), veh/h	0	595	349	58	347	0				332	0	141
Grp Sat Flow(s),veh/h/ln	0	1839	1547	1668	1765	0				1725	0	1535
Q Serve(g_s), s	0.0	0.0	0.0	1.2	13.3	0.0				14.8	0.0	6.3
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.2	13.3	0.0				14.8	0.0	6.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	951	800	579	1108	0				388	0	345
V/C Ratio(X)	0.00	0.63	0.44	0.10	0.31	0.00				0.86	0.00	0.41
Avail Cap(c_a), veh/h	0	951	800	645	1108	0				476	0	424
HCM Platoon Ratio	1.00	2.00	2.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.98	0.98	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	7.0	17.1	0.0				29.8	0.0	26.5
Incr Delay (d2), s/veh	0.0	3.1	1.7	0.1	0.7	0.0				12.2	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	1.5	0.7	0.7	10.5	0.0				11.6	0.0	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	3.1	1.7	7.1	17.8	0.0				42.0	0.0	27.2
LnGrp LOS	A	A	A	A	B	A				D	A	C
Approach Vol, veh/h		944			405						473	
Approach Delay, s/veh		2.6			16.3						37.6	
Approach LOS		A			B						D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		56.1		23.9	8.8	47.3
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 46		22.1	7.5	* 34
Max Q Clear Time (g_c+I1), s		15.3		16.8	3.2	2.0
Green Ext Time (p_c), s		2.3		1.2	0.0	6.0

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

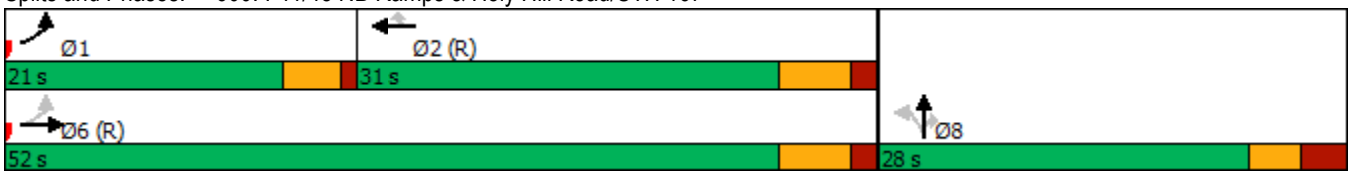
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	310	570	0	0	180	105	205	0	51	0	0	0
Future Volume (vph)	310	570	0	0	180	105	205	0	51	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	576	0	0	182	66	0	207	52	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	21.0	52.0			31.0	31.0	28.0	28.0	28.0			
Total Split (%)	26.3%	65.0%			38.8%	38.8%	35.0%	35.0%	35.0%			
Maximum Green (s)	16.5	46.1			25.1	25.1	22.1	22.1	22.1			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.39	0.48			0.23	0.10		0.66	0.19			
Control Delay	2.9	6.1			16.7	16.4		39.5	26.7			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	2.9	6.1			16.7	16.4		39.5	26.7			
Queue Length 50th (ft)	0	28			52	18		97	22			
Queue Length 95th (ft)	1	170			121	52		151	48			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	834	1190			806	680		449	401			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.38	0.48			0.23	0.10		0.46	0.13			

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 31 (39%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	310	570	0	0	180	105	205	0	51	0	0	0
Future Volume (veh/h)	310	570	0	0	180	105	205	0	51	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1824	0	0	1795	1781	1737	1737	1737			
Adj Flow Rate, veh/h	313	576	0	0	182	66	207	0	52			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	6	6	0	0	8	8	11	11	11			
Cap, veh/h	831	1269	0	0	963	810	260	0	231			
Arrive On Green	0.03	0.23	0.00	0.00	0.54	0.54	0.16	0.00	0.16			
Sat Flow, veh/h	1725	1824	0	0	1795	1510	1654	0	1472			
Grp Volume(v), veh/h	313	576	0	0	182	66	207	0	52			
Grp Sat Flow(s),veh/h/ln	1725	1824	0	0	1795	1510	1654	0	1472			
Q Serve(g_s), s	5.6	21.7	0.0	0.0	4.2	1.7	9.6	0.0	2.5			
Cycle Q Clear(g_c), s	5.6	21.7	0.0	0.0	4.2	1.7	9.6	0.0	2.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	831	1269	0	0	963	810	260	0	231			
V/C Ratio(X)	0.38	0.45	0.00	0.00	0.19	0.08	0.80	0.00	0.22			
Avail Cap(c_a), veh/h	1009	1269	0	0	963	810	457	0	407			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.74	0.74	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	6.2	17.8	0.0	0.0	9.6	9.0	32.5	0.0	29.5			
Incr Delay (d2), s/veh	0.2	0.9	0.0	0.0	0.4	0.2	5.5	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	3.5	15.3	0.0	0.0	2.9	1.0	7.5	0.0	1.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	18.6	0.0	0.0	10.0	9.2	38.0	0.0	30.0			
LnGrp LOS	A	B	A	A	B	A	D	A	C			
Approach Vol, veh/h		889			248			259				
Approach Delay, s/veh		14.3			9.8			36.4				
Approach LOS		B			A			D				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	12.7	48.8				61.5		18.5				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	16.5	* 25				* 46		22.1				
Max Q Clear Time (g_c+I1), s	7.6	6.2				23.7		11.6				
Green Ext Time (p_c), s	0.7	1.1				4.0		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	695	5	1	260	5	1	1	1	5	1	25
Future Volume (vph)	20	695	5	1	260	5	1	1	1	5	1	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	760	5	0	283	0	0	3	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	695	5	1	260	5	1	1	1	5	1	25
Future Vol, veh/h	20	695	5	1	260	5	1	1	1	5	1	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	8	8	8	7	7	7	2	2	2	20	20	20
Mvmt Flow	21	739	5	1	277	5	1	1	1	5	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	282	0	0	744	0	0	1077	1065	739	1067	1068	280
Stage 1	-	-	-	-	-	-	781	781	-	282	282	-
Stage 2	-	-	-	-	-	-	296	284	-	785	786	-
Critical Hdwy	4.18	-	-	4.17	-	-	7.12	6.52	6.22	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.3	5.7	-
Follow-up Hdwy	2.272	-	-	2.263	-	-	3.518	4.018	3.318	3.68	4.18	3.48
Pot Cap-1 Maneuver	1247	-	-	841	-	-	197	223	417	185	206	718
Stage 1	-	-	-	-	-	-	388	405	-	687	646	-
Stage 2	-	-	-	-	-	-	712	676	-	360	378	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	841	-	-	185	216	417	180	200	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	185	216	-	180	200	-
Stage 1	-	-	-	-	-	-	377	393	-	667	645	-
Stage 2	-	-	-	-	-	-	684	675	-	348	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	20.1	13.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	241	1247	-	-	841	-	-	459
HCM Lane V/C Ratio	0.013	0.017	-	-	0.001	-	-	0.072
HCM Control Delay (s)	20.1	7.9	0	-	9.3	0	-	13.4
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	210	490	210	65	15	55
Future Volume (vph)	210	490	210	65	15	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	100	0
Storage Lanes	0			0	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	1664		1026	
Travel Time (s)		26.0	25.2		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	19%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						0
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	769	302	0	76	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	210	490	210	65	15	55
Future Vol, veh/h	210	490	210	65	15	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	19	67	67
Mvmt Flow	231	538	231	71	16	60

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	302	0	-	0	1267	267
Stage 1	-	-	-	-	267	-
Stage 2	-	-	-	-	1000	-
Critical Hdwy	4.27	-	-	-	7.07	6.87
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	2.353	-	-	-	4.103	3.903
Pot Cap-1 Maneuver	1178	-	-	-	138	638
Stage 1	-	-	-	-	649	-
Stage 2	-	-	-	-	272	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1178	-	-	-	99	638
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	272	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	21.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1178	-	-	-	294
HCM Lane V/C Ratio	0.196	-	-	-	0.262
HCM Control Delay (s)	8.8	0	-	-	21.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	70	435	255	25	10	20
Future Volume (vph)	70	435	255	25	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	250			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		30	30		30	
Link Distance (ft)		1664	640		615	
Travel Time (s)		37.8	14.5		14.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	19%	9%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	555	307	0	33	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	70	435	255	25	10	20
Future Vol, veh/h	70	435	255	25	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	17	17	19	9	2	2
Mvmt Flow	77	478	280	27	11	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	307	0	-	0	926	294
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	632	-
Critical Hdwy	4.27	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.353	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1173	-	-	-	298	745
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1173	-	-	-	271	745
Mov Cap-2 Maneuver	-	-	-	-	271	-
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	530	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1173	-	-	-	471
HCM Lane V/C Ratio	0.066	-	-	-	0.07
HCM Control Delay (s)	8.3	0	-	-	13.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	170	160	5	120	15	95	30	1	5	85	65
Future Volume (vph)	115	170	160	5	120	15	95	30	1	5	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	511	0	0	161	0	0	144	0	0	179	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	170	160	5	120	15	95	30	1	5	85	65
Future Vol, veh/h	115	170	160	5	120	15	95	30	1	5	85	65
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	7	7	7	4	4	4	16	16	16	3	3	3
Mvmt Flow	132	195	184	6	138	17	109	34	1	6	98	75
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	20.7	10.7	11.8	11.2
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	75%	26%	4%	3%
Vol Thru, %	24%	38%	86%	55%
Vol Right, %	1%	36%	11%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	445	140	155
LT Vol	95	115	5	5
Through Vol	30	170	120	85
RT Vol	1	160	15	65
Lane Flow Rate	145	511	161	178
Geometry Grp	1	1	1	1
Degree of Util (X)	0.26	0.728	0.255	0.287
Departure Headway (Hd)	6.468	5.121	5.7	5.808
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	553	706	628	615
Service Time	4.538	3.166	3.764	3.875
HCM Lane V/C Ratio	0.262	0.724	0.256	0.289
HCM Control Delay	11.8	20.7	10.7	11.2
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	1	6.3	1	1.2

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Build AM Peak Hour w/Mods
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	1	0	1	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LT		R		L		TR				LTR				LTR	
Volume (V), veh/h	0	10	720	100	0	85	280	30	0	30	25	130	0	110	80	20
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	11	823	114	0	103	338	36	0	36	30	156	0	135	98	25
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				1				1				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.2000	4.2000			4.2000			4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	834.00	114.00		103.00	374.00			222.00			258.00	
Entry Volume veh/h	801.92	109.62		93.64	340.00			203.67			230.36	
Circulating Flow (v_c), pc/h	336			77			969			477		
Exiting Flow (v_{ex}), pc/h	1114			399			77			315		
Capacity (c_{pce}), pc/h	1008.69	1008.69		1210.97	1210.97			605.11			911.02	
Capacity (c), veh/h	969.89	969.89		1100.89	1100.89			555.14			813.41	
v/c Ratio (x)	0.83	0.11		0.09	0.31			0.37			0.28	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	22.7	4.7		4.0	6.3			12.0			7.6	
Lane LOS	C	A		A	A			B			A	
95% Queue, veh	9.8	0.4		0.3	1.3			1.7			1.2	
Approach Delay, s/veh	20.6			5.8			12.0			7.6		
Approach LOS	C			A			B			A		
Intersection Delay, s/veh | LOS	14.3						B					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	380	45	155	655	95	90	185	115	65	85	15
Future Volume (vph)	30	380	45	155	655	95	90	185	115	65	85	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		50	50		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	436	48	165	798	0	0	415	0	0	175	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	555	1	5	895	10	5	1	10	10	1	5
Future Volume (vph)	5	555	1	5	895	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	585	0	5	953	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	555	1	5	895	10	5	1	10	10	1	5
Future Vol, veh/h	5	555	1	5	895	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	584	1	5	942	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	953	0	0	585	0	0	1556	1558	585	1559	1553	948
Stage 1	-	-	-	-	-	-	595	595	-	958	958	-
Stage 2	-	-	-	-	-	-	961	963	-	601	595	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.3	6.7	6.4	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.12	5.52	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.68	4.18	3.48	3.518	4.018	3.318
Pot Cap-1 Maneuver	701	-	-	980	-	-	83	103	479	91	113	316
Stage 1	-	-	-	-	-	-	461	465	-	309	336	-
Stage 2	-	-	-	-	-	-	286	311	-	487	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	701	-	-	980	-	-	80	102	479	87	112	316
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	102	-	87	112	-
Stage 1	-	-	-	-	-	-	458	462	-	307	334	-
Stage 2	-	-	-	-	-	-	279	309	-	472	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	28.2	41.6
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	172	701	-	-	980	-	-	115
HCM Lane V/C Ratio	0.098	0.008	-	-	0.005	-	-	0.146
HCM Control Delay (s)	28.2	10.2	-	-	8.7	-	-	41.6
HCM Lane LOS	D	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	525	1	5	800	40	1	1	1	265	1	110
Future Volume (vph)	50	525	1	5	800	40	1	1	1	265	1	110
Ideal Flow (vphpl)	1900	1914	1914	1900	1914	1914	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	572	0	5	913	0	1	2	0	288	121	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6			2			8			4		
Detector Phase	1	6		2	2		8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		15.9	15.9	
Total Split (s)	12.0	62.0		50.0	50.0		28.0	28.0		28.0	28.0	
Total Split (%)	13.3%	68.9%		55.6%	55.6%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	7.5	56.1		44.1	44.1		22.1	22.1		22.1	22.1	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		2.5	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		30.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.28	0.51		0.01	0.94		0.00	0.01		0.95	0.38	
Control Delay	9.7	11.2		5.8	29.4		26.0	26.0		76.0	32.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.7	11.2		5.8	29.4		26.0	26.0		76.0	32.6	
Queue Length 50th (ft)	10	162		1	260		0	1		161	57	
Queue Length 95th (ft)	23	243		m2	#761		4	7		#317	109	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	219	1130		433	973		310	392		307	320	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.51		0.01	0.94		0.00	0.01		0.94	0.38	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 42 (47%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 300: Richfield Parkway & STH 167

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	525	1	5	800	40	1	1	1	265	1	110
Future Volume (veh/h)	50	525	1	5	800	40	1	1	1	265	1	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1824	1824	1841	1854	1854	1870	1735	1735	1678	1556	1556
Adj Flow Rate, veh/h	54	571	1	5	870	43	1	1	1	288	1	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	476	1136	2	454	919	45	295	195	195	390	3	321
Arrive On Green	0.05	0.62	0.62	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1725	1821	3	827	1752	87	1270	796	796	1269	11	1309
Grp Volume(v), veh/h	54	0	572	5	0	913	1	0	2	288	0	121
Grp Sat Flow(s),veh/h/ln	1725	0	1824	827	0	1839	1270	0	1591	1269	0	1320
Q Serve(g_s), s	1.2	0.0	15.5	0.1	0.0	0.0	0.1	0.0	0.1	20.0	0.0	6.9
Cycle Q Clear(g_c), s	1.2	0.0	15.5	6.6	0.0	0.0	6.9	0.0	0.1	20.1	0.0	6.9
Prop In Lane	1.00		0.00	1.00		0.05	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	476	0	1138	454	0	964	295	0	390	390	0	324
V/C Ratio(X)	0.11	0.00	0.50	0.01	0.00	0.95	0.00	0.00	0.01	0.74	0.00	0.37
Avail Cap(c_a), veh/h	534	0	1138	454	0	964	295	0	391	390	0	324
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	9.3	0.5	0.0	0.0	31.1	0.0	25.7	33.3	0.0	28.2
Incr Delay (d2), s/veh	0.0	0.0	1.6	0.0	0.0	18.7	0.0	0.0	0.0	7.2	0.0	0.7
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.7	0.0	9.2	0.0	0.0	8.7	0.0	0.0	0.1	11.1	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.6	0.0	10.9	0.5	0.0	18.7	31.1	0.0	25.7	40.5	0.0	28.9
LnGrp LOS	A	A	B	A	A	B	C	A	C	D	A	C
Approach Vol, veh/h		626			918			3			409	
Approach Delay, s/veh		10.6			18.6			27.5			37.1	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	8.9	53.1		28.0		62.0		28.0
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	7.5	* 44		22.1		* 56		22.1
Max Q Clear Time (g_c+I1), s	3.2	8.6		22.1		17.5		8.9
Green Ext Time (p_c), s	0.0	8.9		0.0		4.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	790	845	145	0	0
Future Volume (vph)	0	790	845	145	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	840	899	154	0	0
Sign Control		Free	Free		Stop	

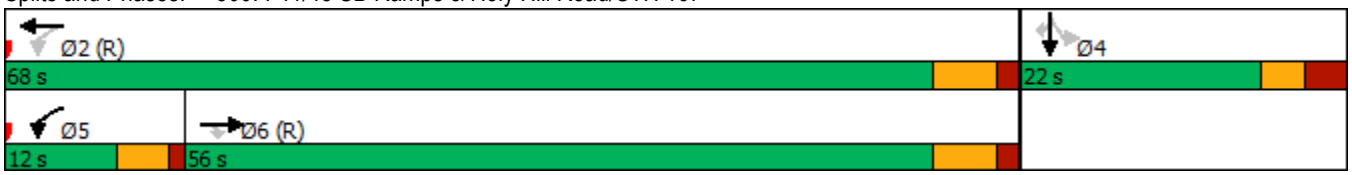
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	495	295	135	705	0	0	0	0	125	0	97
Future Volume (vph)	0	495	295	135	705	0	0	0	0	125	0	97
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	62%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	569	210	155	810	0	0	0	0	0	144	111
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6	2						4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0	15.0	6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9	20.9	10.5	20.9					15.9	15.9	15.9
Total Split (s)		56.0	56.0	12.0	68.0					22.0	22.0	22.0
Total Split (%)		62.2%	62.2%	13.3%	75.6%					24.4%	24.4%	24.4%
Maximum Green (s)		50.1	50.1	7.5	62.1					16.1	16.1	16.1
Yellow Time (s)		4.3	4.3	3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6	1.6	1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0	0.0	0.0	0.0						0.0	0.0
Total Lost Time (s)		5.9	5.9	4.5	5.9						5.9	5.9
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max	C-Max	None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.54	0.23	0.29	0.61						0.59	0.51
Control Delay		11.0	7.7	3.6	2.2						45.6	43.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.8						0.0	0.0
Total Delay		11.0	7.7	3.6	3.0						45.6	43.4
Queue Length 50th (ft)		155	47	0	0						78	59
Queue Length 95th (ft)		m211	m77	m23	m65						128	104
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		1062	895	544	1335						307	275
Starvation Cap Reductn		0	0	0	238						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.54	0.23	0.28	0.74						0.47	0.40

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 36 (40%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	495	295	135	705	0	0	0	0	125	0	97
Future Volume (veh/h)	0	495	295	135	705	0	0	0	0	125	0	97
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1810	1796	1841	1854	0				1826	1826	1826
Adj Flow Rate, veh/h	0	569	210	155	810	0				144	0	111
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	7	7	4	4	0				5	5	5
Cap, veh/h	0	1163	978	633	1405	0				193	0	172
Arrive On Green	0.00	1.00	1.00	0.07	0.76	0.00				0.11	0.00	0.11
Sat Flow, veh/h	0	1810	1522	1753	1854	0				1739	0	1547
Grp Volume(v), veh/h	0	569	210	155	810	0				144	0	111
Grp Sat Flow(s),veh/h/ln	0	1810	1522	1753	1854	0				1739	0	1547
Q Serve(g_s), s	0.0	0.0	0.0	2.4	16.9	0.0				7.2	0.0	6.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	16.9	0.0				7.2	0.0	6.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1163	978	633	1405	0				193	0	172
V/C Ratio(X)	0.00	0.49	0.21	0.24	0.58	0.00				0.75	0.00	0.65
Avail Cap(c_a), veh/h	0	1163	978	665	1405	0				311	0	277
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.40	0.40	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	3.6	4.7	0.0				38.8	0.0	38.3
Incr Delay (d2), s/veh	0.0	1.5	0.5	0.1	0.7	0.0				5.7	0.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.9	0.2	1.0	5.9	0.0				6.0	0.0	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.5	0.5	3.7	5.4	0.0				44.4	0.0	42.4
LnGrp LOS	A	A	A	A	A	A				D	A	D
Approach Vol, veh/h		779			965						255	
Approach Delay, s/veh		1.2			5.1						43.5	
Approach LOS		A			A						D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		74.1		15.9	10.4	63.7
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 62		16.1	7.5	* 50
Max Q Clear Time (g_c+I1), s		18.9		9.2	4.4	2.0
Green Ext Time (p_c), s		6.4		0.6	0.1	5.3

Intersection Summary	
HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

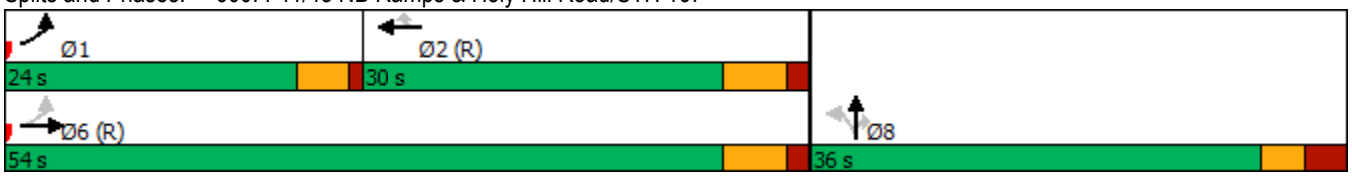
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	225	0	0	375	340	465	0	29	0	0	0
Future Volume (vph)	395	225	0	0	375	340	465	0	29	0	0	0
Ideal Flow (vphpl)	1900	1914	1900	1900	1914	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	259	0	0	431	242	0	534	33	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					2	8		8			
Detector Phase	1	6			2	2	8	8	8			
Switch Phase												
Minimum Initial (s)	6.0	15.0			15.0	15.0	10.0	10.0	10.0			
Minimum Split (s)	10.5	20.9			20.9	20.9	15.9	15.9	15.9			
Total Split (s)	24.0	54.0			30.0	30.0	36.0	36.0	36.0			
Total Split (%)	26.7%	60.0%			33.3%	33.3%	40.0%	40.0%	40.0%			
Maximum Green (s)	19.5	48.1			24.1	24.1	30.1	30.1	30.1			
Yellow Time (s)	3.5	4.3			4.3	4.3	3.0	3.0	3.0			
All-Red Time (s)	1.0	1.6			1.6	1.6	2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.9			5.9	5.9		5.9	5.9			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.97	0.27			0.86	0.57		0.95	0.07			
Control Delay	52.4	5.4			49.8	34.8		58.4	20.9			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	52.4	5.4			49.8	34.8		58.4	20.9			
Queue Length 50th (ft)	254	51			233	119		290	13			
Queue Length 95th (ft)	#376	56			#373	188		#461	32			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	470	959			502	423		574	514			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.97	0.27			0.86	0.57		0.93	0.06			

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 83 (92%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	225	0	0	375	340	465	0	29	0	0	0
Future Volume (veh/h)	395	225	0	0	375	340	465	0	29	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1781	1795	0	0	1884	1870	1826	1826	1826			
Adj Flow Rate, veh/h	454	259	0	0	431	242	534	0	33			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	8	8	0	0	2	2	5	5	5			
Cap, veh/h	490	974	0	0	527	443	567	0	505			
Arrive On Green	0.07	0.18	0.00	0.00	0.28	0.28	0.33	0.00	0.33			
Sat Flow, veh/h	1697	1795	0	0	1884	1585	1739	0	1547			
Grp Volume(v), veh/h	454	259	0	0	431	242	534	0	33			
Grp Sat Flow(s),veh/h/ln	1697	1795	0	0	1884	1585	1739	0	1547			
Q Serve(g_s), s	17.1	11.2	0.0	0.0	19.2	11.7	26.9	0.0	1.3			
Cycle Q Clear(g_c), s	17.1	11.2	0.0	0.0	19.2	11.7	26.9	0.0	1.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	490	974	0	0	527	443	567	0	505			
V/C Ratio(X)	0.93	0.27	0.00	0.00	0.82	0.55	0.94	0.00	0.07			
Avail Cap(c_a), veh/h	496	974	0	0	527	443	582	0	518			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.83	0.83	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	25.8	21.5	0.0	0.0	30.3	27.6	29.5	0.0	20.9			
Incr Delay (d2), s/veh	20.7	0.6	0.0	0.0	13.2	4.8	23.6	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	15.2	9.0	0.0	0.0	15.7	8.5	20.7	0.0	0.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.5	22.0	0.0	0.0	43.5	32.3	53.0	0.0	20.9			
LnGrp LOS	D	C	A	A	D	C	D	A	C			
Approach Vol, veh/h		713			673			567				
Approach Delay, s/veh		37.6			39.5			51.2				
Approach LOS		D			D			D				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	23.7	31.1				54.8		35.2				
Change Period (Y+Rc), s	4.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	19.5	* 24				* 48		30.1				
Max Q Clear Time (g_c+I1), s	19.1	21.2				13.2		28.9				
Green Ext Time (p_c), s	0.1	1.0				1.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	42.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	280	5	1	675	20	5	1	1	10	1	35
Future Volume (vph)	25	280	5	1	675	20	5	1	1	10	1	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		120	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	371	6	0	848	0	0	8	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	280	5	1	675	20	5	1	1	10	1	35
Future Vol, veh/h	25	280	5	1	675	20	5	1	1	10	1	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	120	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	11	11	11	6	6	6	2	2	2	2	2	2
Mvmt Flow	30	341	6	1	823	24	6	1	1	12	1	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	847	0	0	347	0	0	1260	1250	341	1242	1244	835
Stage 1	-	-	-	-	-	-	401	401	-	837	837	-
Stage 2	-	-	-	-	-	-	859	849	-	405	407	-
Critical Hdwy	4.21	-	-	4.16	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.299	-	-	2.254	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	753	-	-	1190	-	-	147	173	701	152	174	368
Stage 1	-	-	-	-	-	-	626	601	-	361	382	-
Stage 2	-	-	-	-	-	-	351	377	-	622	597	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	753	-	-	1190	-	-	124	164	701	145	165	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	124	164	-	145	165	-
Stage 1	-	-	-	-	-	-	595	572	-	343	381	-
Stage 2	-	-	-	-	-	-	309	376	-	589	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	31.2	21.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	146	753	-	-	1190	-	-	270
HCM Lane V/C Ratio	0.058	0.04	-	-	0.001	-	-	0.208
HCM Control Delay (s)	31.2	10	0	-	8	0	-	21.8
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.8

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	55	235	480	25	60	215
Future Volume (vph)	55	235	480	25	60	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	100	0
Storage Lanes	0			0	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		30	
Link Distance (ft)		1713	1664		1026	
Travel Time (s)		26.0	25.2		23.3	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	341	594	0	324	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	10.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	235	480	25	60	215
Future Vol, veh/h	55	235	480	25	60	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	9	9
Mvmt Flow	65	276	565	29	71	253

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	594	0	-	0	986	580
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	406	-
Critical Hdwy	4.28	-	-	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	2.362	-	-	-	3.581	3.381
Pot Cap-1 Maneuver	908	-	-	-	267	501
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	658	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	908	-	-	-	244	501
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	40.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	908	-	-	-	407
HCM Lane V/C Ratio	0.071	-	-	-	0.795
HCM Control Delay (s)	9.3	0	-	-	40.5
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	7

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	260	435	5	25	70
Future Volume (vph)	35	260	435	5	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	250			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		1664	640		615	
Travel Time (s)		25.2	9.7		16.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	5%	5%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	347	518	0	111	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	260	435	5	25	70
Future Vol, veh/h	35	260	435	5	25	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	18	18	5	5	2	2
Mvmt Flow	41	306	512	6	29	82

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	518	0	-	0	903	515
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	388	-
Critical Hdwy	4.28	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.362	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	971	-	-	-	308	560
Stage 1	-	-	-	-	600	-
Stage 2	-	-	-	-	686	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	971	-	-	-	292	560
Mov Cap-2 Maneuver	-	-	-	-	292	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	686	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	451
HCM Lane V/C Ratio	0.042	-	-	-	0.248
HCM Control Delay (s)	8.9	0	-	-	15.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	100	90	5	120	5	205	100	5	15	35	115
Future Volume (vph)	95	100	90	5	120	5	205	100	5	15	35	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		640			1139			840			756	
Travel Time (s)		9.7			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	351	0	0	160	0	0	382	0	0	204	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	17.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	100	90	5	120	5	205	100	5	15	35	115
Future Vol, veh/h	95	100	90	5	120	5	205	100	5	15	35	115
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	11	11	11	6	6	6	3	3	3	15	15	15
Mvmt Flow	117	123	111	6	148	6	253	123	6	19	43	142
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.3	12.5	20.3	12.7
HCM LOS	C	B	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	66%	33%	4%	9%
Vol Thru, %	32%	35%	92%	21%
Vol Right, %	2%	32%	4%	70%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	310	285	130	165
LT Vol	205	95	5	15
Through Vol	100	100	120	35
RT Vol	5	90	5	115
Lane Flow Rate	383	352	160	204
Geometry Grp	1	1	1	1
Degree of Util (X)	0.656	0.604	0.297	0.354
Departure Headway (Hd)	6.169	6.183	6.654	6.254
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	586	584	539	574
Service Time	4.214	4.229	4.712	4.311
HCM Lane V/C Ratio	0.654	0.603	0.297	0.355
HCM Control Delay	20.3	18.3	12.5	12.7
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	4.8	4	1.2	1.6

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2025
Time Analyzed	Build PM Peak Hour w/Mods
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	1	0	1	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LT		R		L		TR				LTR				LTR	
Volume (V), veh/h	0	30	380	45	0	155	655	95	0	90	185	115	0	65	85	15
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	35	441	52	0	170	718	104	0	99	203	126	0	75	99	17
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				1				1				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.2000	4.2000			4.2000			4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000			2.8000			2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	476.00	52.00		170.00	822.00			428.00			191.00	
Entry Volume veh/h	436.70	47.71		165.05	798.06			415.53			175.23	
Circulating Flow (v_c), pc/h	344			337			551			987		
Exiting Flow (v_{ex}), pc/h	642			834			342			321		
Capacity (c_{pce}), pc/h	1002.87	1002.87		989.26	989.26			837.58			630.33	
Capacity (c), veh/h	920.07	920.07		960.45	960.45			813.18			578.28	
v/c Ratio (x)	0.47	0.05		0.17	0.83			0.51			0.30	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	9.8	4.4		5.4	23.2			11.5			10.4	
Lane LOS	A	A		A	C			B			B	
95% Queue, veh	2.6	0.2		0.6	9.9			3.0			1.3	
Approach Delay, s/veh	9.2			20.2			11.5			10.4		
Approach LOS	A			C			B			B		
Intersection Delay, s/veh | LOS	15.0						B					

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APPENDIX F
Transportation System Improvements with Build Traffic Operational Analysis

Year 2040 Build Traffic
Synchro Worksheets
With Modifications

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	810	100	110	325	120	30	60	165	210	90	40
Future Volume (vph)	65	810	100	110	325	120	30	60	165	210	90	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		50	50		0	0		0	0		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	10%	10%	10%	9%	9%	9%	12%	12%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1071	0	0	610	0	0	99	181	231	143	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1180	1	20	555	25	1	1	10	5	1	1
Future Volume (vph)	5	1180	1	20	555	25	1	1	10	5	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	13%	13%	13%	42%	42%	42%	14%	14%	14%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	1357	0	23	667	0	0	13	0	0	8	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1180	1	20	555	25	1	1	10	5	1	1
Future Vol, veh/h	5	1180	1	20	555	25	1	1	10	5	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	13	13	13	42	42	42	14	14	14
Mvmt Flow	6	1356	1	23	638	29	1	1	11	6	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	667	0	0	1357	0	0	1735	2082	679	1390	2068	334
Stage 1	-	-	-	-	-	-	1369	1369	-	699	699	-
Stage 2	-	-	-	-	-	-	366	713	-	691	1369	-
Critical Hdwy	4.22	-	-	4.36	-	-	8.34	7.34	7.74	7.78	6.78	7.18
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	6.34	-	6.78	5.78	-
Critical Hdwy Stg 2	-	-	-	-	-	-	7.34	6.34	-	6.78	5.78	-
Follow-up Hdwy	2.26	-	-	2.33	-	-	3.92	4.42	3.72	3.64	4.14	3.44
Pot Cap-1 Maneuver	892	-	-	449	-	-	37	32	313	91	46	628
Stage 1	-	-	-	-	-	-	108	151	-	370	412	-
Stage 2	-	-	-	-	-	-	528	348	-	374	192	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	892	-	-	449	-	-	35	30	313	83	43	628
Mov Cap-2 Maneuver	-	-	-	-	-	-	89	105	-	197	123	-
Stage 1	-	-	-	-	-	-	107	150	-	367	391	-
Stage 2	-	-	-	-	-	-	499	330	-	355	191	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	21.8	23.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	228	892	-	-	449	-	-	199
HCM Lane V/C Ratio	0.06	0.006	-	-	0.051	-	-	0.04
HCM Control Delay (s)	21.8	9.1	-	-	13.4	-	-	23.9
HCM Lane LOS	C	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	1040	1	5	525	320	1	1	1	360	1	75
Future Volume (vph)	155	1040	1	5	525	320	1	1	1	360	1	75
Ideal Flow (vphpl)	1900	1953	1953	1900	1953	1953	1900	1762	1762	1900	1799	1799
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	2		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	9%	9%	9%	2%	2%	2%	24%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	1170	0	6	950	0	1	2	0	404	85	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		D.P+P	NA	
Protected Phases	1	6			2			8		7	4	
Permitted Phases	6			2			8			8		
Detector Phase	1	6		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		8.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		13.5	15.9	
Total Split (s)	11.0	40.0		29.0	29.0		16.0	16.0		14.0	30.0	
Total Split (%)	15.7%	57.1%		41.4%	41.4%		22.9%	22.9%		20.0%	42.9%	
Maximum Green (s)	6.5	34.1		23.1	23.1		10.1	10.1		8.5	24.1	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.5	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.0	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.5	5.9	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?										Yes		
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		3.0	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		0.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.52	0.57		0.03	0.61		0.00	0.01		0.88	0.36	
Control Delay	12.2	9.7		12.0	15.0		26.0	26.0		48.8	27.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.2	9.7		12.0	15.0		26.0	26.0		48.8	27.5	
Queue Length 50th (ft)	20	117		1	114		0	1		~112	34	
Queue Length 95th (ft)	#72	298		m6	#297		5	6		114	56	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	338	2039		177	1550		268	230		457	425	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.51	0.57		0.03	0.61		0.00	0.01		0.88	0.20	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 19 (27%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 300: Richfield Parkway & STH 167

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	1040	1	5	525	320	1	1	1	360	1	75
Future Volume (veh/h)	155	1040	1	5	525	320	1	1	1	360	1	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1846	1846	1767	1816	1816	1870	1735	1735	1544	1462	1462
Adj Flow Rate, veh/h	174	1169	1	6	590	360	1	1	1	404	1	84
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	7	7	7	9	9	9	2	2	2	24	24	24
Cap, veh/h	352	1774	2	223	752	459	256	93	93	752	5	389
Arrive On Green	0.08	0.51	0.51	0.73	0.73	0.73	0.12	0.12	0.12	0.12	0.32	0.32
Sat Flow, veh/h	1711	3449	3	453	2059	1256	1313	796	796	2559	15	1227
Grp Volume(v), veh/h	174	544	626	6	494	456	1	0	2	404	0	85
Grp Sat Flow(s),veh/h/ln	1711	1606	1846	453	1725	1590	1313	0	1591	1280	0	1241
Q Serve(g_s), s	4.1	17.4	17.4	0.4	12.7	12.7	0.0	0.0	0.1	8.5	0.0	3.5
Cycle Q Clear(g_c), s	4.1	17.4	17.4	7.4	12.7	12.7	0.0	0.0	0.1	8.5	0.0	3.5
Prop In Lane	1.00		0.00	1.00		0.79	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	352	826	949	223	630	581	256	0	186	752	0	394
V/C Ratio(X)	0.49	0.66	0.66	0.03	0.78	0.78	0.00	0.00	0.01	0.54	0.00	0.22
Avail Cap(c_a), veh/h	366	826	949	223	630	581	292	0	230	752	0	427
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	12.5	12.5	8.7	7.7	7.7	27.3	0.0	27.3	24.1	0.0	17.5
Incr Delay (d2), s/veh	0.4	4.1	3.6	0.2	9.5	10.2	0.0	0.0	0.0	0.8	0.0	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	2.3	9.7	10.7	0.1	6.7	6.4	0.0	0.0	0.1	5.4	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	16.6	16.1	8.9	17.1	17.9	27.3	0.0	27.3	24.9	0.0	17.8
LnGrp LOS	B	B	B	A	B	B	C	A	C	C	A	B
Approach Vol, veh/h		1344			956			3			489	
Approach Delay, s/veh		15.9			17.4			27.3			23.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4		6	7	8
Phs Duration (G+Y+Rc), s	10.4	31.5		28.1		41.9	14.0	14.1
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9	5.5	5.9
Max Green Setting (Gmax), s	6.5	* 23		24.1		* 34	8.5	10.1
Max Q Clear Time (g_c+I1), s	6.1	14.7		5.5		19.4	10.5	2.1
Green Ext Time (p_c), s	0.0	4.0		0.4		6.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1400	850	265	0	0
Future Volume (vph)	0	1400	850	265	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	14%	14%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1573	955	298	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

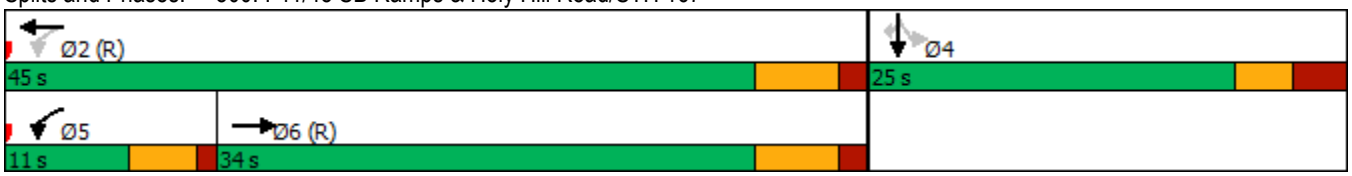
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	177
Future Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	177
Ideal Flow (vphpl)	1900	1953	1900	1900	1953	1900	1900	1900	1900	1900	1835	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			15.1			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	842	632	105	626	0	0	0	0	297	298	186
Turn Type		NA	Free	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			Free	2						4		4
Detector Phase		6		5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0		6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9		10.5	20.9					15.9	15.9	15.9
Total Split (s)		34.0		11.0	45.0					25.0	25.0	25.0
Total Split (%)		48.6%		15.7%	64.3%					35.7%	35.7%	35.7%
Maximum Green (s)		28.1		6.5	39.1					19.1	19.1	19.1
Yellow Time (s)		4.3		3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6		1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.9		4.5	5.9					5.9	5.9	5.9
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0		3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max		None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.73	0.41	0.42	0.32					0.75	0.78	0.50
Control Delay		19.5	0.6	11.2	3.0					36.9	39.6	27.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		19.5	0.6	11.2	3.0					36.9	39.6	27.1
Queue Length 50th (ft)		230	0	22	36					120	121	66
Queue Length 95th (ft)		m#297	m0	12	26					#210	#230	123
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		1147	1538	252	1977					441	426	415
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.73	0.41	0.42	0.32					0.67	0.70	0.45

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 4 (6%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	800	600	100	595	0	0	0	0	565	0	177
Future Volume (veh/h)	0	800	600	100	595	0	0	0	0	565	0	177
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1877	1826	1752	1801	0				1811	1749	1811
Adj Flow Rate, veh/h	0	842	0	105	626	0				595	0	186
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	5	10	10	0				6	6	6
Cap, veh/h	0	1201		340	2108	0				742	0	330
Arrive On Green	0.00	0.32	0.00	0.02	0.20	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	3134	1547	1668	3511	0				3450	0	1535
Grp Volume(v), veh/h	0	842	0	105	626	0				595	0	186
Grp Sat Flow(s),veh/h/ln	0	1257	1547	1668	1711	0				1725	0	1535
Q Serve(g_s), s	0.0	20.5	0.0	2.0	10.9	0.0				11.5	0.0	7.6
Cycle Q Clear(g_c), s	0.0	20.5	0.0	2.0	10.9	0.0				11.5	0.0	7.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1201		340	2108	0				742	0	330
V/C Ratio(X)	0.00	0.70		0.31	0.30	0.00				0.80	0.00	0.56
Avail Cap(c_a), veh/h	0	1201		370	2108	0				941	0	419
HCM Platoon Ratio	1.00	0.67	0.67	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.4	0.0	11.6	15.0	0.0				26.1	0.0	24.5
Incr Delay (d2), s/veh	0.0	3.4	0.0	0.5	0.3	0.0				4.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	10.9	0.0	1.2	8.4	0.0				8.5	0.0	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.9	0.0	12.1	15.4	0.0				30.0	0.0	26.0
LnGrp LOS	A	C		B	B	A				C	A	C
Approach Vol, veh/h		842	A		731						781	
Approach Delay, s/veh		22.9			14.9						29.1	
Approach LOS		C			B						C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		49.0		21.0	9.7	39.3
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 39		19.1	6.5	* 28
Max Q Clear Time (g_c+I1), s		12.9		13.5	4.0	22.5
Green Ext Time (p_c), s		4.6		1.6	0.1	2.7

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

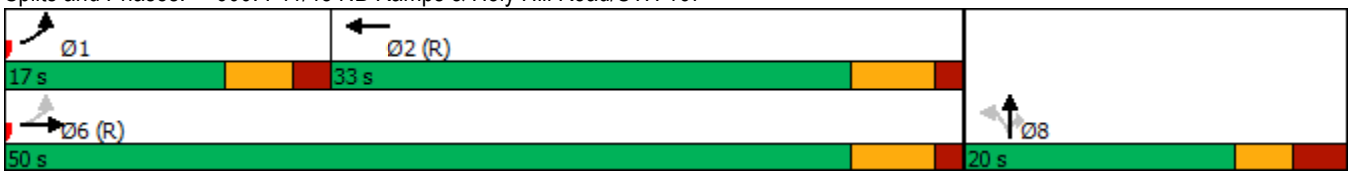
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	390	975	0	0	380	165	315	0	111	0	0	0
Future Volume (vph)	390	975	0	0	380	165	315	0	111	0	0	0
Ideal Flow (vphpl)	1900	1974	1900	1900	1953	1900	1900	1835	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	394	985	0	0	384	167	159	159	112	0	0	0
Turn Type	pm+pt	NA			NA	Free	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					Free	8		8			
Detector Phase	1	6			2		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0		10.0	10.0	10.0			
Minimum Split (s)	13.5	20.9			20.9		15.9	15.9	15.9			
Total Split (s)	17.0	50.0			33.0		20.0	20.0	20.0			
Total Split (%)	24.3%	71.4%			47.1%		28.6%	28.6%	28.6%			
Maximum Green (s)	11.5	44.1			27.1		14.1	14.1	14.1			
Yellow Time (s)	3.5	4.3			4.3		3.0	3.0	3.0			
All-Red Time (s)	2.0	1.6			1.6		2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.5	5.9			5.9		5.9	5.9	5.9			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max		None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.33	0.42			0.30	0.11	0.59	0.61	0.44			
Control Delay	2.2	2.3			11.0	0.2	35.7	36.9	31.1			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	2.2	2.3			11.0	0.2	35.7	36.9	31.1			
Queue Length 50th (ft)	0	6			31	0	66	67	43			
Queue Length 95th (ft)	m0	44			114	0	123	124	86			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	1255	2321			1281	1495	311	300	293			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.31	0.42			0.30	0.11	0.51	0.53	0.38			

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 36 (51%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	975	0	0	380	165	315	0	111	0	0	0
Future Volume (veh/h)	390	975	0	0	380	165	315	0	111	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1882	0	0	1831	1781	1737	1678	1737			
Adj Flow Rate, veh/h	394	985	0	0	384	0	318	0	112			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	6	6	0	0	8	8	11	11	11			
Cap, veh/h	1516	2462	0	0	1434		473	0	210			
Arrive On Green	0.11	0.69	0.00	0.00	0.99	0.00	0.14	0.00	0.14			
Sat Flow, veh/h	3346	3669	0	0	3278	1510	3309	0	1472			
Grp Volume(v), veh/h	394	985	0	0	384	0	318	0	112			
Grp Sat Flow(s),veh/h/ln	1673	1788	0	0	1447	1510	1654	0	1472			
Q Serve(g_s), s	3.4	8.3	0.0	0.0	0.1	0.0	6.4	0.0	4.9			
Cycle Q Clear(g_c), s	3.4	8.3	0.0	0.0	0.1	0.0	6.4	0.0	4.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	1516	2462	0	0	1434		473	0	210			
V/C Ratio(X)	0.26	0.40	0.00	0.00	0.27		0.67	0.00	0.53			
Avail Cap(c_a), veh/h	1683	2462	0	0	1434		666	0	297			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.60	0.60	0.00	0.00	0.97	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.2	4.7	0.0	0.0	0.1	0.0	28.5	0.0	27.8			
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.0	0.4	0.0	1.7	0.0	2.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.7	4.0	0.0	0.0	0.2	0.0	4.6	0.0	3.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	5.0	0.0	0.0	0.6	0.0	30.1	0.0	29.9			
LnGrp LOS	A	A	A	A	A		C	A	C			
Approach Vol, veh/h		1379			384	A		430				
Approach Delay, s/veh		5.1			0.6			30.1				
Approach LOS		A			A			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	13.5	40.6				54.1		15.9				
Change Period (Y+Rc), s	5.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	11.5	* 27				* 44		14.1				
Max Q Clear Time (g_c+I1), s	5.4	2.1				10.3		8.4				
Green Ext Time (p_c), s	0.8	2.6				8.7		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

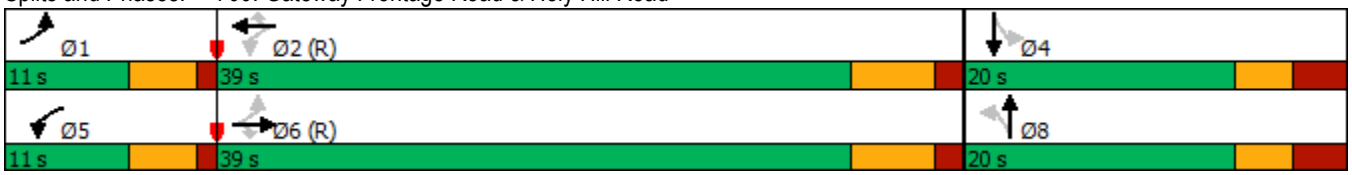
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	995	130	75	365	75	90	1	45	50	1	90
Future Volume (vph)	175	995	130	75	365	75	90	1	45	50	1	90
Ideal Flow (vphpl)	1900	1974	1900	1900	1974	1900	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	250		250	200		0	200		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			9.2			14.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	62%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	7%	7%	7%	2%	2%	2%	20%	20%	20%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	1059	86	80	388	49	96	49	0	53	97	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		
Detector Phase	1	6	6	5	2	2	8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9	20.9	10.5	20.9	20.9	22.5	22.5		15.9	15.9	
Total Split (s)	11.0	39.0	39.0	11.0	39.0	39.0	20.0	20.0		20.0	20.0	
Total Split (%)	15.7%	55.7%	55.7%	15.7%	55.7%	55.7%	28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	6.5	33.1	33.1	6.5	33.1	33.1	14.1	14.1		14.1	14.1	
Yellow Time (s)	3.5	4.3	4.3	3.5	4.3	4.3	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9	5.9	4.5	5.9	5.9	5.9	5.9		5.9	5.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.28	0.51	0.10	0.21	0.22	0.06	0.50	0.20		0.28	0.47	
Control Delay	3.0	7.9	6.4	6.5	6.1	4.6	35.6	26.5		28.8	33.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.0	7.9	6.4	6.5	6.1	4.6	35.6	26.5		28.8	33.7	
Queue Length 50th (ft)	11	110	12	1	58	8	43	19		20	39	
Queue Length 95th (ft)	21	192	35	24	41	8	88	45		49	79	
Internal Link Dist (ft)		681			1633			256			443	
Turn Bay Length (ft)	250		250	250		250	200			200		
Base Capacity (vph)	668	2086	897	385	1786	820	231	296		231	251	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.28	0.51	0.10	0.21	0.22	0.06	0.42	0.17		0.23	0.39	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 57 (81%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 700: Gateway Frontage Road & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	995	130	75	365	75	90	1	45	50	1	90
Future Volume (veh/h)	175	995	130	75	365	75	90	1	45	50	1	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1851	1781	1796	1866	1796	1870	1735	1735	1604	1487	1487
Adj Flow Rate, veh/h	186	1059	86	80	388	49	96	1	48	53	1	96
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	8	8	7	7	7	2	2	2	20	20	20
Cap, veh/h	611	1833	787	457	1679	769	230	5	257	277	2	223
Arrive On Green	0.17	1.00	1.00	0.02	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1697	3517	1510	1711	3322	1522	1156	30	1444	1163	13	1249
Grp Volume(v), veh/h	186	1059	86	80	388	49	96	0	49	53	0	97
Grp Sat Flow(s),veh/h/ln	1697	1758	1510	1711	1661	1522	1156	0	1475	1163	0	1262
Q Serve(g_s), s	3.7	0.0	0.0	1.5	7.1	1.9	5.6	0.0	2.0	2.8	0.0	4.8
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.5	7.1	1.9	10.4	0.0	2.0	4.8	0.0	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.99
Lane Grp Cap(c), veh/h	611	1833	787	457	1679	769	230	0	263	277	0	225
V/C Ratio(X)	0.30	0.58	0.11	0.18	0.23	0.06	0.42	0.00	0.19	0.19	0.00	0.43
Avail Cap(c_a), veh/h	627	1833	787	500	1679	769	257	0	297	304	0	254
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.5	0.0	0.0	7.0	17.4	15.2	30.2	0.0	24.4	26.5	0.0	25.6
Incr Delay (d2), s/veh	0.3	1.2	0.3	0.2	0.3	0.2	1.2	0.0	0.3	0.3	0.0	1.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	1.6	0.6	0.1	0.8	4.6	1.0	2.9	0.0	1.3	1.4	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	1.2	0.3	7.2	17.7	15.4	31.5	0.0	24.8	26.8	0.0	26.9
LnGrp LOS	A	A	A	A	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1331			517			145			150	
Approach Delay, s/veh		1.9			15.8			29.2			26.9	
Approach LOS		A			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	41.3		18.4	9.2	42.4		18.4
Change Period (Y+Rc), s	4.5	* 5.9		5.9	4.5	* 5.9		5.9
Max Green Setting (Gmax), s	6.5	* 33		14.1	6.5	* 33		14.1
Max Q Clear Time (g_c+I1), s	5.7	9.1		6.8	3.5	2.0		12.4
Green Ext Time (p_c), s	0.0	2.5		0.4	0.0	8.6		0.1

Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

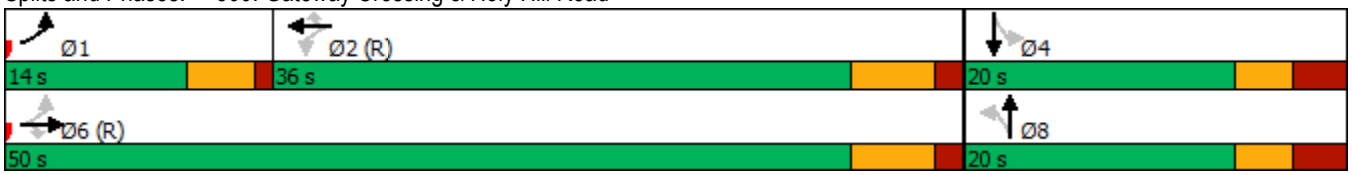
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	800	80	20	440	65	15	1	10	10	1	60
Future Volume (vph)	210	800	80	20	440	65	15	1	10	10	1	60
Ideal Flow (vphpl)	1900	1974	1900	1900	1974	1900	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	250		250	200		0	200		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1713			524			527			1026	
Travel Time (s)		26.0			7.9			12.0			23.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	62%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	17%	19%	19%	19%	2%	2%	2%	67%	67%	67%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	879	55	22	484	44	16	12	0	11	67	0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6		6	2		2	8			4		
Detector Phase	1	6	6	2	2	2	8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9	20.9	20.9	20.9	20.9	15.9	15.9		15.9	15.9	
Total Split (s)	14.0	50.0	50.0	36.0	36.0	36.0	20.0	20.0		20.0	20.0	
Total Split (%)	20.0%	71.4%	71.4%	51.4%	51.4%	51.4%	28.6%	28.6%		28.6%	28.6%	
Maximum Green (s)	9.5	44.1	44.1	30.1	30.1	30.1	14.1	14.1		14.1	14.1	
Yellow Time (s)	3.5	4.3	4.3	4.3	4.3	4.3	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6	1.6	1.6	1.6	1.6	2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9	5.9	5.9	5.9	5.9	5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.36	0.35	0.05	0.08	0.27	0.06	0.07	0.05		0.08	0.46	
Control Delay	1.9	0.8	0.7	11.1	10.6	10.0	24.5	24.0		25.0	36.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	1.9	0.8	0.7	11.1	10.6	10.0	24.5	24.0		25.0	36.4	
Queue Length 50th (ft)	1	2	0	6	70	11	6	4		4	27	
Queue Length 95th (ft)	5	12	m2	m17	99	m26	21	17		16	61	
Internal Link Dist (ft)		1633			444			447			946	
Turn Bay Length (ft)	250		250	250		250	200			200		
Base Capacity (vph)	655	2539	1093	291	1782	767	267	299		171	181	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.35	0.35	0.05	0.08	0.27	0.06	0.06	0.04		0.06	0.37	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 11 (16%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 800: Gateway Crossing & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	800	80	20	440	65	15	1	10	10	1	60
Future Volume (veh/h)	210	800	80	20	440	65	15	1	10	10	1	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1648	1712	1648	1618	1681	1618	1870	1735	1735	907	841	841
Adj Flow Rate, veh/h	231	879	55	22	484	44	16	1	11	11	1	66
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	17	17	17	19	19	19	2	2	2	67	67	67
Cap, veh/h	623	2299	987	405	1769	759	148	15	170	183	1	88
Arrive On Green	0.12	0.94	0.94	0.55	0.55	0.55	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1570	3253	1397	546	3195	1372	1334	124	1365	680	11	704
Grp Volume(v), veh/h	231	879	55	22	484	44	16	0	12	11	0	67
Grp Sat Flow(s),veh/h/ln	1570	1627	1397	546	1597	1372	1334	0	1489	680	0	714
Q Serve(g_s), s	4.1	1.8	0.2	1.3	5.6	1.0	0.8	0.0	0.5	1.0	0.0	6.3
Cycle Q Clear(g_c), s	4.1	1.8	0.2	1.3	5.6	1.0	7.2	0.0	0.5	1.5	0.0	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.99
Lane Grp Cap(c), veh/h	623	2299	987	405	1769	759	148	0	186	183	0	89
V/C Ratio(X)	0.37	0.38	0.06	0.05	0.27	0.06	0.11	0.00	0.06	0.06	0.00	0.75
Avail Cap(c_a), veh/h	697	2299	987	405	1769	759	251	0	300	235	0	144
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.9	0.7	0.6	7.3	8.2	7.2	33.1	0.0	27.0	27.7	0.0	29.6
Incr Delay (d2), s/veh	0.3	0.4	0.1	0.3	0.4	0.1	0.3	0.0	0.1	0.1	0.0	12.0
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	1.4	0.6	0.1	0.3	2.8	0.5	0.5	0.0	0.3	0.3	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.2	1.1	0.7	7.5	8.6	7.3	33.4	0.0	27.2	27.8	0.0	41.6
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	D
Approach Vol, veh/h		1165			550			28			78	
Approach Delay, s/veh		1.9			8.5			30.7			39.6	
Approach LOS		A			A			C			D	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.7	44.7		14.6		55.4		14.6
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	9.5	* 30		14.1		* 44		14.1
Max Q Clear Time (g_c+I1), s	6.1	7.6		8.3		3.8		9.2
Green Ext Time (p_c), s	0.2	3.4		0.2		7.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	695	60	30	490	30	15	0	1	10	0	20
Future Volume (vph)	65	695	60	30	490	30	15	0	1	10	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	200		250	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1158			622			720			612	
Travel Time (s)		26.3			14.1			16.4			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	17%	17%	17%	19%	19%	19%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	764	66	33	571	0	0	17	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	695	60	30	490	30	15	0	1	10	0	20
Future Vol, veh/h	65	695	60	30	490	30	15	0	1	10	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	200	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	17	17	17	19	19	19	2	2	2	2	2	2
Mvmt Flow	71	764	66	33	538	33	16	0	1	11	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	571	0	0	830	0	0	1241	1543	382	1145	1593	286
Stage 1	-	-	-	-	-	-	906	906	-	621	621	-
Stage 2	-	-	-	-	-	-	335	637	-	524	972	-
Critical Hdwy	4.44	-	-	4.48	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.37	-	-	2.39	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1196	-	-	697	-	-	*204	145	616	249	133	*891
Stage 1	-	-	-	-	-	-	*297	353	-	727	662	-
Stage 2	-	-	-	-	-	-	*840	649	-	504	329	-
Platoon blocked, %	1	-	-		-	-	1	1		1	1	1
Mov Cap-1 Maneuver	1196	-	-	697	-	-	*183	130	616	228	120	*891
Mov Cap-2 Maneuver	-	-	-	-	-	-	*241	243	-	340	219	-
Stage 1	-	-	-	-	-	-	*279	332	-	684	631	-
Stage 2	-	-	-	-	-	-	*781	618	-	473	310	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.6	20.4	11.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	251	1196	-	-	697	-	-	578
HCM Lane V/C Ratio	0.07	0.06	-	-	0.047	-	-	0.057
HCM Control Delay (s)	20.4	8.2	-	-	10.4	-	-	11.6
HCM Lane LOS	C	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0.1	-	-	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

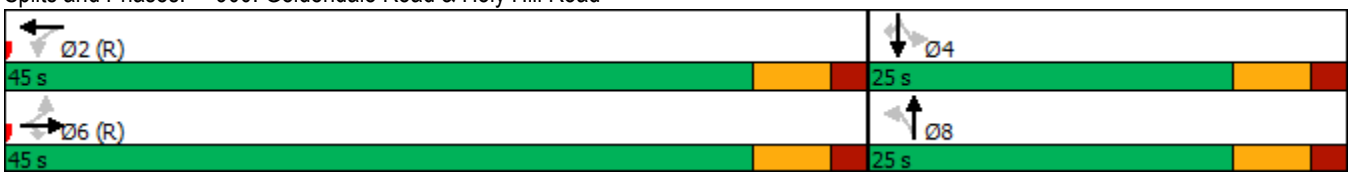
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	270	220	15	265	30	170	50	5	20	90	115
Future Volume (vph)	215	270	220	15	265	30	170	50	5	20	90	115
Ideal Flow (vphpl)	1900	1953	1900	1900	1914	1914	1900	1914	1914	1900	2041	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	250		0	250		0	250		250
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		622			1139			840			756	
Travel Time (s)		9.4			17.3			19.1			17.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	62%	100%	100%	100%	100%	100%	100%	100%	100%	62%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	16%	16%	16%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	247	310	157	17	339	0	195	63	0	23	103	82
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2			8			4		4
Detector Phase	6	6	6	2	2		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0		16.0	16.0		16.0	16.0	16.0
Total Split (s)	45.0	45.0	45.0	45.0	45.0		25.0	25.0		25.0	25.0	25.0
Total Split (%)	64.3%	64.3%	64.3%	64.3%	64.3%		35.7%	35.7%		35.7%	35.7%	35.7%
Maximum Green (s)	39.0	39.0	39.0	39.0	39.0		19.0	19.0		19.0	19.0	19.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.42	0.28	0.17	0.03	0.31		0.76	0.17		0.08	0.23	0.23
Control Delay	4.9	2.3	1.8	7.1	8.5		44.4	21.4		20.1	22.1	22.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	4.9	2.3	1.8	7.1	8.5		44.4	21.4		20.1	22.1	22.3
Queue Length 50th (ft)	5	6	3	3	68		76	21		8	35	28
Queue Length 95th (ft)	13	7	4	11	115		#139	47		23	67	57
Internal Link Dist (ft)		542			1059			760			676	
Turn Bay Length (ft)	250			250			250			250		250
Base Capacity (vph)	587	1096	907	628	1090		306	441		358	537	425
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.42	0.28	0.17	0.03	0.31		0.64	0.14		0.06	0.19	0.19

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 60 (86%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 900: Goldendale Road & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	270	220	15	265	30	170	50	5	20	90	115
Future Volume (veh/h)	215	270	220	15	265	30	170	50	5	20	90	115
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1846	1796	1841	1854	1854	1663	1675	1675	1856	1993	1856
Adj Flow Rate, veh/h	247	310	157	17	305	34	195	57	6	23	103	82
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	7	7	7	4	4	4	16	16	16	3	3	3
Cap, veh/h	600	1090	899	637	967	108	329	355	37	379	475	375
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1000	1846	1522	1052	1639	183	1148	1490	157	1328	1993	1572
Grp Volume(v), veh/h	247	310	157	17	0	339	195	0	63	23	103	82
Grp Sat Flow(s),veh/h/ln	1000	1846	1522	1052	0	1821	1148	0	1647	1328	1993	1572
Q Serve(g_s), s	11.6	5.8	3.3	0.6	0.0	6.6	11.5	0.0	2.1	1.0	2.9	2.9
Cycle Q Clear(g_c), s	18.1	5.8	3.3	6.4	0.0	6.6	14.4	0.0	2.1	3.1	2.9	2.9
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	600	1090	899	637	0	1075	329	0	392	379	475	375
V/C Ratio(X)	0.41	0.28	0.17	0.03	0.00	0.32	0.59	0.00	0.16	0.06	0.22	0.22
Avail Cap(c_a), veh/h	600	1090	899	637	0	1075	367	0	447	423	541	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.8	7.1	6.6	8.6	0.0	7.2	27.2	0.0	21.1	22.3	21.4	21.4
Incr Delay (d2), s/veh	2.1	0.7	0.4	0.1	0.0	0.8	2.1	0.0	0.2	0.1	0.2	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	4.3	3.3	1.6	0.2	0.0	3.7	5.7	0.0	1.4	0.5	2.4	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	7.7	7.0	8.7	0.0	8.0	29.3	0.0	21.3	22.4	21.6	21.7
LnGrp LOS	B	A	A	A	A	A	C	A	C	C	C	C
Approach Vol, veh/h		714			356			258			208	
Approach Delay, s/veh		9.7			8.0			27.3			21.8	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		47.3		22.7		47.3		22.7				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		39.0		19.0		39.0		19.0				
Max Q Clear Time (g_c+I1), s		8.6		5.1		20.1		16.4				
Green Ext Time (p_c), s		2.0		0.7		3.3		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Build AM Peak Hour w/Mods
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.91
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	1	1	0	1	1	0
Lane Assignment	LT		TR		LT		TR		LT		R		L		TR	
Volume (V), veh/h	0	65	810	100	0	110	325	120	0	30	60	165	0	210	90	40
Percent Heavy Vehicles, %	4	4	4	4	10	10	10	10	9	9	9	9	12	12	12	12
Flow Rate (v_{PCE}), pc/h	0	74	926	114	0	133	393	145	0	36	72	198	0	258	111	49
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	523.58	590.42		315.37	355.63		108.00	198.00		258.00	160.00	
Entry Volume veh/h	503.44	567.71		286.70	323.30		99.08	181.65		230.36	142.86	
Circulating Flow (v_c), pc/h	502			182			1258			562		
Exiting Flow (v_{ex}), pc/h	1382			478			291			358		
Capacity (c_{pce}), pc/h	894.72	894.72		1127.35	1127.35		518.28	518.28		856.78	856.78	
Capacity (c), veh/h	860.31	860.31		1024.86	1024.86		475.49	475.49		764.98	764.98	
v/c Ratio (x)	0.59	0.66		0.28	0.32		0.21	0.38		0.30	0.19	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	12.8	15.2		6.3	6.7		10.6	14.1		8.2	6.7	
Lane LOS	B	C		A	A		B	B		A	A	
95% Queue, veh	3.9	5.1		1.2	1.4		0.8	1.8		1.3	0.7	
Approach Delay, s/veh	14.1			6.5			12.9			7.6		
Approach LOS	B			A			B			A		
Intersection Delay, s/veh | LOS	10.9						B					

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	425	45	190	760	205	90	200	135	145	120	70
Future Volume (vph)	50	425	45	190	760	205	90	200	135	145	120	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		50	50		0	0		0	0		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		695			1078			622			703	
Travel Time (s)		10.5			16.3			14.1			16.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	9%	9%	9%	3%	3%	3%	3%	3%	3%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	553	0	0	1229	0	0	309	144	154	202	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type: Roundabout	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	700	1	5	1145	10	5	1	10	10	1	5
Future Volume (vph)	5	700	1	5	1145	10	5	1	10	10	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	50		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1078			400			250			364	
Travel Time (s)		16.3			6.1			5.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	20%	20%	20%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	738	0	5	1216	0	0	17	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	700	1	5	1145	10	5	1	10	10	1	5
Future Vol, veh/h	5	700	1	5	1145	10	5	1	10	10	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	130	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	7	7	7	4	4	4	20	20	20	2	2	2
Mvmt Flow	5	737	1	5	1205	11	5	1	11	11	1	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1216	0	0	738	0	0	1361	1974	369	1600	1969	608
Stage 1	-	-	-	-	-	-	748	748	-	1221	1221	-
Stage 2	-	-	-	-	-	-	613	1226	-	379	748	-
Critical Hdwy	4.24	-	-	4.18	-	-	7.9	6.9	7.3	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.9	5.9	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.9	5.9	-	6.54	5.54	-
Follow-up Hdwy	2.27	-	-	2.24	-	-	3.7	4.2	3.5	3.52	4.02	3.32
Pot Cap-1 Maneuver	542	-	-	851	-	-	91	50	579	71	62	439
Stage 1	-	-	-	-	-	-	332	377	-	191	251	-
Stage 2	-	-	-	-	-	-	405	216	-	615	418	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	542	-	-	851	-	-	88	49	579	69	61	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	143	-	152	167	-
Stage 1	-	-	-	-	-	-	329	374	-	189	249	-
Stage 2	-	-	-	-	-	-	396	215	-	597	414	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	16.6	25.5
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	327	542	-	-	851	-	-	192
HCM Lane V/C Ratio	0.052	0.01	-	-	0.006	-	-	0.088
HCM Control Delay (s)	16.6	11.7	-	-	9.3	-	-	25.5
HCM Lane LOS	C	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

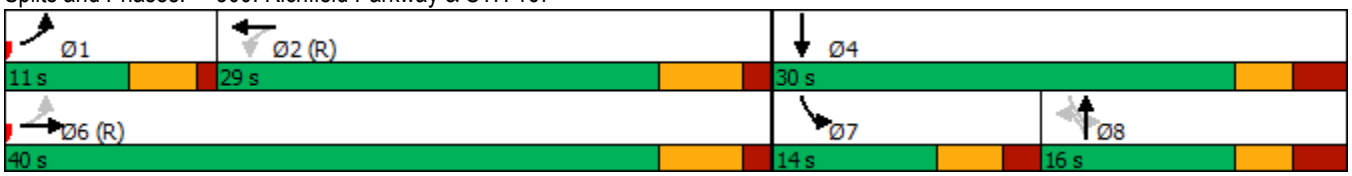
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	655	1	5	1010	90	1	1	1	530	1	150
Future Volume (vph)	65	655	1	5	1010	90	1	1	1	530	1	150
Ideal Flow (vphpl)	1900	1953	1953	1900	1953	1953	1900	1762	1762	1900	1799	1799
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		0	320		0	50		0	150		0
Storage Lanes	1		0	1		0	1		0	2		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		400			345			302			572	
Travel Time (s)		6.1			5.2			8.2			15.6	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	2%	2%	2%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	713	0	5	1196	0	1	2	0	576	164	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		D.P+P	NA	
Protected Phases	1	6			2			8		7	4	
Permitted Phases	6			2			8			8		
Detector Phase	1	6		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		10.0	10.0		8.0	10.0	
Minimum Split (s)	10.5	20.9		20.9	20.9		15.9	15.9		13.5	15.9	
Total Split (s)	11.0	40.0		29.0	29.0		16.0	16.0		14.0	30.0	
Total Split (%)	15.7%	57.1%		41.4%	41.4%		22.9%	22.9%		20.0%	42.9%	
Maximum Green (s)	6.5	34.1		23.1	23.1		10.1	10.1		8.5	24.1	
Yellow Time (s)	3.5	4.3		4.3	4.3		3.0	3.0		3.5	3.0	
All-Red Time (s)	1.0	1.6		1.6	1.6		2.9	2.9		2.0	2.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9		5.9	5.9		5.9	5.9		5.5	5.9	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?										Yes		
Vehicle Extension (s)	1.5	3.3		3.3	3.3		1.5	1.5		3.0	3.0	
Minimum Gap (s)	1.5	2.3		2.3	2.3		1.5	1.5		3.0	2.5	
Time Before Reduce (s)	20.0	21.0		21.0	21.0		30.0	30.0		0.0	30.0	
Time To Reduce (s)	0.0	10.0		10.0	10.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.27	0.35		0.02	0.69		0.00	0.01		0.97	0.57	
Control Delay	9.0	8.1		6.8	12.0		26.0	26.0		57.1	31.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.0	8.1		6.8	12.0		26.0	26.0		57.1	31.3	
Queue Length 50th (ft)	9	68		0	124		0	1		136	65	
Queue Length 95th (ft)	33	145		m2	#404		5	6		157	100	
Internal Link Dist (ft)		320			265			222			492	
Turn Bay Length (ft)	200			320			50			150		
Base Capacity (vph)	275	2062		332	1739		268	230		593	458	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.35		0.02	0.69		0.00	0.01		0.97	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 17 (24%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 300: Richfield Parkway & STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	655	1	5	1010	90	1	1	1	530	1	150
Future Volume (veh/h)	65	655	1	5	1010	90	1	1	1	530	1	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1862	1862	1841	1892	1892	1870	1735	1735	1678	1589	1589
Adj Flow Rate, veh/h	71	712	1	5	1098	98	1	1	1	576	1	163
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	4	4	4	2	2	2	15	15	15
Cap, veh/h	262	1754	2	368	1221	109	271	109	109	873	3	452
Arrive On Green	0.06	0.49	0.49	0.73	0.73	0.73	0.14	0.14	0.14	0.12	0.34	0.34
Sat Flow, veh/h	1725	3550	5	725	3338	298	1222	796	796	2908	8	1339
Grp Volume(v), veh/h	71	340	373	5	591	605	1	0	2	576	0	164
Grp Sat Flow(s),veh/h/ln	1725	1694	1861	725	1797	1838	1222	0	1591	1454	0	1347
Q Serve(g_s), s	1.6	8.9	8.9	0.1	18.0	18.1	0.0	0.0	0.1	8.5	0.0	6.4
Cycle Q Clear(g_c), s	1.6	8.9	8.9	0.1	18.0	18.1	0.0	0.0	0.1	8.5	0.0	6.4
Prop In Lane	1.00		0.00	1.00		0.16	1.00		0.50	1.00		0.99
Lane Grp Cap(c), veh/h	262	837	919	368	657	672	271	0	218	873	0	455
V/C Ratio(X)	0.27	0.41	0.41	0.01	0.90	0.90	0.00	0.00	0.01	0.66	0.00	0.36
Avail Cap(c_a), veh/h	311	837	919	368	657	672	279	0	230	873	0	464
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	11.2	11.2	6.0	8.4	8.4	26.1	0.0	26.1	24.2	0.0	17.5
Incr Delay (d2), s/veh	0.2	1.5	1.3	0.1	17.6	17.4	0.0	0.0	0.0	1.8	0.0	0.5
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	1.0	5.4	5.9	0.0	9.7	9.8	0.0	0.0	0.1	8.0	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.3	12.7	12.5	6.0	25.9	25.8	26.1	0.0	26.1	26.0	0.0	18.0
LnGrp LOS	B	B	B	A	C	C	C	A	C	C	A	B
Approach Vol, veh/h		784			1201			3			740	
Approach Delay, s/veh		12.8			25.8			26.1			24.2	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2		4		6	7	8
Phs Duration (G+Y+Rc), s	9.0	31.5		29.5		40.5	14.0	15.5
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9	5.5	5.9
Max Green Setting (Gmax), s	6.5	* 23		24.1		* 34	8.5	10.1
Max Q Clear Time (g_c+I1), s	3.6	20.1		8.4		10.9	10.5	2.1
Green Ext Time (p_c), s	0.0	2.0		0.9		4.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1185	1105	225	0	0
Future Volume (vph)	0	1185	1105	225	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			1	0	0
Taper Length (ft)	100				100	
Link Speed (mph)		45	45		25	
Link Distance (ft)		345	355		359	
Travel Time (s)		5.2	5.4		9.8	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	6%	6%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1261	1176	239	0	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

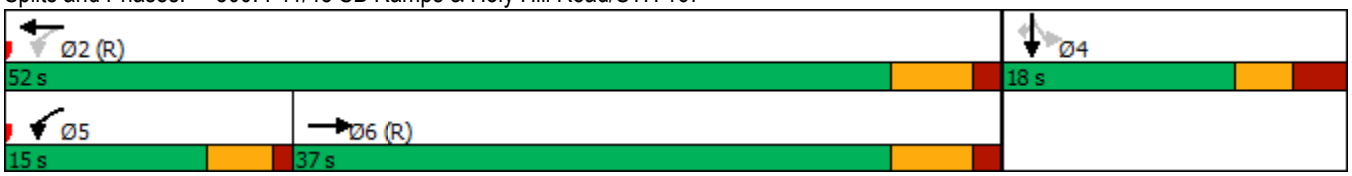
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	114
Future Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	114
Ideal Flow (vphpl)	1900	1953	1900	1900	1953	1900	1900	1900	1900	1900	1835	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	862	500	339	1144	0	0	0	0	152	153	131
Turn Type		NA	Free	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			Free	2						4		4
Detector Phase		6		5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0		6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9		10.5	20.9					15.9	15.9	15.9
Total Split (s)		37.0		15.0	52.0					18.0	18.0	18.0
Total Split (%)		52.9%		21.4%	74.3%					25.7%	25.7%	25.7%
Maximum Green (s)		31.1		10.5	46.1					12.1	12.1	12.1
Yellow Time (s)		4.3		3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6		1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.9		4.5	5.9					5.9	5.9	5.9
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0		3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max		None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.91	0.33	0.89	0.48					0.58	0.60	0.53
Control Delay		29.8	0.5	20.9	0.9					36.6	38.0	35.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		29.8	0.5	20.9	0.9					36.6	38.0	35.3
Queue Length 50th (ft)		327	0	11	0					64	64	52
Queue Length 95th (ft)		m#407	m0	m19	m0					116	117	98
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		950	1509	381	2393					282	272	265
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.91	0.33	0.89	0.48					0.54	0.56	0.49

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 1 (1%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	750	435	295	995	0	0	0	0	265	0	114
Future Volume (veh/h)	0	750	435	295	995	0	0	0	0	265	0	114
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1846	1796	1841	1892	0				1826	1763	1826
Adj Flow Rate, veh/h	0	862	0	339	1144	0				305	0	131
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	7	7	4	4	0				5	5	5
Cap, veh/h	0	1089		397	2475	0				497	0	221
Arrive On Green	0.00	0.34	0.00	0.12	0.69	0.00				0.14	0.00	0.14
Sat Flow, veh/h	0	2917	1522	1753	3690	0				3478	0	1547
Grp Volume(v), veh/h	0	862	0	339	1144	0				305	0	131
Grp Sat Flow(s),veh/h/ln	0	1071	1522	1753	1797	0				1739	0	1547
Q Serve(g_s), s	0.0	25.4	0.0	5.8	10.2	0.0				5.8	0.0	5.5
Cycle Q Clear(g_c), s	0.0	25.4	0.0	5.8	10.2	0.0				5.8	0.0	5.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1089		397	2475	0				497	0	221
V/C Ratio(X)	0.00	0.79		0.85	0.46	0.00				0.61	0.00	0.59
Avail Cap(c_a), veh/h	0	1089		458	2475	0				601	0	267
HCM Platoon Ratio	1.00	0.67	0.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.23	0.23	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.7	0.0	14.0	5.0	0.0				28.2	0.0	28.1
Incr Delay (d2), s/veh	0.0	5.9	0.0	3.4	0.1	0.0				1.3	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	11.7	0.0	4.0	3.3	0.0				4.3	0.0	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	25.6	0.0	17.4	5.1	0.0				29.5	0.0	30.6
LnGrp LOS	A	C		B	A	A				C	A	C
Approach Vol, veh/h		862	A		1483						436	
Approach Delay, s/veh		25.6			7.9						29.8	
Approach LOS		C			A						C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		54.1		15.9	12.6	41.5
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 46		12.1	10.5	* 31
Max Q Clear Time (g_c+I1), s		12.2		7.8	7.8	27.4
Green Ext Time (p_c), s		9.3		0.7	0.3	1.9

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

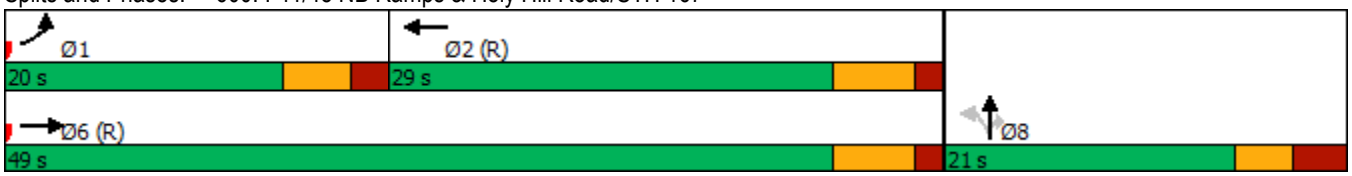
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	465	0	0	780	550	510	0	63	0	0	0
Future Volume (vph)	550	465	0	0	780	550	510	0	63	0	0	0
Ideal Flow (vphpl)	1900	1974	1900	1900	1953	1900	1900	1835	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	632	534	0	0	897	632	293	293	72	0	0	0
Turn Type	Prot	NA			NA	Free	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases						Free	8		8			
Detector Phase	1	6			2		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0		10.0	10.0	10.0			
Minimum Split (s)	13.5	20.9			20.9		15.9	15.9	15.9			
Total Split (s)	20.0	49.0			29.0		21.0	21.0	21.0			
Total Split (%)	28.6%	70.0%			41.4%		30.0%	30.0%	30.0%			
Maximum Green (s)	14.5	43.1			23.1		15.1	15.1	15.1			
Yellow Time (s)	3.5	4.3			4.3		3.0	3.0	3.0			
All-Red Time (s)	2.0	1.6			1.6		2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.5	5.9			5.9		5.9	5.9	5.9			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max		None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.92	0.25			0.97	0.40	0.85	0.89	0.22			
Control Delay	31.4	0.8			35.6	0.4	51.8	56.9	24.8			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	31.4	0.8			35.6	0.4	51.8	56.9	24.8			
Queue Length 50th (ft)	85	1			213	0	127	128	26			
Queue Length 95th (ft)	m#124	m4			m#381	m0	#246	#251	57			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	685	2158			926	1583	352	340	331			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.92	0.25			0.97	0.40	0.83	0.86	0.22			

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 36 (51%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	550	465	0	0	780	550	510	0	63	0	0	0
Future Volume (veh/h)	550	465	0	0	780	550	510	0	63	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1781	1851	0	0	1923	1870	1826	1763	1826			
Adj Flow Rate, veh/h	632	534	0	0	897	0	586	0	72			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	8	8	0	0	2	2	5	5	5			
Cap, veh/h	682	2226	0	0	975		690	0	307			
Arrive On Green	0.07	0.21	0.00	0.00	0.69	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	3291	3609	0	0	3326	1585	3478	0	1547			
Grp Volume(v), veh/h	632	534	0	0	897	0	586	0	72			
Grp Sat Flow(s),veh/h/ln	1646	1758	0	0	1403	1585	1739	0	1547			
Q Serve(g_s), s	13.4	8.9	0.0	0.0	18.9	0.0	11.4	0.0	2.7			
Cycle Q Clear(g_c), s	13.4	8.9	0.0	0.0	18.9	0.0	11.4	0.0	2.7			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	682	2226	0	0	975		690	0	307			
V/C Ratio(X)	0.93	0.24	0.00	0.00	0.92		0.85	0.00	0.23			
Avail Cap(c_a), veh/h	682	2226	0	0	975		750	0	334			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.40	0.40	0.00	0.00	0.43	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.1	13.7	0.0	0.0	9.9	0.0	27.0	0.0	23.6			
Incr Delay (d2), s/veh	9.3	0.1	0.0	0.0	7.6	0.0	8.6	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	9.3	5.6	0.0	0.0	5.4	0.0	9.1	0.0	1.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.3	13.8	0.0	0.0	17.4	0.0	35.6	0.0	24.0			
LnGrp LOS	D	B	A	A	B		D	A	C			
Approach Vol, veh/h		1166			897	A		658				
Approach Delay, s/veh		28.7			17.4			34.3				
Approach LOS		C			B			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	20.0	30.2				50.2		19.8				
Change Period (Y+Rc), s	5.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	14.5	* 23				* 43		15.1				
Max Q Clear Time (g_c+I1), s	15.4	20.9				10.9		13.4				
Green Ext Time (p_c), s	0.0	1.3				4.0		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

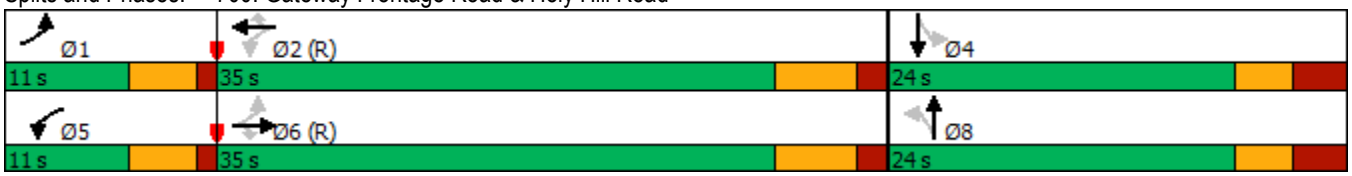
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	405	130	80	995	70	150	1	80	80	1	185
Future Volume (vph)	115	405	130	80	995	70	150	1	80	80	1	185
Ideal Flow (vphpl)	1900	1974	1900	1900	1974	1900	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	250		250	200		0	200		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		761			1713			336			523	
Travel Time (s)		11.5			26.0			7.6			11.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	62%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	494	98	98	1213	53	183	99	0	98	227	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6		6	2		2	8			4		
Detector Phase	1	6	6	5	2	2	8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9	20.9	10.5	20.9	20.9	15.9	15.9		15.9	15.9	
Total Split (s)	11.0	35.0	35.0	11.0	35.0	35.0	24.0	24.0		24.0	24.0	
Total Split (%)	15.7%	50.0%	50.0%	15.7%	50.0%	50.0%	34.3%	34.3%		34.3%	34.3%	
Maximum Green (s)	6.5	29.1	29.1	6.5	29.1	29.1	18.1	18.1		18.1	18.1	
Yellow Time (s)	3.5	4.3	4.3	3.5	4.3	4.3	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9	5.9	4.5	5.9	5.9	5.9	5.9		5.9	5.9	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.56	0.31	0.15	0.18	0.84	0.08	0.88	0.28		0.32	0.64	
Control Delay	18.4	15.9	15.8	4.6	17.9	8.0	66.3	23.3		24.3	32.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.4	15.9	15.8	4.6	17.9	8.0	66.3	23.3		24.3	32.6	
Queue Length 50th (ft)	38	90	33	13	104	8	88	34		34	86	
Queue Length 95th (ft)	72	114	60	m21	#136	m15	#184	64		65	137	
Internal Link Dist (ft)		681			1633			256			443	
Turn Bay Length (ft)	250		250	250		250	200			200		
Base Capacity (vph)	253	1569	675	545	1450	706	223	380		333	380	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.55	0.31	0.15	0.18	0.84	0.08	0.82	0.26		0.29	0.60	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 32 (46%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 700: Gateway Frontage Road & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	405	130	80	995	70	150	1	80	80	1	185
Future Volume (veh/h)	115	405	130	80	995	70	150	1	80	80	1	185
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1805	1737	1811	1882	1811	1870	1735	1735	1870	1735	1735
Adj Flow Rate, veh/h	140	494	98	98	1213	53	183	1	98	98	1	226
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	11	11	11	6	6	6	2	2	2	2	2	2
Cap, veh/h	318	1494	641	496	1355	658	222	4	377	369	2	379
Arrive On Green	0.03	0.14	0.14	0.15	0.86	0.86	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1654	3429	1472	1725	3161	1535	969	15	1457	1296	6	1464
Grp Volume(v), veh/h	140	494	98	98	1213	53	183	0	99	98	0	227
Grp Sat Flow(s),veh/h/ln	1654	1714	1472	1725	1581	1535	969	0	1472	1296	0	1471
Q Serve(g_s), s	3.2	9.1	4.1	2.1	16.5	0.4	8.6	0.0	3.7	4.6	0.0	9.5
Cycle Q Clear(g_c), s	3.2	9.1	4.1	2.1	16.5	0.4	18.1	0.0	3.7	8.3	0.0	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Lane Grp Cap(c), veh/h	318	1494	641	496	1355	658	222	0	381	369	0	380
V/C Ratio(X)	0.44	0.33	0.15	0.20	0.90	0.08	0.82	0.00	0.26	0.27	0.00	0.60
Avail Cap(c_a), veh/h	339	1494	641	531	1355	658	222	0	381	369	0	380
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	0.82	0.82	0.82	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	20.8	18.7	9.0	4.0	2.9	32.2	0.0	20.6	23.9	0.0	22.8
Incr Delay (d2), s/veh	0.9	0.6	0.5	0.2	8.0	0.2	21.5	0.0	0.4	0.4	0.0	2.5
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	1.9	6.6	2.4	1.1	5.0	0.2	7.8	0.0	2.3	2.5	0.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	21.4	19.2	9.2	12.0	3.1	53.6	0.0	21.0	24.3	0.0	25.3
LnGrp LOS	B	C	B	A	B	A	D	A	C	C	A	C
Approach Vol, veh/h		732			1364			282			325	
Approach Delay, s/veh		19.6			11.5			42.2			25.0	
Approach LOS		B			B			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.1	35.9		24.0	9.6	36.4		24.0
Change Period (Y+Rc), s	4.5	* 5.9		5.9	4.5	* 5.9		5.9
Max Green Setting (Gmax), s	6.5	* 29		18.1	6.5	* 29		18.1
Max Q Clear Time (g_c+I1), s	5.2	18.5		11.5	4.1	11.1		20.1
Green Ext Time (p_c), s	0.0	5.8		0.9	0.0	3.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

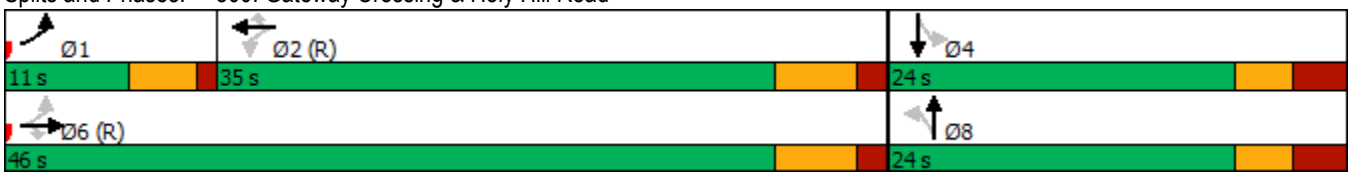
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	500	10	15	845	25	85	1	20	60	1	215
Future Volume (vph)	55	500	10	15	845	25	85	1	20	60	1	215
Ideal Flow (vphpl)	1900	1974	1900	1900	1974	1900	1900	1762	1762	1900	1762	1762
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	250		250	200		0	200		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1713			524			527			1026	
Travel Time (s)		26.0			7.9			14.4			28.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	62%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	588	7	18	994	18	100	25	0	71	254	0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6			2			8			4	
Permitted Phases	6		6	2		2	8			4		
Detector Phase	1	6	6	2	2	2	8	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	15.0	15.0	15.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	20.9	20.9	20.9	20.9	20.9	15.9	15.9		15.9	15.9	
Total Split (s)	11.0	46.0	46.0	35.0	35.0	35.0	24.0	24.0		24.0	24.0	
Total Split (%)	15.7%	65.7%	65.7%	50.0%	50.0%	50.0%	34.3%	34.3%		34.3%	34.3%	
Maximum Green (s)	6.5	40.1	40.1	29.1	29.1	29.1	18.1	18.1		18.1	18.1	
Yellow Time (s)	3.5	4.3	4.3	4.3	4.3	4.3	3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.6	1.6	1.6	1.6	1.6	2.9	2.9		2.9	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	5.9	5.9	5.9	5.9	5.9	5.9	5.9		5.9	5.9	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.22	0.31	0.01	0.05	0.55	0.02	0.47	0.07		0.24	0.80	
Control Delay	6.7	7.7	4.8	11.6	14.5	11.0	30.4	20.4		23.1	44.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.7	7.7	4.8	11.6	14.5	11.0	30.4	20.4		23.1	44.8	
Queue Length 50th (ft)	17	81	2	5	182	5	36	8		24	99	
Queue Length 95th (ft)	33	111	m4	m11	207	m11	74	24		52	#182	
Internal Link Dist (ft)		1633			444			447			946	
Turn Bay Length (ft)	250		250	250		250	200			200		
Base Capacity (vph)	299	1905	820	393	1804	776	237	382		334	355	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.22	0.31	0.01	0.05	0.55	0.02	0.42	0.07		0.21	0.72	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 1 (1%), Referenced to phase 2:WBTL and 6:EBTL, Start of 1st Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 800: Gateway Crossing & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	500	10	15	845	25	85	1	20	60	1	215
Future Volume (veh/h)	55	500	10	15	845	25	85	1	20	60	1	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1633	1697	1633	1826	1897	1826	1870	1735	1735	1767	1638	1638
Adj Flow Rate, veh/h	65	588	7	18	994	18	100	1	24	71	1	253
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	18	18	18	5	5	5	2	2	2	9	9	9
Cap, veh/h	314	1847	793	436	1611	692	207	15	367	425	1	358
Arrive On Green	0.02	0.19	0.19	0.45	0.45	0.45	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1555	3224	1384	803	3604	1547	1126	59	1420	1309	5	1384
Grp Volume(v), veh/h	65	588	7	18	994	18	100	0	25	71	0	254
Grp Sat Flow(s),veh/h/ln	1555	1612	1384	803	1802	1547	1126	0	1479	1309	0	1389
Q Serve(g_s), s	1.4	11.0	0.3	0.9	14.7	0.5	6.2	0.0	0.9	3.0	0.0	11.6
Cycle Q Clear(g_c), s	1.4	11.0	0.3	3.1	14.7	0.5	17.8	0.0	0.9	3.9	0.0	11.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		1.00
Lane Grp Cap(c), veh/h	314	1847	793	436	1611	692	207	0	382	425	0	359
V/C Ratio(X)	0.21	0.32	0.01	0.04	0.62	0.03	0.48	0.00	0.07	0.17	0.00	0.71
Avail Cap(c_a), veh/h	362	1847	793	436	1611	692	207	0	382	425	0	359
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.6	16.6	12.2	12.2	14.8	10.8	31.6	0.0	19.6	21.0	0.0	23.5
Incr Delay (d2), s/veh	0.3	0.4	0.0	0.2	1.8	0.1	1.7	0.0	0.1	0.2	0.0	6.2
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	0.7	7.5	0.1	0.3	9.1	0.3	3.1	0.0	0.6	1.7	0.0	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	17.0	12.3	12.4	16.6	10.9	33.4	0.0	19.6	21.2	0.0	29.8
LnGrp LOS	B	B	B	B	B	B	C	A	B	C	A	C
Approach Vol, veh/h		660			1030			125			325	
Approach Delay, s/veh		16.4			16.4			30.6			27.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	8.8	37.2		24.0		46.0		24.0
Change Period (Y+Rc), s	4.5	* 5.9		5.9		* 5.9		5.9
Max Green Setting (Gmax), s	6.5	* 29		18.1		* 40		18.1
Max Q Clear Time (g_c+I1), s	3.4	16.7		13.6		13.0		19.8
Green Ext Time (p_c), s	0.0	5.2		0.8		3.9		0.0

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	530	15	1	755	5	60	0	15	25	0	70
Future Volume (vph)	35	530	15	1	755	5	60	0	15	25	0	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	200		250	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		45			30			25			25	
Link Distance (ft)		1158			622			720			612	
Travel Time (s)		17.5			14.1			19.6			16.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	18%	18%	18%	5%	5%	5%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	624	18	1	894	0	0	89	0	0	111	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	530	15	1	755	5	60	0	15	25	0	70
Future Vol, veh/h	35	530	15	1	755	5	60	0	15	25	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	200	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	18	18	18	5	5	5	2	2	2	2	2	2
Mvmt Flow	41	624	18	1	888	6	71	0	18	29	0	82

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	894	0	0	642	0	0	1152	1602	312	1287	1617	447
Stage 1	-	-	-	-	-	-	706	706	-	893	893	-
Stage 2	-	-	-	-	-	-	446	896	-	394	724	-
Critical Hdwy	4.46	-	-	4.2	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.38	-	-	2.25	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	971	-	-	918	-	-	*333	153	684	247	150	*802
Stage 1	-	-	-	-	-	-	*393	437	-	615	569	-
Stage 2	-	-	-	-	-	-	*756	567	-	602	429	-
Platoon blocked, %	1	-	-		-	-	1	1		1	1	1
Mov Cap-1 Maneuver	971	-	-	918	-	-	*289	147	684	232	143	*802
Mov Cap-2 Maneuver	-	-	-	-	-	-	*327	279	-	368	280	-
Stage 1	-	-	-	-	-	-	*376	419	-	590	568	-
Stage 2	-	-	-	-	-	-	*678	566	-	562	411	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	18	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	365	971	-	-	918	-	-	612
HCM Lane V/C Ratio	0.242	0.042	-	-	0.001	-	-	0.183
HCM Control Delay (s)	18	8.9	-	-	8.9	-	-	12.2
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-	-	0.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

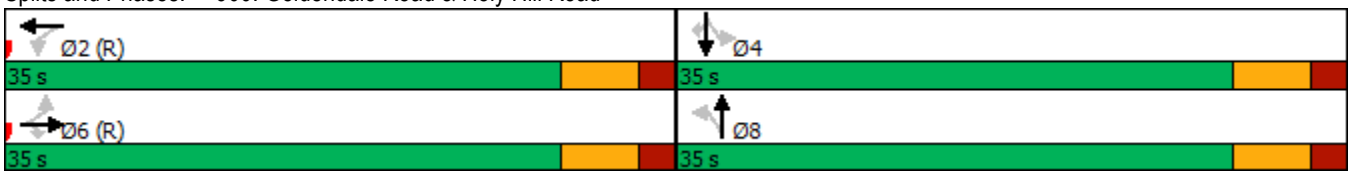
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	255	160	15	250	15	295	100	15	30	45	215
Future Volume (vph)	155	255	160	15	250	15	295	100	15	30	45	215
Ideal Flow (vphpl)	1900	1953	1900	1900	1914	1914	1900	1914	1914	1900	2041	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	250		0	250		0	250		250
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		622			1139			840			756	
Travel Time (s)		9.4			17.3			10.4			9.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Growth Factor	100%	100%	62%	100%	100%	100%	100%	100%	100%	100%	100%	62%
Heavy Vehicles (%)	11%	11%	11%	6%	6%	6%	3%	3%	3%	15%	15%	15%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	315	122	19	328	0	364	142	0	37	56	165
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			8			4	
Permitted Phases	6		6	2			8			4		4
Detector Phase	6	6	6	2	2		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	21.0		16.0	16.0		16.0	16.0	16.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	29.0	29.0	29.0	29.0	29.0		29.0	29.0		29.0	29.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.43	0.37	0.17	0.04	0.37		0.81	0.23		0.10	0.09	0.35
Control Delay	11.1	8.1	6.4	12.1	14.2		35.4	16.1		14.3	14.1	18.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	11.1	8.1	6.4	12.1	14.2		35.4	16.1		14.3	14.1	18.2
Queue Length 50th (ft)	17	28	11	4	86		137	42		11	16	51
Queue Length 95th (ft)	108	136	27	15	142		181	64		23	30	76
Internal Link Dist (ft)		542			1059			760			676	
Turn Bay Length (ft)	250			250			250			250		250
Base Capacity (vph)	446	863	714	477	878		550	754		455	735	581
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.43	0.37	0.17	0.04	0.37		0.66	0.19		0.08	0.08	0.28

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 45 (64%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 900: Goldendale Road & Holy Hill Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	255	160	15	250	15	295	100	15	30	45	215
Future Volume (veh/h)	155	255	160	15	250	15	295	100	15	30	45	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1785	1737	1811	1824	1824	1856	1869	1869	1678	1802	1678
Adj Flow Rate, veh/h	191	315	122	19	309	19	364	123	19	37	56	165
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	11	11	11	6	6	6	3	3	3	15	15	15
Cap, veh/h	439	828	682	424	788	48	500	577	89	451	658	519
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	977	1785	1472	922	1701	105	1151	1581	244	1118	1802	1422
Grp Volume(v), veh/h	191	315	122	19	0	328	364	0	142	37	56	165
Grp Sat Flow(s),veh/h/ln	977	1785	1472	922	0	1806	1151	0	1825	1118	1802	1422
Q Serve(g_s), s	11.2	8.0	3.4	1.0	0.0	8.3	21.2	0.0	3.7	1.6	1.4	5.8
Cycle Q Clear(g_c), s	19.5	8.0	3.4	9.0	0.0	8.3	22.6	0.0	3.7	5.4	1.4	5.8
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	439	828	682	424	0	837	500	0	666	451	658	519
V/C Ratio(X)	0.43	0.38	0.18	0.04	0.00	0.39	0.73	0.00	0.21	0.08	0.09	0.32
Avail Cap(c_a), veh/h	439	828	682	424	0	837	556	0	756	506	747	589
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	12.2	11.0	15.2	0.0	12.3	22.0	0.0	15.3	17.2	14.6	16.0
Incr Delay (d2), s/veh	3.1	1.3	0.6	0.2	0.0	1.4	4.3	0.0	0.2	0.1	0.1	0.3
Initial Q Delay(d3),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
%ile BackOfQ(95%),veh/ln	4.6	5.3	1.8	0.4	0.0	5.5	9.0	0.0	2.4	0.7	0.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	13.6	11.6	15.4	0.0	13.7	26.3	0.0	15.5	17.2	14.6	16.3
LnGrp LOS	C	B	B	B	A	B	C	A	B	B	B	B
Approach Vol, veh/h		628			347			506			258	
Approach Delay, s/veh		15.7			13.8			23.2			16.1	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	38.4	31.6	38.4	31.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	29.0	29.0	29.0	29.0
Max Q Clear Time (g_c+I1), s	11.0	7.8	21.5	24.6
Green Ext Time (p_c), s	1.7	0.8	1.9	0.9

Intersection Summary	
HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

HCS7 Roundabouts Report

General Information

Analyst	TADI - TSC
Agency or Co.	
Date Performed	1/12/2021
Analysis Year	2040
Time Analyzed	Build PM Peak Hour w/Mods
Project Description	2521 STH 167-Holy Hill Road Study

Site Information

Intersection	STH 167 & STH 175
E/W Street Name	STH 167
N/S Street Name	STH 175
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.94
Jurisdiction	Richfield

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	1	1	0	1	1	0
Lane Assignment	LT		TR		LT		TR		LT		R		L		TR	
Volume (V), veh/h	0	50	425	45	0	190	760	205	0	90	200	135	0	145	120	70
Percent Heavy Vehicles, %	9	9	9	9	3	3	3	3	3	3	3	3	9	9	9	9
Flow Rate (v_{PCE}), pc/h	0	58	493	52	0	208	833	225	0	99	219	148	0	168	139	81
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	283.41	319.59		595.02	670.98		318.00	148.00		168.00	220.00	
Entry Volume veh/h	260.01	293.20		577.69	651.44		308.74	143.69		154.13	201.83	
Circulating Flow (v_c), pc/h	515			376			719			1140		
Exiting Flow (v_{ex}), pc/h	809			1013			502			399		
Capacity (c_{pce}), pc/h	886.36	886.36		979.96	979.96		764.94	764.94		564.38	564.38	
Capacity (c), veh/h	813.18	813.18		951.42	951.42		742.66	742.66		517.78	517.78	
v/c Ratio (x)	0.32	0.36		0.61	0.68		0.42	0.19		0.30	0.39	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	8.1	8.7		12.5	15.0		10.3	7.0		11.4	13.3	
Lane LOS	A	A		B	B		B	A		B	B	
95% Queue, veh	1.4	1.6		4.3	5.7		2.1	0.7		1.2	1.8	
Approach Delay, s/veh	8.4			13.8			9.3			12.4		
Approach LOS	A			B			A			B		
Intersection Delay, s/veh | LOS	11.7						B					

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APPENDIX I
Traffic Signal Warrant Analysis

Year 2040 Build
Holy Hill Road & Gateway Frontage Road

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Holy Hill Road & Gateway Frontage Road
County: Washington
Village: Germantown

Major Street: Holy Hill Road
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: Gateway Frontage Road
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 0%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2040 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**Yes**
Condition A: Minimum Vehicular Volume	Yes
Condition B: Interruption of Continuous Traffic	Yes
Condition C: Combination: 80% of A and B	Yes
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	105	84
Number of Hours	8	9

Satisfied? Yes

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	53	42
Number of Hours	10	10

Satisfied? Yes

Condition C: Combination of A & B at 56%

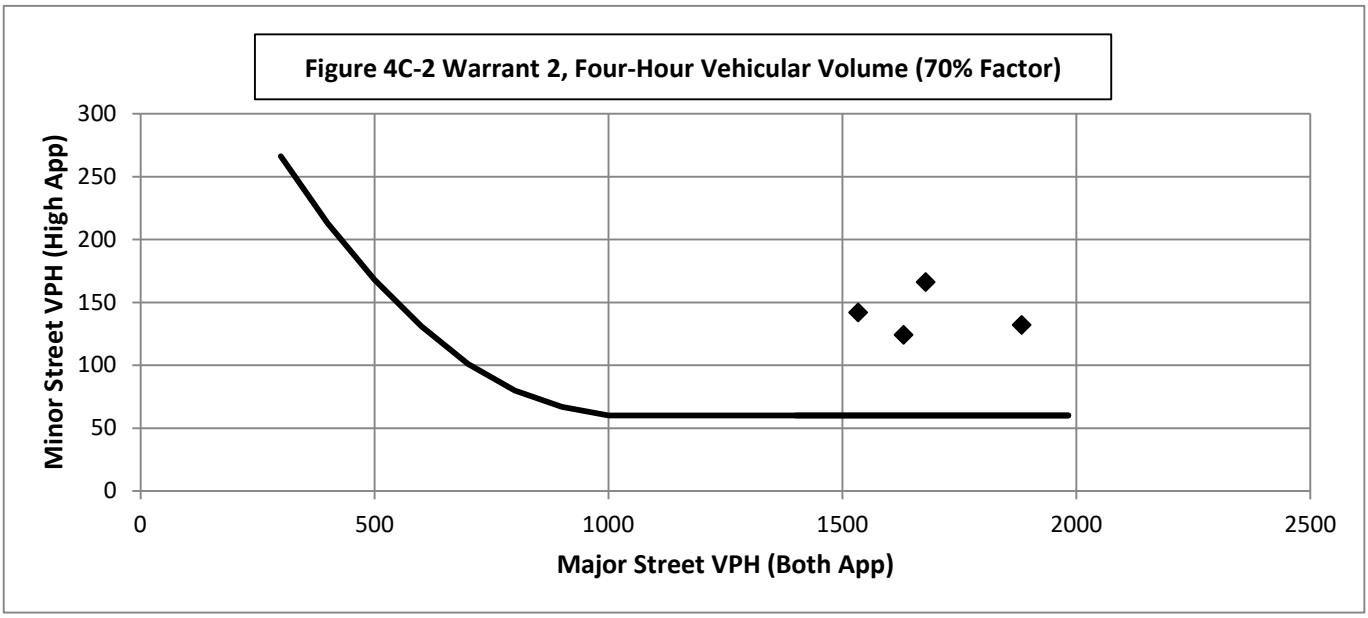
Satisfied? Yes

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	1261	14	1275
2	7:00	8:00	1770	37	1807
3	8:00	9:00	1373	74	1447
4	9:00	10:00	1206	100	1306
5	10:00	11:00	1209	110	1319
6	11:00	12:00	1386	140	1526
7	12:00	13:00	1678	166	1844
8	13:00	14:00	1460	149	1609
9	14:00	15:00	1512	139	1651
10	15:00	16:00	1883	132	2015
11	16:00	17:00	1631	124	1755
12	17:00	18:00	1534	142	1676
13	18:00	19:00	23	0	23
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	15:00	12:00	16:00	17:00
Major Road Vol.	1883	1678	1631	1534
Minor Road Vol.	132	166	124	142



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

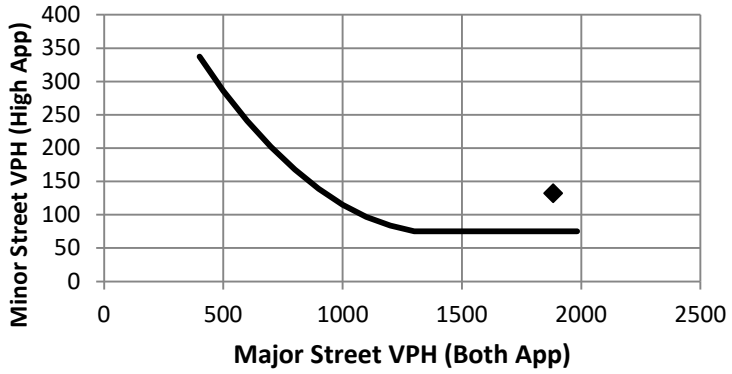
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
15:00	1883	132

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

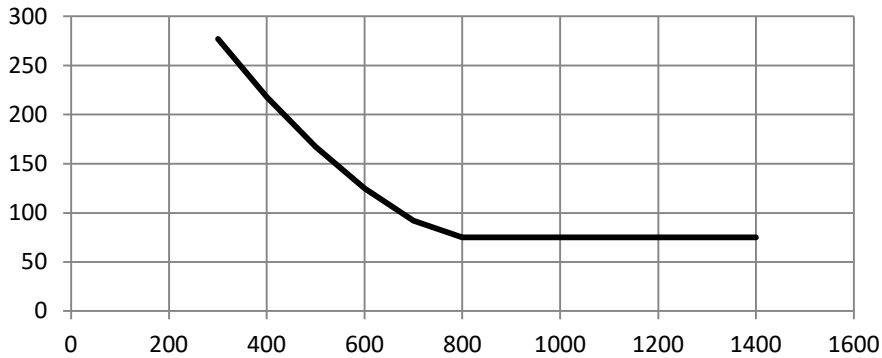
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

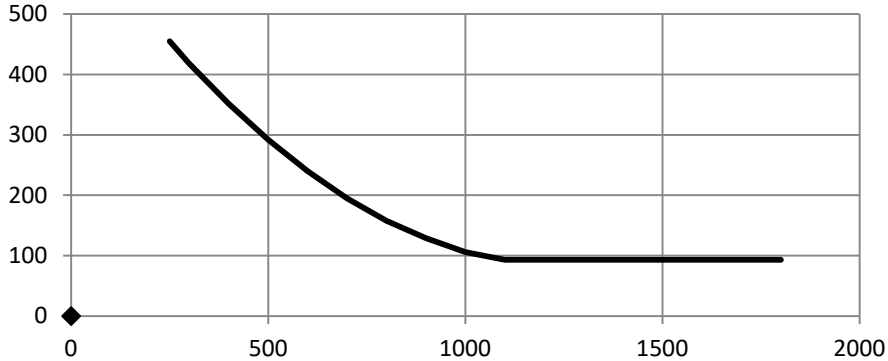


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		Yes	Yes
	Warrant 1, Condition B (80%)		Yes	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

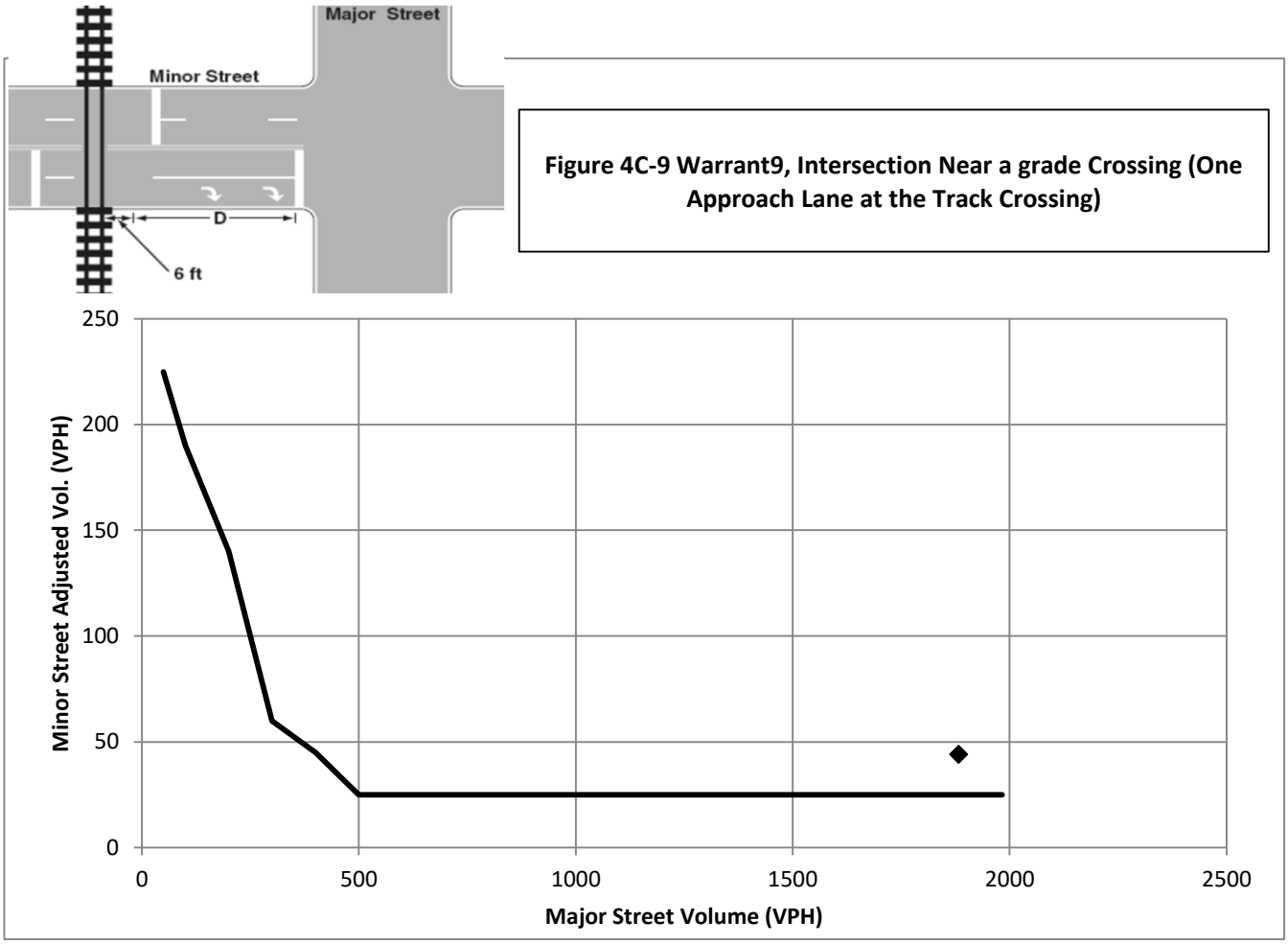
	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			2015	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	15:00	1883	132	44.22



Conclusions/Comments:

Assumes 2040 modifications of 4-lane divided cross-section on Holy Hill Road and at least 2 lanes on the NB and SB approaches. For stop control, assume LT/TH Lane and RT Lane (1 lane approach and 0% RT volumes).

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	31	0	14	0	45	56	235	41	0	332	7	0	14	0	21	24	791	114	0	929	1327
	7:00	65	0	21	0	86	79	382	82	0	543	19	1	36	0	56	88	966	173	0	1227	1912
	8:00	68	0	30	0	98	61	363	72	0	496	40	0	74	0	114	122	618	136	1	877	1585
	9:00	79	1	42	0	122	43	421	61	0	525	56	0	100	0	156	114	467	100	0	681	1484
MD	10:00	95	0	49	0	144	44	431	66	0	541	62	2	108	0	172	122	442	104	0	668	1525
	11:00	144	0	73	0	217	63	507	73	0	643	80	1	139	0	220	152	452	139	0	743	1823
	12:00	163	0	91	0	254	83	621	83	0	787	94	0	166	0	260	159	551	181	0	891	2192
	13:00	112	0	51	0	163	58	497	78	0	633	69	0	149	0	218	137	560	129	1	827	1841
PM	14:00	119	0	50	0	169	53	643	65	0	761	71	0	139	0	210	119	514	118	0	751	1891
	15:00	166	0	62	0	228	62	995	58	0	1115	79	1	131	0	211	112	537	119	0	768	2322
	16:00	166	0	67	0	233	56	873	55	0	984	68	0	124	0	192	114	432	101	0	647	2056
	17:00	191	1	86	0	278	46	907	47	0	1000	90	0	142	0	232	111	328	95	0	534	2044
	18:00	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	0	8	0	0	8	23
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		1399	2	636	0	2037	704	6890	781	0	8375	735	5	1322	0	2062	1374	6666	1509	2	9551	22025

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach?

% Right Turns Included (Default 0%)

From North (SB)	0%
From East (WB)	100%
From South (NB)	0%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
80	1026	155	1181	1261
167	1348	255	1603	1770
183	981	209	1190	1373
157	888	161	1049	1206
166	873	170	1043	1209
215	959	212	1171	1386
242	1172	264	1436	1678
195	1057	208	1265	1460
172	1157	183	1340	1512
174	1532	177	1709	1883
170	1305	156	1461	1631
157	1235	142	1377	1534
0	23	0	23	23
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2078	13556	2292	15848	17926

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	14	14	14
0	1	36	37	37
0	0	74	74	74
0	0	100	100	100
0	2	108	110	110
0	1	139	140	140
0	0	166	166	166
0	0	149	149	149
0	0	139	139	139
0	1	131	132	132
0	0	124	124	124
0	0	142	142	142
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	5	1322	1327	1327

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Gateway Frontage Rd & Holy Hill Road

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	10	0	5	0	11	83	0	0	0	0	2	0	2	213	8	0	334
7-8am	27	0	3	0	6	130	2	0	1	1	2	0	3	206	18	0	399
8-9am	10	0	2	0	5	93	2	0	1	0	2	0	3	129	10	1	257
9-10am	9	1	4	0	3	100	4	0	3	0	6	0	9	96	11	0	246
10-11am	10	0	5	0	1	78	3	0	2	2	5	0	6	78	11	0	201
11am-12pm	17	0	11	0	13	96	3	0	4	1	5	0	8	105	15	0	278
12-1pm	13	0	16	0	17	107	1	0	1	0	3	0	2	84	17	0	261
1-2pm	10	0	8	0	2	111	2	0	3	0	2	0	4	127	9	1	278
2-3pm	17	0	3	0	4	178	0	0	1	0	4	0	4	113	16	0	340
3-4pm	41	0	3	0	20	230	1	0	2	1	2	0	8	119	21	0	448
4-5pm	33	0	8	0	19	258	1	0	2	0	7	0	4	149	26	0	507
5-6pm	26	1	8	0	14	190	0	0	1	0	5	0	2	123	25	0	395
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes

Midday counts at 48th taken during construction/detours in area, resulting in lower than normal counts on Holy Hill Road. Therefore, EB & SB Through Volumes calculated from IH-41/45 NB Ramp count.

Midday count was from 9A-3P.

Year 2040 Background Traffic

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	10	0	5	0	11	101	0	0	0	0	2	0	2	248	8	0	387
7-8am	27	0	3	0	6	159	2	0	1	1	2	0	3	240	18	0	462
8-9am	10	0	2	0	5	113	2	0	1	0	2	0	3	150	10	1	298
9-10am	9	1	4	0	3	122	4	0	3	0	6	0	9	112	11	0	284
10-11am	10	0	5	0	1	95	3	0	2	2	5	0	6	91	11	0	231
11am-12pm	17	0	11	0	13	117	3	0	4	1	5	0	8	122	15	0	316
12-1pm	13	0	16	0	17	131	1	0	1	0	3	0	2	98	17	0	299
1-2pm	10	0	8	0	2	135	2	0	3	0	2	0	4	148	9	1	323
2-3pm	17	0	3	0	4	217	0	0	1	0	4	0	4	132	16	0	398
3-4pm	41	0	3	0	20	281	1	0	2	1	2	0	8	139	21	0	519
4-5pm	33	0	8	0	19	315	1	0	2	0	7	0	4	174	26	0	589
5-6pm	26	1	8	0	14	232	0	0	1	0	5	0	2	143	25	0	457
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Growth Rates	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	
PM Growth Rates	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	

Notes

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8
7-8am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
11am-12pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
12-1pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
2-3pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
3-4pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
4-5pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
5-6pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IN %						8%											IN %
OUT %														8%			OUT %

IN	OUT
55	52
66	66
75	73
63	64
61	61
65	63
73	73
68	66
70	70
73	72
73	73
77	76
0	0
0	0

AADT IN	AADT OUT	
1165	1165	
0%	0%	<- % Reduction, Sensitivity Test
1165	1165	
% AADT IN	% AADT OUT	Notes
4.7%	4.5%	Existing Kwik Trip daily traffic estimated
5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
6.4%	6.3%	
5.4%	5.5%	Distribution based on 2020 counts
5.2%	5.2%	collected at Kwik Trip driveways:
5.6%	5.4%	25% to/from west on 167 (770)
6.3%	6.3%	75% to/from east on 167 (2330)
5.8%	5.7%	
6.0%	6.0%	Distribution to/from I/S same as
6.3%	6.2%	evaluated for KT assignment in TIA.
6.3%	6.3%	
6.6%	6.5%	Hourly Distributions: ITE LU#960

By: TSC
Date: 1/13/2021

Exxon (-)

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Exxon traffic was approximately 23%
7-8am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Therefore, subtract 23% of hourly
9-10am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			traffic from Kwik Trip (+) table.
10-11am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
11am-12pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
12-1pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
1-2pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
2-3pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
3-4pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
4-5pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
5-6pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Gateway (+)

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				175	175	
																				0%	0%	<- % Reduction, Sensitivity Test
																				175	175	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	5	0	0	0	0	0	0	0	0	29	0	34	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	0	0	0	0	0	6	0	0	0	0	0	0	0	0	24	0	30	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	0	0	0	0	0	5	0	0	0	0	0	0	0	0	10	0	15	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	0	6	0	11	6	5	3.6%	2.9%	
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	0	6	0	11	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	8	0	0	0	0	0	0	0	0	11	0	19	11	8	6.2%	4.7%	
12-1pm	0	0	0	0	0	11	0	0	0	0	0	0	0	0	16	0	27	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	0	0	0	0	0	12	0	0	0	0	0	0	0	0	12	0	24	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	0	0	0	0	0	12	0	0	0	0	0	0	0	0	9	0	21	9	12	5.1%	6.9%	
3-4pm	0	0	0	0	0	36	0	0	0	0	0	0	0	0	17	0	53	17	36	9.7%	20.7%	
4-5pm	0	0	0	0	0	20	0	0	0	0	0	0	0	0	6	0	26	6	20	3.6%	11.6%	
5-6pm	0	0	0	0	0	17	0	0	0	0	0	0	0	0	5	0	22	5	17	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %															100%		IN %					
OUT %						100%											OUT %					

2040 West Development (LU #110 & #130) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				2835	2835	
																				0%	0%	<- % Reduction, Sensitivity Test
																				2835	2835	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	15	0	0	0	0	0	0	0	2	0	0	17	301	34	10.6%	1.2%	Area A (820) New
7-8am	0	0	0	0	0	25	0	0	0	0	0	0	0	4	0	0	29	490	77	17.3%	2.7%	Area C (2775) New
8-9am	0	0	0	0	0	15	0	0	0	0	0	0	0	6	0	0	21	295	119	10.4%	4.2%	Area D (2325) New
9-10am	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	20	190	193	6.7%	6.8%	
10-11am	0	0	0	0	0	10	0	0	0	0	0	0	0	11	0	0	21	207	224	7.3%	7.9%	Less 5% Linked Trips for Areas C & D
11am-12pm	0	0	0	0	0	10	0	0	0	0	0	0	0	12	0	0	22	193	238	6.8%	8.4%	Area C (-140) linked
12-1pm	0	0	0	0	0	13	0	0	0	0	0	0	0	15	0	0	28	266	301	9.4%	10.6%	Area D (-115) linked
1-2pm	0	0	0	0	0	12	0	0	0	0	0	0	0	9	0	0	21	230	184	8.1%	6.5%	
2-3pm	0	0	0	0	0	10	0	0	0	0	0	0	0	13	0	0	23	201	264	7.1%	9.3%	
3-4pm	0	0	0	0	0	8	0	0	0	0	0	0	0	18	0	0	26	164	363	5.8%	12.8%	Hourly Distributions: ITE LU#110
4-5pm	0	0	0	0	0	5	0	0	0	0	0	0	0	14	0	0	19	96	286	3.4%	10.1%	
5-6pm	0	0	0	0	0	2	0	0	0	0	0	0	0	22	0	0	24	31	431	1.1%	15.2%	Directional Distribution: "West Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2040 West Development (LU #210) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		245	245			
																		0%	0%			<- % Reduction, Sensitivity Test
																		245	245			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	14	1.6%	5.9%	490 new trips
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	25	3.2%	10.2%	
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	9	21	3.7%	8.6%	
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	13	3.2%	5.4%	Hourly Distributions: ITE LU#210
10-11am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	10	13	4.2%	5.4%	
11am-12pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	13	12	5.4%	5.1%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	13	14	5.5%	5.6%	from TIA
1-2pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	15	14	6.0%	5.9%	
2-3pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	17	15	7.0%	6.2%	
3-4pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	21	15	8.5%	6.0%	
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	26	18	10.5%	7.5%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	25	18	10.3%	7.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

2040 West Development (LU #220) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		285	285			
																		0%	0%			<- % Reduction, Sensitivity Test
																		285	285			
6-7am	0	0		0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	17	1.1%	5.8%	565 new trips
7-8am	0	0		0	0	0	0	0	0	0	0	0	0	2	0	0	2	7	37	2.6%	12.9%	
8-9am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	26	4.0%	9.1%	
9-10am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	21	3.9%	7.2%	Hourly Distributions: ITE LU#220
10-11am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	13	3.9%	4.7%	
11am-12pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	16	4.9%	5.5%	Directional Distribution: "West Dist"
12-1pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	16	15	5.6%	5.4%	from TIA
1-2pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	14	4.8%	4.9%	
2-3pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	17	17	5.9%	6.0%	
3-4pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	24	15	8.3%	5.2%	
4-5pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	29	15	10.0%	5.1%	
5-6pm	0	0		0	0	2	0	0	0	0	0	0	0	1	0	0	3	32	19	11.4%	6.7%	
6-7pm	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

2040 West Development (LU #154) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		915	915			
																		0%	0%			<- % Reduction, Sensitivity Test
																		915	915			
6-7am	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	6	93	19	10.2%	2.1%	
7-8am	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4	67	21	7.3%	2.3%	Area C (1125) New
8-9am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	47	26	5.1%	2.8%	Area D (800) New
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	6	108	24	11.8%	2.6%	
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	5	87	27	9.5%	2.9%	Less 5% Linked Trips for Areas C & D
11am-12pm	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4	35	34	3.8%	3.7%	Area C (-55) linked
12-1pm	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	5	47	63	5.1%	6.9%	Area D (-40) linked
1-2pm	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	54	54	5.9%	5.9%	
2-3pm	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5	55	39	6.0%	4.3%	
3-4pm	0	0	0	0	0	2	0	0	0	0	0	0	0	5	0	0	7	48	92	5.3%	10.0%	Hourly Distributions: ITE LU#154
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	4	28	58	3.1%	6.3%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	5	20	71	2.2%	7.8%	Directional Distribution: "West Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2040 West Development (LU #960 - Kwik Trip Growth to 2040) - Diverted Linked Trips

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				910	910	
																				0%	0%	<- % Reduction, Sensitivity Test
																				910	910	
																				% AADT IN	% AADT OUT	
6-7am	2	0	-2	0	0	4	0	0	-2	0	2	0	0	8	0	0	12	43	41	4.7%	4.5%	5530 daily trips at 100% in 2040
7-8am	3	0	-3	0	0	5	0	0	-3	0	3	0	0	10	0	0	15	52	52	5.7%	5.7%	-3100 existing daily trips
8-9am	3	0	-3	0	0	6	0	0	-3	0	3	0	0	11	0	0	17	58	57	6.4%	6.3%	
9-10am	2	0	-2	0	0	5	0	0	-2	0	2	0	0	10	0	0	15	49	50	5.4%	5.5%	=2430 new KT trips in 2025 Build.
10-11am	2	0	-2	0	0	5	0	0	-2	0	2	0	0	9	0	0	14	47	47	5.2%	5.2%	
11am-12pm	3	0	-3	0	0	5	0	0	-3	0	3	0	0	10	0	0	15	51	49	5.6%	5.4%	75% (1820) are diverted linked trips
12-1pm	3	0	-3	0	0	6	0	0	-3	0	3	0	0	11	0	0	17	57	57	6.3%	6.3%	25% (610) are pas-by trips
1-2pm	3	0	-3	0	0	5	0	0	-3	0	3	0	0	10	0	0	15	53	52	5.8%	5.7%	PB trips do not pass through
2-3pm	3	0	-3	0	0	6	0	0	-3	0	3	0	0	11	0	0	17	55	55	6.0%	6.0%	intersection.
3-4pm	3	0	-3	0	0	6	0	0	-3	0	3	0	0	11	0	0	17	57	56	6.3%	6.2%	
4-5pm	3	0	-3	0	0	6	0	0	-3	0	3	0	0	11	0	0	17	57	57	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	3	0	-3	0	0	6	0	0	-3	0	3	0	0	12	0	0	18	60	59	6.6%	6.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %	5%		-5%			10%			-5%		5%						IN %					
OUT %														20%			OUT %					

2040 East Development (LU #130) - New Trips

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				4670	4670	
																				0%	0%	<- % Reduction, Sensitivity Test
																				4670	4670	
																				% AADT IN	% AADT OUT	
6-7am	5	0	2	0	15	37	0	0	0	0	0	0	0	327	45	0	431	495	56	10.6%	1.2%	Area F (1145) New (12%)
7-8am	11	0	4	0	24	83	0	0	0	0	0	0	0	533	73	0	728	808	126	17.3%	2.7%	Area H (135)
8-9am	18	0	6	0	15	129	0	0	0	0	0	0	0	321	44	0	533	486	196	10.4%	4.2%	Area H (2515)
9-10am	29	0	10	0	9	210	0	0	0	0	0	0	0	207	28	0	493	313	318	6.7%	6.8%	Area I (1545)
10-11am	33	0	11	0	10	244	0	0	0	0	0	0	0	225	31	0	554	341	369	7.3%	7.9%	Area K (1615)
11am-12pm	35	0	12	0	10	259	0	0	0	0	0	0	0	210	29	0	555	318	392	6.8%	8.4%	Area P (1535)
12-1pm	45	0	15	0	13	327	0	0	0	0	0	0	0	290	40	0	730	439	495	9.4%	10.6%	Area Q (845)
1-2pm	27	0	9	0	11	201	0	0	0	0	0	0	0	249	34	0	531	378	304	8.1%	6.5%	
2-3pm	39	0	13	0	10	286	0	0	0	0	0	0	0	219	30	0	597	332	434	7.1%	9.3%	
3-4pm	54	0	18	0	8	395	0	0	0	0	0	0	0	179	24	0	678	271	598	5.8%	12.8%	Hourly Distributions: ITE LU#110
4-5pm	42	0	14	0	5	312	0	0	0	0	0	0	0	105	14	0	492	159	472	3.4%	10.1%	
5-6pm	64	0	21	0	2	469	0	0	0	0	0	0	0	34	5	0	595	51	710	1.1%	15.2%	Directional Distribution: "East Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					3%									66%	9%		IN %	9				
OUT %	9%		3%			66%											OUT %	3				

2040 East Development (LU #154) - New Trips

	↓ Gateway Frontage Rd				← Holy Hill Road				↑ Gateway Frontage Rd				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				1005	1005	
																				0%	0%	<- % Reduction, Sensitivity Test
																				1005	1005	
																				% AADT IN	% AADT OUT	
6-7am	2	0	1	0	3	14	0	0	0	0	0	0	0	70	8	0	98	103	21	10.2%	2.1%	Area F (205) New (10%)
7-8am	2	0	1	0	2	16	0	0	0	0	0	0	0	49	5	0	75	73	23	7.3%	2.3%	Area H (930)
8-9am	2	0	1	0	1	19	0	0	0	0	0	0	0	34	4	0	61	51	28	5.1%	2.8%	Area K (395)
9-10am	2	0	1	0	3	18	0	0	0	0	0	0	0	80	9	0	113	119	26	11.8%	2.6%	Area P (360)
10-11am	2	0	1	0	2	20	0	0	0	0	0	0	0	64	7	0	96	95	29	9.5%	2.9%	Area Q (115)
11am-12pm	3	0	1	0	1	25	0	0	0	0	0	0	0	26	3	0	59	38	37	3.8%	3.7%	
12-1pm	5	0	2	0	1	47	0	0	0	0	0	0	0	34	4	0	93	51	69	5.1%	6.9%	
1-2pm	4	0	1	0	1	40	0	0	0	0	0	0	0	40	4	0	90	59	59	5.9%	5.9%	
2-3pm	3	0	1	0	2	29	0	0	0	0	0	0	0	41	5	0	81	60	43	6.0%	4.3%	
3-4pm	8	0	3	0	1	68	0	0	0	0	0	0	0	36	4	0	120	53	101	5.3%	10.0%	Hourly Distributions: ITE LU#154
4-5pm	5	0	2	0	1	43	0	0	0	0	0	0	0	21	2	0	74	31	63	3.1%	6.3%	
5-6pm	6	0	2	0	1	53	0	0	0	0	0	0	0	15	2	0	79	22	78	2.2%	7.8%	Directional Distribution: "East Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					2.5%									67.5%	7.5%		IN %	7.5				
OUT %	7.5%		2.5%			67.5%											OUT %	2.5				

By: TSC
Date: 1/13/2021

2040 East Development (LU #934) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		905	905			
																		0%	0%			<- % Reduction, Sensitivity Test
																		905	905			
6-7am	8	0	3	0	3	0	3	0	2	0	6	0	8	0	8	0	41	21	17	2.3%	1.9%	Area G (1415) New (50%)
7-8am	11	0	4	0	4	0	4	0	3	0	10	0	11	0	11	0	58	29	26	3.2%	2.9%	Area O (1415) (50%)
8-9am	12	0	4	0	4	0	4	0	4	0	11	0	12	0	12	0	63	31	30	3.4%	3.3%	Less Internally Linked Trips
9-10am	11	0	4	0	4	0	4	0	4	0	11	0	11	0	11	0	60	30	29	3.3%	3.2%	Area G 5% (-70)
10-11am	14	0	5	0	5	0	5	0	4	0	12	0	14	0	14	0	73	36	33	4.0%	3.7%	Area O 5% (-70)
11am-12pm	31	0	10	0	10	0	10	0	9	0	26	0	31	0	31	0	158	82	69	9.1%	7.6%	Less Externally Linked Trips
12-1pm	40	0	13	0	13	0	13	0	13	0	40	0	40	0	40	0	212	106	107	11.7%	11.8%	Area G 15% (-210)
1-2pm	27	0	9	0	9	0	9	0	10	0	30	0	27	0	27	0	148	71	79	7.9%	8.7%	Area O 15% (-210)
2-3pm	20	0	7	0	7	0	7	0	7	0	22	0	20	0	20	0	110	52	58	5.8%	6.4%	Less Pass-by Trips
3-4pm	19	0	6	0	6	0	6	0	6	0	19	0	19	0	19	0	100	51	51	5.6%	5.6%	Area G 20% (-230)
4-5pm	20	0	7	0	7	0	7	0	6	0	18	0	20	0	20	0	105	52	49	5.7%	5.4%	Area O 20% (-230)
5-6pm	23	0	8	0	8	0	8	0	7	0	22	0	23	0	23	0	122	62	58	6.8%	6.4%	Hourly Distributions: ITE LU#934
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %	37.5%		12.5%		12.5%		12.5%						37.5%		37.5%		IN %	37.5				
OUT %									12.5%		37.5%						OUT %	12.5				

2040 East Development (LU #932) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		290	290			
																		0%	0%			<- % Reduction, Sensitivity Test
																		290	290			
6-7am	2	0	1	0	1	0	1	0	0	0	1	0	2	0	2	0	10	5	3	1.7%	0.9%	Area G (450) New (50%)
7-8am	3	0	1	0	1	0	1	0	1	0	2	0	3	0	3	0	15	7	5	2.5%	1.7%	Area O (450) (50%)
8-9am	4	0	1	0	1	0	1	0	1	0	3	0	4	0	4	0	19	10	8	3.4%	2.9%	Less Internally Linked Trips
9-10am	4	0	1	0	1	0	1	0	1	0	4	0	4	0	4	0	20	11	10	3.8%	3.3%	Area G 5% (-20)
10-11am	6	0	2	0	2	0	2	0	2	0	5	0	6	0	6	0	31	15	12	5.2%	4.2%	Area O 5% (-20)
11am-12pm	13	0	4	0	4	0	4	0	2	0	7	0	13	0	13	0	60	35	19	11.9%	6.7%	Less Externally Linked Trips
12-1pm	13	0	4	0	4	0	4	0	4	0	13	0	13	0	13	0	68	35	35	12.0%	11.9%	Area G 15% (-70)
1-2pm	6	0	2	0	2	0	2	0	4	0	12	0	6	0	6	0	40	17	31	5.9%	10.8%	Area O 15% (-70)
2-3pm	4	0	1	0	1	0	1	0	2	0	5	0	4	0	4	0	22	11	14	3.9%	4.8%	Less Pass-by Trips
3-4pm	4	0	1	0	1	0	1	0	1	0	4	0	4	0	4	0	20	10	11	3.4%	3.8%	Area G 20% (-70)
4-5pm	7	0	2	0	2	0	2	0	1	0	4	0	7	0	7	0	32	19	11	6.6%	3.8%	Area O 20% (-70)
5-6pm	12	0	4	0	4	0	4	0	3	0	8	0	12	0	12	0	59	32	20	11.0%	6.8%	Hourly Distributions: ITE LU#932
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %	37.5%		12.5%		12.5%		12.5%						37.5%		37.5%		IN %					
OUT %									12.5%		37.5%						OUT %					

2040 East Development (LU #912) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		240	240			
																		0%	0%			<- % Reduction, Sensitivity Test
																		240	240			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6%	0.3%	Area G (375) New (50%)
7-8am	2	0	1	0	1	0	1	0	0	0	1	0	2	0	2	0	10	5	3	2.2%	1.4%	Area O (375) (50%)
8-9am	8	0	3	0	3	0	3	0	2	0	5	0	8	0	8	0	40	20	13	8.2%	5.3%	Less Internally Linked Trips
9-10am	8	0	3	0	3	0	3	0	2	0	7	0	8	0	8	0	42	22	19	9.2%	8.0%	Area G 5% (-20)
10-11am	9	0	3	0	3	0	3	0	3	0	9	0	9	0	9	0	48	24	23	9.9%	9.4%	Area O 5% (-20)
11am-12pm	9	0	3	0	3	0	3	0	3	0	9	0	9	0	9	0	48	24	25	10.0%	10.5%	Less Externally Linked Trips
12-1pm	10	0	3	0	3	0	3	0	3	0	10	0	10	0	10	0	52	27	26	11.2%	10.8%	Area G 15% (-55)
1-2pm	9	0	3	0	3	0	3	0	3	0	9	0	9	0	9	0	48	25	24	10.5%	10.2%	Area O 15% (-55)
2-3pm	9	0	3	0	3	0	3	0	3	0	8	0	9	0	9	0	47	24	22	9.8%	9.3%	Less Pass-by Trips
3-4pm	8	0	3	0	3	0	3	0	3	0	9	0	8	0	8	0	45	22	24	9.2%	9.9%	Area G 20% (-60)
4-5pm	8	0	3	0	3	0	3	0	3	0	9	0	8	0	8	0	45	21	24	8.7%	10.0%	Area O 20% (-60)
5-6pm	7	0	2	0	2	0	2	0	3	0	9	0	7	0	7	0	39	18	23	7.4%	9.6%	Hourly Distributions: ITE LU#912
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %	37.5%		12.5%		12.5%		12.5%						37.5%		37.5%		IN %					
OUT %									12.5%		37.5%						OUT %					

By: TSC
Date: 1/13/2021

2040 East Development (LU #710) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	1	0	0	0	4	2	0	0	0	0	0	0	0	20	12	0	39	42	5	4.6%	0.5%	Area G (700) New (38%)
7-8am	5	0	2	0	11	8	0	0	0	0	0	0	0	56	34	0	116	120	17	13.1%	1.9%	Area L (700)
8-9am	9	0	3	0	13	15	0	0	0	0	0	0	0	61	38	0	139	132	32	14.4%	3.5%	Area R (430)
9-10am	11	0	4	0	6	18	0	0	0	0	0	0	0	27	17	0	83	59	39	6.4%	4.3%	
10-11am	15	0	5	0	5	25	0	0	0	0	0	0	0	23	14	0	87	49	54	5.4%	5.9%	Hourly Distributions: ITE LU#710
11am-12pm	27	0	9	0	5	44	0	0	0	0	0	0	0	27	16	0	128	57	94	6.2%	10.3%	
12-1pm	27	0	9	0	9	44	0	0	0	0	0	0	0	43	27	0	159	93	95	10.2%	10.4%	Directional Distribution: "East Dist"
1-2pm	17	0	6	0	8	28	0	0	0	0	0	0	0	38	23	0	120	82	61	9.0%	6.7%	for diverted linked trips from TIA
2-3pm	17	0	6	0	7	27	0	0	0	0	0	0	0	35	21	0	113	75	59	8.2%	6.5%	
3-4pm	22	0	7	0	6	36	0	0	0	0	0	0	0	32	19	0	122	68	78	7.4%	8.5%	
4-5pm	40	0	13	0	5	65	0	0	0	0	0	0	0	23	14	0	160	50	139	5.5%	15.2%	
5-6pm	41	0	14	0	4	66	0	0	0	0	0	0	0	18	11	0	154	38	143	4.2%	15.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					9.5%									46.5%	28.5%		IN %	28.5				
OUT %	28.5%		9.5%			46.5%											OUT %	9.5				

AADT IN	AADT OUT
915	915
0%	0%
915	915

<- % Reduction, Sensitivity Test

2040 East Development (LU #140) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	11	0	0	0	0	0	0	0	74	0	0	85	99	15	16.8%	2.6%	Area I (385) New
7-8am	0	0	0	0	0	14	0	0	0	0	0	0	0	61	0	0	75	81	19	13.8%	3.2%	Area J (790)
8-9am	0	0	0	0	0	12	0	0	0	0	0	0	0	26	0	0	38	34	16	5.7%	2.7%	
9-10am	0	0	0	0	0	13	0	0	0	0	0	0	0	16	0	0	29	21	17	3.6%	2.9%	
10-11am	0	0	0	0	0	13	0	0	0	0	0	0	0	14	0	0	27	19	17	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	21	0	0	0	0	0	0	0	28	0	0	49	37	28	6.2%	4.7%	
12-1pm	0	0	0	0	0	27	0	0	0	0	0	0	0	40	0	0	67	53	36	8.9%	6.1%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	0	31	0	0	0	0	0	0	0	30	0	0	61	40	41	6.8%	7.0%	for diverted linked trips from TIA
2-3pm	0	0	0	0	0	31	0	0	0	0	0	0	0	23	0	0	54	30	41	5.1%	6.9%	
3-4pm	0	0	0	0	0	92	0	0	0	0	0	0	0	43	0	0	135	57	122	9.7%	20.7%	
4-5pm	0	0	0	0	0	51	0	0	0	0	0	0	0	16	0	0	67	21	68	3.6%	11.6%	
5-6pm	0	0	0	0	0	42	0	0	0	0	0	0	0	12	0	0	54	16	56	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75.0%			IN %					
OUT %						75.0%											OUT %					

AADT IN	AADT OUT
590	590
0%	0%
590	590

<- % Reduction, Sensitivity Test

2040 East Development (LU #210) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	33	0	0	0	0	0	0	0	9	0	0	42	12	44	1.6%	5.9%	Area M (710) New
7-8am	0	0	0	0	0	58	0	0	0	0	0	0	0	18	0	0	76	24	77	3.2%	10.2%	Area S (1155)
8-9am	0	0	0	0	0	49	0	0	0	0	0	0	0	21	0	0	70	28	65	3.7%	8.6%	
9-10am	0	0	0	0	0	31	0	0	0	0	0	0	0	18	0	0	49	24	41	3.2%	5.4%	Less Internally Linked Trips
10-11am	0	0	0	0	0	31	0	0	0	0	0	0	0	24	0	0	55	32	41	4.2%	5.4%	Area M 20% (-140)
11am-12pm	0	0	0	0	0	29	0	0	0	0	0	0	0	31	0	0	60	41	38	5.4%	5.1%	Area S 20% (-230)
12-1pm	0	0	0	0	0	32	0	0	0	0	0	0	0	31	0	0	63	41	42	5.5%	5.6%	
1-2pm	0	0	0	0	0	33	0	0	0	0	0	0	0	34	0	0	67	45	44	6.0%	5.9%	Hourly Distributions: ITE LU#210
2-3pm	0	0	0	0	0	35	0	0	0	0	0	0	0	40	0	0	75	53	47	7.0%	6.2%	
3-4pm	0	0	0	0	0	34	0	0	0	0	0	0	0	48	0	0	82	64	45	8.5%	6.0%	Directional Distribution: "East Dist"
4-5pm	0	0	0	0	0	42	0	0	0	0	0	0	0	59	0	0	101	79	56	10.5%	7.5%	for diverted linked trips from TIA
5-6pm	0	0	0	0	0	42	0	0	0	0	0	0	0	58	0	0	100	77	56	10.3%	7.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

AADT IN	AADT OUT
750	750
0%	0%
750	750

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2040 East Development (LU #840) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		820	820			
																		0%	0%			<- % Reduction, Sensitivity Test
																		820	820			
6-7am	0	0	0	0	0	0	3	0	1	0	2	0	8	0	0	0	14	10	2	1.2%	0.2%	Area N (1820)
7-8am	0	0	0	0	0	0	19	0	5	0	14	0	56	0	0	0	94	74	19	9.0%	2.3%	
8-9am	0	0	0	0	0	0	23	0	11	0	32	0	70	0	0	0	136	93	43	11.3%	5.3%	Less Externally Linked Trips
9-10am	0	0	0	0	0	0	17	0	14	0	43	0	50	0	0	0	124	66	57	8.1%	6.9%	Area N 10% (-185)
10-11am	0	0	0	0	0	0	19	0	15	0	44	0	56	0	0	0	134	75	58	9.2%	7.1%	
11am-12pm	0	0	0	0	0	0	18	0	19	0	56	0	53	0	0	0	146	71	74	8.6%	9.0%	Hourly Distributions: ITE LU#840
12-1pm	0	0	0	0	0	0	18	0	21	0	64	0	53	0	0	0	156	70	85	8.5%	10.4%	
1-2pm	0	0	0	0	0	0	20	0	19	0	58	0	59	0	0	0	156	78	77	9.5%	9.4%	Directional Distribution: "East Dist"
2-3pm	0	0	0	0	0	0	19	0	23	0	68	0	56	0	0	0	166	75	90	9.1%	11.0%	for diverted linked trips from TIA
3-4pm	0	0	0	0	0	0	14	0	20	0	60	0	43	0	0	0	137	57	80	6.9%	9.8%	
4-5pm	0	0	0	0	0	0	15	0	16	0	47	0	45	0	0	0	123	60	62	7.3%	7.5%	
5-6pm	0	0	0	0	0	0	13	0	21	0	62	0	39	0	0	0	135	52	82	6.4%	10.0%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %							25.0%						75.0%				IN %					
OUT %									25.0%		75.0%						OUT %					

2040 East Development (LU #843) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		410	410			
																		0%	0%			<- % Reduction, Sensitivity Test
																		410	410			
6-7am	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	3	2	0	0.6%	0.0%	Area N (905)
7-8am	0	0	0	0	0	0	3	0	1	0	3	0	10	0	0	0	17	13	4	3.2%	1.0%	
8-9am	0	0	0	0	0	0	6	0	5	0	16	0	19	0	0	0	46	25	21	6.0%	5.0%	Less Externally Linked Trips
9-10am	0	0	0	0	0	0	9	0	8	0	24	0	26	0	0	0	67	35	32	8.5%	7.8%	Area N 10% (-90)
10-11am	0	0	0	0	0	0	8	0	9	0	27	0	25	0	0	0	69	33	36	8.1%	8.7%	
11am-12pm	0	0	0	0	0	0	9	0	9	0	27	0	26	0	0	0	71	34	36	8.4%	8.8%	Hourly Distributions: ITE LU#843
12-1pm	0	0	0	0	0	0	9	0	9	0	26	0	27	0	0	0	71	36	35	8.8%	8.5%	
1-2pm	0	0	0	0	0	0	9	0	9	0	26	0	27	0	0	0	71	36	35	8.8%	8.5%	Directional Distribution: "East Dist"
2-3pm	0	0	0	0	0	0	7	0	7	0	22	0	22	0	0	0	58	29	29	7.1%	7.0%	for diverted linked trips from TIA
3-4pm	0	0	0	0	0	0	9	0	9	0	27	0	27	0	0	0	72	36	36	8.7%	8.8%	
4-5pm	0	0	0	0	0	0	9	0	9	0	28	0	26	0	0	0	72	35	37	8.6%	9.1%	
5-6pm	0	0	0	0	0	0	8	0	8	0	24	0	23	0	0	0	63	30	32	7.3%	7.7%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %							25.0%						75.0%				IN %					
OUT %									25.0%		75.0%						OUT %					

2040 East Development Externally Linked Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		660	660			
																		0%	0%			<- % Reduction, Sensitivity Test
																		660	660			
6-7am	0	0	2	0	18	-6	32	0	4	0	0	0	0	-53	0	0	-3	70	8	10.6%	1.2%	Externally Linked trips are to/from
7-8am	0	0	5	0	29	-14	51	0	8	0	0	0	0	-86	0	0	-7	114	18	17.3%	2.7%	different types of land uses in the area,
8-9am	0	0	7	0	17	-21	31	0	13	0	0	0	0	-52	0	0	-5	69	28	10.4%	4.2%	meaning that different distributions would
9-10am	0	0	11	0	11	-34	20	0	20	0	0	0	0	-33	0	0	-5	44	45	6.7%	6.8%	represent the same trips exiting one
10-11am	0	0	13	0	12	-39	22	0	23	0	0	0	0	-36	0	0	-5	48	52	7.3%	7.9%	development and entering another.
11am-12pm	0	0	14	0	11	-41	20	0	25	0	0	0	0	-34	0	0	-5	45	55	6.8%	8.4%	
12-1pm	0	0	18	0	16	-53	28	0	32	0	0	0	0	-47	0	0	-6	62	70	9.4%	10.6%	For simplicites sake, this warrant analysis
1-2pm	0	0	11	0	13	-32	24	0	19	0	0	0	0	-40	0	0	-5	53	43	8.1%	6.5%	assumes one trip distribution for all
2-3pm	0	0	15	0	12	-46	21	0	27	0	0	0	0	-35	0	0	-6	47	61	7.1%	9.3%	externally linked trips. Land Use #110
3-4pm	0	0	21	0	10	-63	17	0	38	0	0	0	0	-29	0	0	-6	38	84	5.8%	12.8%	was chosen as most trips are to/from
4-5pm	0	0	17	0	6	-50	10	0	30	0	0	0	0	-17	0	0	-4	22	67	3.4%	10.1%	the light industrial areas on site.
5-6pm	0	0	25	0	2	-75	3	0	45	0	0	0	0	-5	0	0	-5	7	100	1.1%	15.2%	(residential-L‡; commercial-L‡, etc.)
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					25%		45%							75%			IN %					
OUT %			25%			75%			45%								OUT %					

By: TSC
Date: 1/13/2021

2040 East Development (LU #934) - Pass-by Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				230	230	
																				0%	0%	<- % Reduction, Sensitivity Test
																				230	230	
																				% AADT IN	% AADT OUT	
6-7am	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	5	4	2.3%	1.9%	Land Use#934 Pass-by
7-8am	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	7	7	3.2%	2.9%	Area G (230)
8-9am	1	0	3	0	1	-2	1	0	3	0	1	0	3	-6	3	0	8	8	8	3.4%	3.3%	Area O (230)
9-10am	1	0	3	0	1	-2	1	0	3	0	1	0	3	-6	3	0	8	8	7	3.3%	3.2%	
10-11am	2	0	3	0	2	-4	2	0	3	0	2	0	3	-6	3	0	10	9	9	4.0%	3.7%	Hourly Distributions: ITE LU#934
11am-12pm	4	0	7	0	4	-8	4	0	7	0	4	0	7	-14	7	0	22	21	17	9.1%	7.6%	
12-1pm	5	0	9	0	5	-10	5	0	9	0	5	0	9	-18	9	0	28	27	27	11.7%	11.8%	Directional Distribution: "East Dist"
1-2pm	6	0	3	0	6	-12	6	0	3	0	6	0	3	-6	3	0	18	18	20	7.9%	8.7%	for diverted linked trips from TIA
2-3pm	4	0	2	0	4	-8	4	0	2	0	4	0	2	-4	2	0	12	13	15	5.8%	6.4%	
3-4pm	4	0	2	0	4	-8	4	0	2	0	4	0	2	-4	2	0	12	13	13	5.6%	5.6%	
4-5pm	4	0	2	0	4	-8	4	0	2	0	4	0	2	-4	2	0	12	13	12	5.7%	5.4%	
5-6pm	5	0	3	0	5	-10	5	0	3	0	5	0	3	-6	3	0	16	16	15	6.8%	6.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AM%					17.5%	-35%	17.5%						32.5%	-65%	32.5%		IN %	32.5				
PM%					32.5%	-65%	32.5%						17.5%	-35%	17.5%		OUT %					

2040 East Development (LU #932) - Pass-by Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				70	70	
																				0%	0%	<- % Reduction, Sensitivity Test
																				70	70	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.7%	0.9%	Land Use#932 Pass-by
7-8am	0	0	1	0	0	0	0	0	1	0	0	0	1	-2	1	0	2	2	1	2.5%	1.7%	Area G (70)
8-9am	0	0	1	0	0	0	0	0	1	0	0	0	1	-2	1	0	2	2	2	3.4%	2.9%	Area O (70)
9-10am	1	0	1	0	1	-2	1	0	1	0	1	0	1	-2	1	0	4	3	2	3.8%	3.3%	
10-11am	1	0	1	0	1	-2	1	0	1	0	1	0	1	-2	1	0	4	4	3	5.2%	4.2%	
11am-12pm	1	0	3	0	1	-2	1	0	3	0	1	0	3	-6	3	0	8	8	5	11.9%	6.7%	
12-1pm	1	0	3	0	1	-2	1	0	3	0	1	0	3	-6	3	0	8	8	8	12.0%	11.9%	
1-2pm	1	0	1	0	1	-2	1	0	1	0	1	0	1	-2	1	0	4	4	8	5.9%	10.8%	
2-3pm	1	0	1	0	1	-2	1	0	1	0	1	0	1	-2	1	0	4	3	3	3.9%	4.8%	
3-4pm	1	0	0	0	1	-2	1	0	0	0	1	0	0	0	0	0	2	2	3	3.4%	3.8%	
4-5pm	2	0	1	0	2	-4	2	0	1	0	2	0	1	-2	1	0	6	5	3	6.6%	3.8%	
5-6pm	3	0	1	0	3	-6	3	0	1	0	3	0	1	-2	1	0	8	8	5	11.0%	6.8%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AM%					17.5%	-35%	17.5%						32.5%	-65%	32.5%		IN %					
PM%					32.5%	-65%	32.5%						17.5%	-35%	17.5%		OUT %					

2040 East Development (LU #912) - Pass-by Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				60	60	
																				0%	0%	<- % Reduction, Sensitivity Test
																				60	60	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6%	0.3%	Land Use#912 Pass-by
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2.2%	1.4%	Area G (60)
8-9am	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	5	3	8.2%	5.3%	Area O (60)
9-10am	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	6	5	9.2%	8.0%	
10-11am	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	6	6	9.9%	9.4%	
11am-12pm	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	6	6	10.0%	10.5%	
12-1pm	1	0	2	0	1	-2	1	0	2	0	1	0	2	-4	2	0	6	7	6	11.2%	10.8%	
1-2pm	2	0	1	0	2	-4	2	0	1	0	2	0	1	-2	1	0	6	6	6	10.5%	10.2%	
2-3pm	2	0	1	0	2	-4	2	0	1	0	2	0	1	-2	1	0	6	6	6	9.8%	9.3%	
3-4pm	2	0	1	0	2	-4	2	0	1	0	2	0	1	-2	1	0	6	6	6	9.2%	9.9%	
4-5pm	2	0	1	0	2	-4	2	0	1	0	2	0	1	-2	1	0	6	5	6	8.7%	10.0%	
5-6pm	1	0	1	0	1	-2	1	0	1	0	1	0	1	-2	1	0	4	4	6	7.4%	9.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					17.5%	-35.0%	17.5%						32.5%	-65.0%	32.5%		IN %					
OUT %					32.5%	-65.0%	32.5%						17.5%	-35.0%	17.5%		OUT %					

By: TSC
Date: 1/13/2021

2040 South Development (LU #130 & 140) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				930	930	
																				0%	0%	<- % Reduction, Sensitivity Test
																				930	930	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	12	0	0	0	0	0	0	0	78	0	0	90	156	24	16.8%	2.6%	Area T (1160)
7-8am	0	0	0	0	0	15	0	0	0	0	0	0	0	64	0	0	79	128	30	13.8%	3.2%	Area U (255)
8-9am	0	0	0	0	0	13	0	0	0	0	0	0	0	27	0	0	40	53	25	5.7%	2.7%	Area U (445)
9-10am	0	0	0	0	0	14	0	0	0	0	0	0	0	17	0	0	31	33	27	3.6%	2.9%	
10-11am	0	0	0	0	0	13	0	0	0	0	0	0	0	16	0	0	29	31	26	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	22	0	0	0	0	0	0	0	29	0	0	51	58	44	6.2%	4.7%	
12-1pm	0	0	0	0	0	29	0	0	0	0	0	0	0	42	0	0	71	83	57	8.9%	6.1%	Directional Distribution: "South Dist"
1-2pm	0	0	0	0	0	33	0	0	0	0	0	0	0	32	0	0	65	63	65	6.8%	7.0%	from TIA
2-3pm	0	0	0	0	0	32	0	0	0	0	0	0	0	24	0	0	56	47	64	5.1%	6.9%	
3-4pm	0	0	0	0	0	97	0	0	0	0	0	0	0	45	0	0	142	90	193	9.7%	20.7%	
4-5pm	0	0	0	0	0	54	0	0	0	0	0	0	0	17	0	0	71	33	108	3.6%	11.6%	
5-6pm	0	0	0	0	0	44	0	0	0	0	0	0	0	13	0	0	57	25	88	2.7%	9.5%	
6-7pm	0	0	0	0	0	11	0	0	0	0	0	0	0	6	0	0	17	11	22	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50%			IN %					
OUT %						50%											OUT %					

2040 South Development (LU #710) - New Trips

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				230	230	
																				0%	0%	<- % Reduction, Sensitivity Test
																				230	230	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	7	11	1	4.6%	0.5%	Area U (435)
7-8am	0	0	0	0	0	2	0	0	0	0	0	0	0	15	0	0	17	30	4	13.1%	1.9%	Area U (25)
8-9am	0	0	0	0	0	4	0	0	0	0	0	0	0	17	0	0	21	33	8	14.4%	3.5%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	8	0	0	13	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	0	0	0	0	7	0	0	0	0	0	0	0	6	0	0	13	12	14	5.4%	5.9%	
11am-12pm	0	0	0	0	0	12	0	0	0	0	0	0	0	7	0	0	19	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	0	12	0	0	0	0	0	0	0	12	0	0	24	23	24	10.2%	10.4%	from TIA
1-2pm	0	0	0	0	0	8	0	0	0	0	0	0	0	11	0	0	19	21	15	9.0%	6.7%	
2-3pm	0	0	0	0	0	8	0	0	0	0	0	0	0	10	0	0	18	19	15	8.2%	6.5%	
3-4pm	0	0	0	0	0	10	0	0	0	0	0	0	0	9	0	0	19	17	20	7.4%	8.5%	
4-5pm	0	0	0	0	0	18	0	0	0	0	0	0	0	7	0	0	25	13	35	5.5%	15.2%	
5-6pm	0	0	0	0	0	18	0	0	0	0	0	0	0	5	0	0	23	10	36	4.2%	15.6%	
6-7pm	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	6	4	7	1.7%	2.9%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50.0%			IN %					
OUT %						50.0%											OUT %					

Start Time	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Frontage Rd Right	Gateway Frontage Rd Thru	Gateway Frontage Rd Left	Gateway Frontage Rd U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

APPENDIX I
Traffic Signal Warrant Analysis

Year 2025 Build
Holy Hill Road & Gateway Crossing

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Holy Hill Road & Gateway Crossing
County: Washington
Village: Germantown

Major Street: Holy Hill Road
Critical Approach Speed: 45 mph
Lanes: 1 lane

Minor Street: Gateway Crossing
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**No**
Warrant 3: Peak Hour Volume	**No**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	0	0

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	2	4

Satisfied? No

Condition C: Combination of A & B at 56%

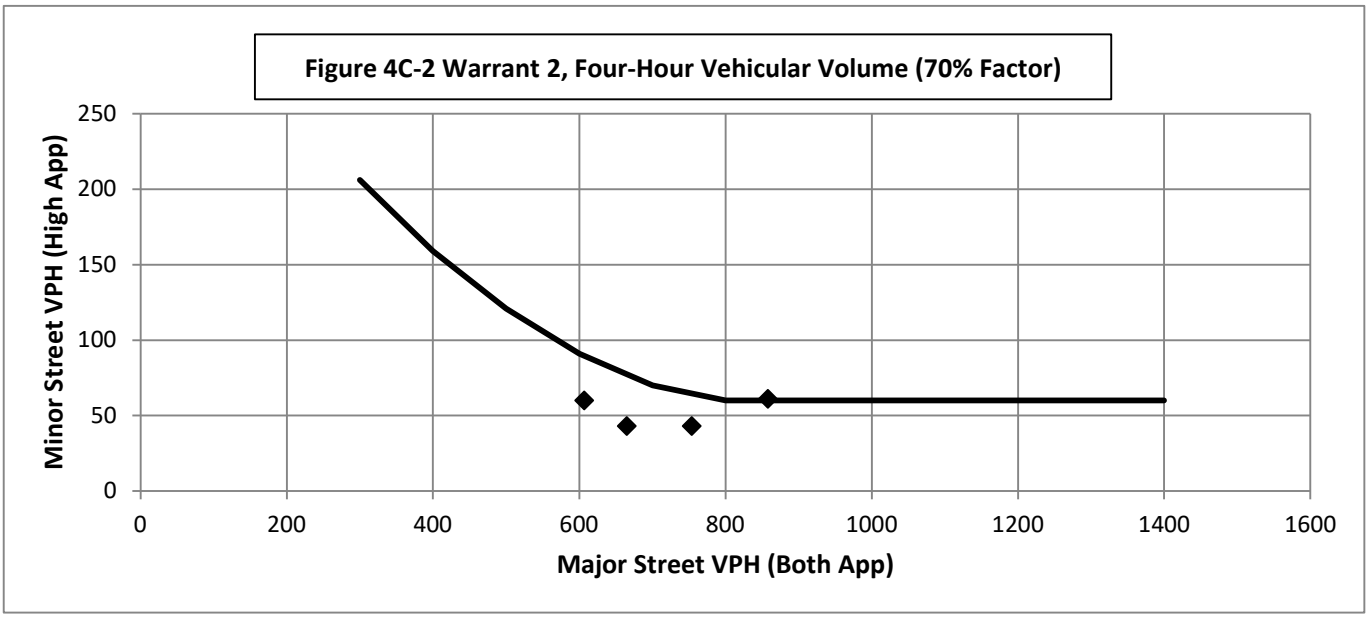
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	761	6	767
2	7:00	8:00	921	11	932
3	8:00	9:00	601	15	616
4	9:00	10:00	529	24	553
5	10:00	11:00	486	28	514
6	11:00	12:00	564	31	595
7	12:00	13:00	665	43	708
8	13:00	14:00	627	29	656
9	14:00	15:00	660	36	696
10	15:00	16:00	858	61	919
11	16:00	17:00	754	43	797
12	17:00	18:00	607	60	667
13	18:00	19:00	84	17	101
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	15:00	16:00	17:00	12:00
Major Road Vol.	858	754	607	665
Minor Road Vol.	61	43	60	43



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

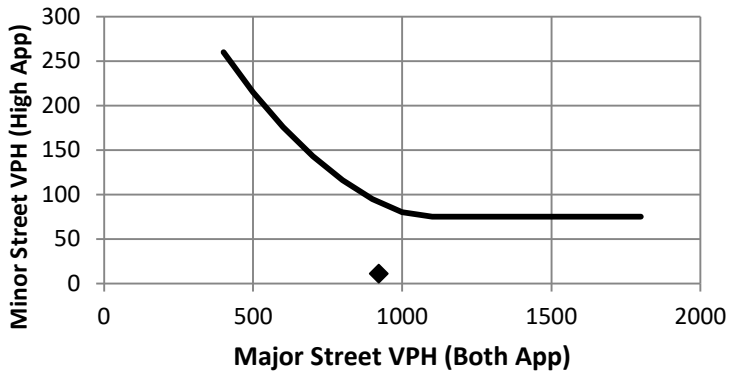
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	No
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	921	11

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

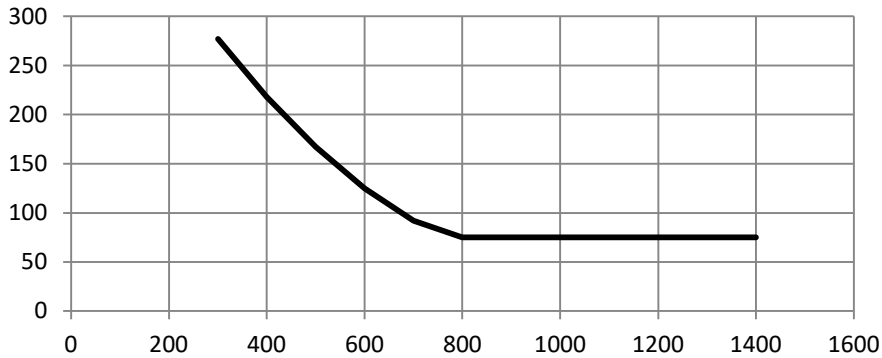
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

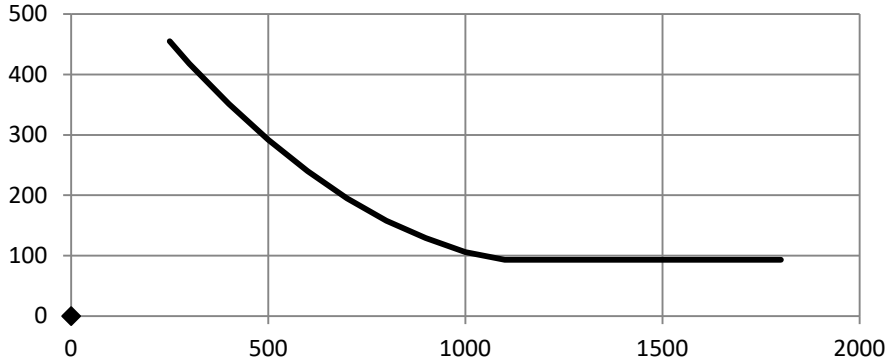


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

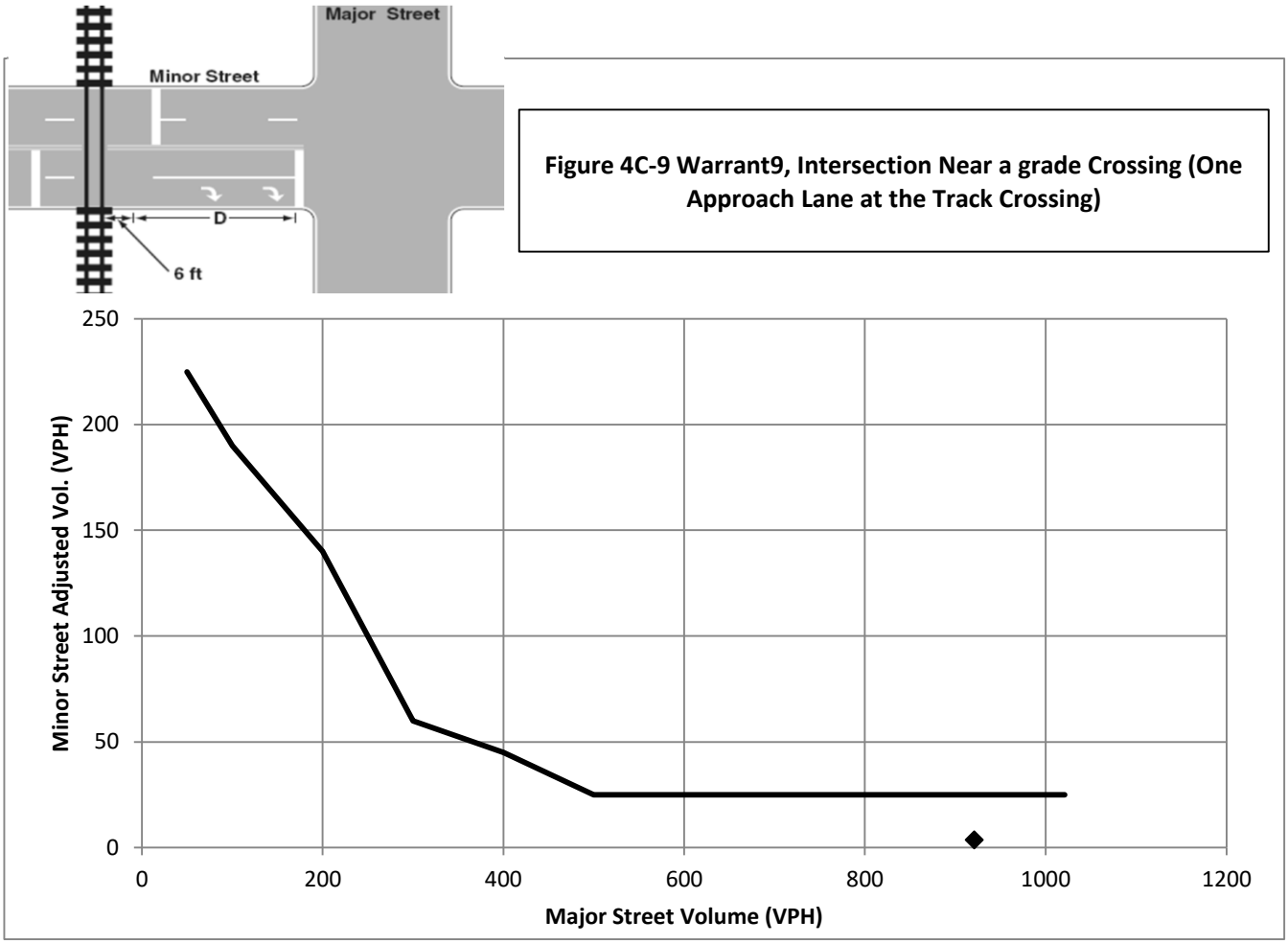
	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			932	No	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	7:00	921	11	3.685



Conclusions/Comments:

One wide SB approach. This warrant study assumes that right turns will be able to move around a vehicle waiting

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	26	0	6	0	32	54	136	0	0	190	0	0	0	0	0	0	409	162	0	571	793
	7:00	43	0	11	0	54	72	201	0	0	273	0	0	0	0	0	0	432	216	0	648	975
	8:00	59	0	15	0	74	44	164	0	0	208	0	0	0	0	0	0	263	130	0	393	675
	9:00	84	0	24	0	108	38	187	0	0	225	0	0	0	0	0	0	191	113	0	304	637
MD	10:00	95	0	28	0	123	37	167	0	0	204	0	0	0	0	0	0	171	111	0	282	609
	11:00	105	0	31	0	136	31	218	0	0	249	0	0	0	0	0	0	225	90	0	315	700
	12:00	140	0	43	0	183	41	256	0	0	297	0	0	0	0	0	0	244	124	0	368	848
	13:00	97	0	29	0	126	37	223	0	0	260	0	0	0	0	0	0	258	109	0	367	753
PM	14:00	119	0	36	0	155	33	307	0	0	340	0	0	0	0	0	0	221	99	0	320	815
	15:00	193	0	61	0	254	29	488	0	0	517	0	0	0	0	0	0	251	90	0	341	1112
	16:00	141	0	43	0	184	17	454	0	0	471	0	0	0	0	0	0	233	50	0	283	938
	17:00	194	0	60	0	254	8	390	0	0	398	0	0	0	0	0	0	186	23	0	209	861
	18:00	63	0	17	0	80	5	40	0	0	45	0	0	0	0	0	0	23	16	0	39	164
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		1359	0	404	0	1763	446	3231	0	0	3677	0	0	0	0	0	0	3107	1333	0	4440	9880

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach?

% Right Turns Included (Default 0%)

From North (SB)	0%
From East (WB)	100%
From South (NB)	100%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
54	545	162	707	761
72	633	216	849	921
44	427	130	557	601
38	378	113	491	529
37	338	111	449	486
31	443	90	533	564
41	500	124	624	665
37	481	109	590	627
33	528	99	627	660
29	739	90	829	858
17	687	50	737	754
8	576	23	599	607
5	63	16	79	84
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
446	6338	1333	7671	8117

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	6	6	6
0	0	11	11	11
0	0	15	15	15
0	0	24	24	24
0	0	28	28	28
0	0	31	31	31
0	0	43	43	43
0	0	29	29	29
0	0	36	36	36
0	0	61	61	61
0	0	43	43	43
0	0	60	60	60
0	0	17	17	17
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	404	404	404

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Gateway Crossing & Holy Hill Road

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals
6-7am	0	0	0	0	0	94	0	0	0	0	0	0	0	218	0	0	312
7-8am	0	0	0	0	0	138	0	0	0	0	0	0	0	210	0	0	348
8-9am	0	0	0	0	0	100	0	0	0	0	0	0	0	132	0	0	232
9-10am	0	0	0	0	0	107	0	0	0	0	0	0	0	103	0	0	210
10-11am	0	0	0	0	0	82	0	0	0	0	0	0	0	85	0	0	167
11am-12pm	0	0	0	0	0	112	0	0	0	0	0	0	0	120	0	0	232
12-1pm	0	0	0	0	0	125	0	0	0	0	0	0	0	101	0	0	226
1-2pm	0	0	0	0	0	115	0	0	0	0	0	0	0	138	0	0	253
2-3pm	0	0	0	0	0	182	0	0	0	0	0	0	0	117	0	0	299
3-4pm	0	0	0	0	0	251	0	0	0	0	0	0	0	124	0	0	375
4-5pm	0	0	0	0	0	278	0	0	0	0	0	0	0	159	0	0	437
5-6pm	0	0	0	0	0	204	0	0	0	0	0	0	0	132	0	0	336
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes

Midday counts at 48th taken during construction/detours in area, resulting in lower than normal counts on Holy Hill Road. Therefore, EB & SB Through Volumes at 48th Street were calculated from the IH-41/45 NB Ramp count.
Midday count was from 9A-3P.

The "Existing' traffic used in the Gateway Crossing warrant analysis was taken from the EB & WB traffic throught the 48th Street intersection as evaluated in the 48th Street warrant analysis.

Year 2025 Background Traffic

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals
6-7am	0	0	0	0	0	100	0	0	0	0	0	0	0	230	0	0	330
7-8am	0	0	0	0	0	147	0	0	0	0	0	0	0	222	0	0	369
8-9am	0	0	0	0	0	106	0	0	0	0	0	0	0	139	0	0	245
9-10am	0	0	0	0	0	114	0	0	0	0	0	0	0	109	0	0	223
10-11am	0	0	0	0	0	87	0	0	0	0	0	0	0	90	0	0	177
11am-12pm	0	0	0	0	0	119	0	0	0	0	0	0	0	127	0	0	246
12-1pm	0	0	0	0	0	133	0	0	0	0	0	0	0	107	0	0	240
1-2pm	0	0	0	0	0	122	0	0	0	0	0	0	0	146	0	0	268
2-3pm	0	0	0	0	0	193	0	0	0	0	0	0	0	124	0	0	317
3-4pm	0	0	0	0	0	267	0	0	0	0	0	0	0	131	0	0	398
4-5pm	0	0	0	0	0	296	0	0	0	0	0	0	0	168	0	0	464
5-6pm	0	0	0	0	0	217	0	0	0	0	0	0	0	139	0	0	356
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Growth Rates						0.8%								0.8%			
PM Growth Rates						1.0%								0.8%			

Notes

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals
6-7am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8
7-8am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
11am-12pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
12-1pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10
2-3pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
3-4pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
4-5pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
5-6pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
6-7pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IN %						8%											IN %
OUT %														8%			OUT %

IN	OUT
55	52
66	66
75	73
63	64
61	61
65	63
73	73
68	66
70	70
73	72
73	73
77	76
70	71
0	0

AADT IN	AADT OUT	
1165	1165	
0%	0%	<- % Reduction, Sensitivity Test
1165	1165	
% AADT IN	% AADT OUT	Notes
4.7%	4.5%	Existing Kwik Trip daily traffic estimated
5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
6.4%	6.3%	
5.4%	5.5%	Distribution based on 2020 counts
5.2%	5.2%	collected at Kwik Trip driveways:
5.6%	5.4%	25% to/from west on 167 (770)
6.3%	6.3%	75% to/from east on 167 (2330)
5.8%	5.7%	
6.0%	6.0%	Distribution to/from I/S same as
6.3%	6.2%	evaluated for KT assignment in TIA.
6.3%	6.3%	
6.6%	6.5%	Hourly Distributions: ITE LU#960
6.0%	6.1%	

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Gateway Crossing & Holy Hill Road

By: TSC
Date: 1/13/2021

Exxon (-)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Exxon traffic was approximately 23%
7-8am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Therefore, subtract 23% of hourly
9-10am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			traffic from Kwik Trip (+) table.
10-11am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
11am-12pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
12-1pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
1-2pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
2-3pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
3-4pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
4-5pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
5-6pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
6-7pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Gateway (+)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				175	175	
																				0%	0%	<- % Reduction, Sensitivity Test
																				175	175	
																				% AADT IN	% AADT OUT	
6-7am	4	0	1	0	7	0	0	0	0	0	0	0	0	0	22	0	34	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	5	0	2	0	6	0	0	0	0	0	0	0	0	0	18	0	31	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	4	0	1	0	3	0	0	0	0	0	0	0	0	0	8	0	16	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	4	0	1	0	2	0	0	0	0	0	0	0	0	0	5	0	12	6	5	3.6%	2.9%	
10-11am	4	0	1	0	2	0	0	0	0	0	0	0	0	0	5	0	12	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	6	0	2	0	3	0	0	0	0	0	0	0	0	0	8	0	19	11	8	6.2%	4.7%	
12-1pm	8	0	3	0	4	0	0	0	0	0	0	0	0	0	12	0	27	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	9	0	3	0	3	0	0	0	0	0	0	0	0	0	9	0	24	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	9	0	3	0	2	0	0	0	0	0	0	0	0	0	7	0	21	9	12	5.1%	6.9%	
3-4pm	27	0	9	0	4	0	0	0	0	0	0	0	0	0	13	0	53	17	36	9.7%	20.7%	
4-5pm	15	0	5	0	2	0	0	0	0	0	0	0	0	0	5	0	27	6	20	3.6%	11.6%	
5-6pm	13	0	4	0	1	0	0	0	0	0	0	0	0	0	4	0	22	5	17	2.7%	9.5%	
6-7pm	3	0	1	0	1	0	0	0	0	0	0	0	0	0	2	0	7	2	4	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					25%										75%		IN %					
OUT %	75%		25%														OUT %					

2025 West Development (LU #154) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				380	380	
																				0%	0%	<- % Reduction, Sensitivity Test
																				380	380	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	39	8	10.2%	2.1%	800 new trips
7-8am	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	9	7.3%	2.3%	5% linked trips (40)
8-9am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	19	11	5.1%	2.8%	
9-10am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	45	10	11.8%	2.6%	Hourly Distributions: ITE LU#154
10-11am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	36	11	9.5%	2.9%	
11am-12pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	14	3.8%	3.7%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	19	26	5.1%	6.9%	from TIA
1-2pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	22	22	5.9%	5.9%	
2-3pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	23	16	6.0%	4.3%	
3-4pm	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3	20	38	5.3%	10.0%	
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	12	24	3.1%	6.3%	
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	8	30	2.2%	7.8%	
6-7pm	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3	10	33	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2025 West Development (LU #130) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN 1105	AADT OUT 1105			
																		0%	0%			<- % Reduction, Sensitivity Test
																		1105	1105			
6-7am	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	7	117	13	10.6%	1.2%	2325 new trips
7-8am	0	0	0	0	0	10	0	0	0	0	0	0	0	2	0	0	12	191	30	17.3%	2.7%	5% linked trips (115)
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0	8	115	46	10.4%	4.2%	
9-10am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	74	75	6.7%	6.8%	Hourly Distributions: ITE LU#110
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	81	87	7.3%	7.9%	
11am-12pm	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9	75	93	6.8%	8.4%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	11	104	117	9.4%	10.6%	from TIA
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9	90	72	8.1%	6.5%	
2-3pm	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9	78	103	7.1%	9.3%	
3-4pm	0	0	0	0	0	3	0	0	0	0	0	0	0	7	0	0	10	64	141	5.8%	12.8%	
4-5pm	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	8	38	112	3.4%	10.1%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	9	12	168	1.1%	15.2%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	29	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

2025 West Development (LU #960 - Kwik Trip Growth to 2025) - Diverted Linked Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN 240	AADT OUT 240			
																		0%	0%			<- % Reduction, Sensitivity Test
																		240	240			
6-7am	2	0	-2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	11	11	4.7%	4.5%	5530 daiyl trips at 100% in 2040
7-8am	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	14	14	5.7%	5.7%	-3100 existing daily trips
8-9am	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	15	15	6.4%	6.3%	-1825 trips in 2040 (75% of total growth)
9-10am	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	13	13	5.4%	5.5%	=605 new KT trips in 2025 Build.
10-11am	2	0	-2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	12	12	5.2%	5.2%	
11am-12pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	13	13	5.6%	5.4%	80% (480) are diverted linked trips
12-1pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	15	15	6.3%	6.3%	20% (125) are pas-by trips
1-2pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	14	14	5.8%	5.7%	PB trips do not pass through
2-3pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	14	14	6.0%	6.0%	intersection.
3-4pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	15	15	6.3%	6.2%	
4-5pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	15	15	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	16	16	6.6%	6.5%	
6-7pm	3	0	-3	0	0	0	0	0	0	0	0	0	0	3	0	0	3	14	15	6.0%	6.1%	Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %																	IN %					
OUT %	20%		-20%											20%			OUT %					

2025 East Development (LU #130) - New Trips (Area H)

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN 1325	AADT OUT 1325			
																		0%	0%			<- % Reduction, Sensitivity Test
																		1325	1325			
6-7am	12	0	4	0	35	0	0	0	0	0	0	0	0	0	105	0	156	140	16	10.6%	1.2%	Area H (135)
7-8am	27	0	9	0	57	0	0	0	0	0	0	0	0	0	172	0	265	229	36	17.3%	2.7%	Area H (2515)
8-9am	42	0	14	0	35	0	0	0	0	0	0	0	0	0	104	0	195	138	56	10.4%	4.2%	
9-10am	68	0	23	0	22	0	0	0	0	0	0	0	0	0	67	0	180	89	90	6.7%	6.8%	
10-11am	79	0	26	0	24	0	0	0	0	0	0	0	0	0	73	0	202	97	105	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	83	0	28	0	23	0	0	0	0	0	0	0	0	0	68	0	202	90	111	6.8%	8.4%	
12-1pm	105	0	35	0	31	0	0	0	0	0	0	0	0	0	94	0	265	125	140	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	65	0	22	0	27	0	0	0	0	0	0	0	0	0	80	0	194	107	86	8.1%	6.5%	from TIA
2-3pm	92	0	31	0	24	0	0	0	0	0	0	0	0	0	71	0	218	94	123	7.1%	9.3%	
3-4pm	128	0	43	0	19	0	0	0	0	0	0	0	0	0	58	0	248	77	170	5.8%	12.8%	
4-5pm	101	0	34	0	11	0	0	0	0	0	0	0	0	0	34	0	180	45	134	3.4%	10.1%	
5-6pm	151	0	50	0	4	0	0	0	0	0	0	0	0	0	11	0	216	15	201	1.1%	15.2%	
6-7pm	26	0	9	0	1	0	0	0	0	0	0	0	0	0	4	0	40	5	34	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					25%										75%		IN %					
OUT %	75%		25%														OUT %					

By: TSC
Date: 1/13/2021

2025 East Development (LU #130) - New Trips (Area I)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	0	0	0	0	0	7	0	0	0	0	0	0	0	62	0	0	69	82	9	10.6%	1.2%	Area I (1545)
7-8am	0	0	0	0	0	16	0	0	0	0	0	0	0	101	0	0	117	134	21	17.3%	2.7%	
8-9am	0	0	0	0	0	25	0	0	0	0	0	0	0	61	0	0	86	81	33	10.4%	4.2%	
9-10am	0	0	0	0	0	40	0	0	0	0	0	0	0	39	0	0	79	52	53	6.7%	6.8%	
10-11am	0	0	0	0	0	46	0	0	0	0	0	0	0	43	0	0	89	57	61	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	0	0	0	0	0	49	0	0	0	0	0	0	0	40	0	0	89	53	65	6.8%	8.4%	
12-1pm	0	0	0	0	0	62	0	0	0	0	0	0	0	55	0	0	117	73	82	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	0	38	0	0	0	0	0	0	0	47	0	0	85	63	50	8.1%	6.5%	from TIA
2-3pm	0	0	0	0	0	54	0	0	0	0	0	0	0	41	0	0	95	55	72	7.1%	9.3%	
3-4pm	0	0	0	0	0	74	0	0	0	0	0	0	0	34	0	0	108	45	99	5.8%	12.8%	
4-5pm	0	0	0	0	0	59	0	0	0	0	0	0	0	20	0	0	79	26	78	3.4%	10.1%	
5-6pm	0	0	0	0	0	89	0	0	0	0	0	0	0	7	0	0	96	9	118	1.1%	15.2%	
6-7pm	0	0	0	0	0	15	0	0	0	0	0	0	0	2	0	0	17	3	20	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

AADT IN	AADT OUT
775	775
0%	0%
775	775

<- % Reduction, Sensitivity Test

2025 East Development (LU #154) - New Trips (Area H)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	8	0	3	0	12	0	0	0	0	0	0	0	0	0	35	0	58	47	10	10.2%	2.1%	Area H (930)
7-8am	8	0	3	0	9	0	0	0	0	0	0	0	0	0	26	0	46	34	11	7.3%	2.3%	
8-9am	10	0	3	0	6	0	0	0	0	0	0	0	0	0	18	0	37	24	13	5.1%	2.8%	Hourly Distributions: ITE LU#154
9-10am	9	0	3	0	14	0	0	0	0	0	0	0	0	0	41	0	67	55	12	11.8%	2.6%	
10-11am	10	0	3	0	11	0	0	0	0	0	0	0	0	0	33	0	57	44	13	9.5%	2.9%	Directional Distribution: "East Dist"
11am-12pm	13	0	4	0	5	0	0	0	0	0	0	0	0	0	14	0	36	18	17	3.8%	3.7%	from TIA
12-1pm	24	0	8	0	6	0	0	0	0	0	0	0	0	0	18	0	56	24	32	5.1%	6.9%	
1-2pm	20	0	7	0	7	0	0	0	0	0	0	0	0	0	20	0	54	27	27	5.9%	5.9%	
2-3pm	15	0	5	0	7	0	0	0	0	0	0	0	0	0	21	0	48	28	20	6.0%	4.3%	
3-4pm	35	0	12	0	6	0	0	0	0	0	0	0	0	0	19	0	72	25	47	5.3%	10.0%	
4-5pm	22	0	7	0	4	0	0	0	0	0	0	0	0	0	11	0	44	14	29	3.1%	6.3%	
5-6pm	27	0	9	0	3	0	0	0	0	0	0	0	0	0	8	0	47	10	36	2.2%	7.8%	
6-7pm	31	0	10	0	3	0	0	0	0	0	0	0	0	0	10	0	54	13	41	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					25%										75%		IN %					
OUT %	75%		25%														OUT %					

AADT IN	AADT OUT
465	465
0%	0%
465	465

<- % Reduction, Sensitivity Test

2025 East Development (LU #140) - New Trips (Area I)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	0	0	0	0	0	4	0	0	0	0	0	0	0	25	0	0	29	33	5	16.8%	2.6%	Area I (385)
7-8am	0	0	0	0	0	5	0	0	0	0	0	0	0	20	0	0	25	27	6	13.8%	3.2%	
8-9am	0	0	0	0	0	4	0	0	0	0	0	0	0	8	0	0	12	11	5	5.7%	2.7%	Hourly Distributions: ITE LU#140
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	7	6	3.6%	2.9%	
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9	6	5	3.3%	2.8%	Directional Distribution: "East Dist"
11am-12pm	0	0	0	0	0	7	0	0	0	0	0	0	0	9	0	0	16	12	9	6.2%	4.7%	from TIA
12-1pm	0	0	0	0	0	9	0	0	0	0	0	0	0	13	0	0	22	17	12	8.9%	6.1%	
1-2pm	0	0	0	0	0	11	0	0	0	0	0	0	0	10	0	0	21	13	14	6.8%	7.0%	
2-3pm	0	0	0	0	0	10	0	0	0	0	0	0	0	8	0	0	18	10	13	5.1%	6.9%	
3-4pm	0	0	0	0	0	30	0	0	0	0	0	0	0	14	0	0	44	19	40	9.7%	20.7%	
4-5pm	0	0	0	0	0	17	0	0	0	0	0	0	0	5	0	0	22	7	23	3.6%	11.6%	
5-6pm	0	0	0	0	0	14	0	0	0	0	0	0	0	4	0	0	18	5	19	2.7%	9.5%	
6-7pm	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	6	2	5	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

AADT IN	AADT OUT
195	195
0%	0%
195	195

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2025 East Development (LU #140) - New Trips (Area J)

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				395	395	
																				0%	0%	<- % Reduction, Sensitivity Test
																				395	395	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	8	0	0	0	0	0	0	0	50	0	0	58	66	10	16.8%	2.6%	Area J (790)
7-8am	0	0	0	0	0	10	0	0	0	0	0	0	0	41	0	0	51	55	13	13.8%	3.2%	
8-9am	0	0	0	0	0	8	0	0	0	0	0	0	0	17	0	0	25	23	11	5.7%	2.7%	Hourly Distributions: ITE LU#140
9-10am	0	0	0	0	0	8	0	0	0	0	0	0	0	11	0	0	19	14	11	3.6%	2.9%	
10-11am	0	0	0	0	0	8	0	0	0	0	0	0	0	10	0	0	18	13	11	3.3%	2.8%	Directional Distribution: "East Dist"
11am-12pm	0	0	0	0	0	14	0	0	0	0	0	0	0	18	0	0	32	24	19	6.2%	4.7%	from TIA
12-1pm	0	0	0	0	0	18	0	0	0	0	0	0	0	26	0	0	44	35	24	8.9%	6.1%	
1-2pm	0	0	0	0	0	21	0	0	0	0	0	0	0	20	0	0	41	27	28	6.8%	7.0%	
2-3pm	0	0	0	0	0	20	0	0	0	0	0	0	0	15	0	0	35	20	27	5.1%	6.9%	
3-4pm	0	0	0	0	0	62	0	0	0	0	0	0	0	29	0	0	91	38	82	9.7%	20.7%	
4-5pm	0	0	0	0	0	35	0	0	0	0	0	0	0	11	0	0	46	14	46	3.6%	11.6%	
5-6pm	0	0	0	0	0	29	0	0	0	0	0	0	0	8	0	0	37	11	38	2.7%	9.5%	
6-7pm	0	0	0	0	0	7	0	0	0	0	0	0	0	4	0	0	11	5	9	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

2025 South Development (LU #140) - New Trips

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				350	350	
																				0%	0%	<- % Reduction, Sensitivity Test
																				350	350	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	5	0	0	0	0	0	0	0	30	0	0	35	59	9	16.8%	2.6%	Area U (255)
7-8am	0	0	0	0	0	6	0	0	0	0	0	0	0	24	0	0	30	48	11	13.8%	3.2%	Area U (445)
8-9am	0	0	0	0	0	5	0	0	0	0	0	0	0	10	0	0	15	20	9	5.7%	2.7%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	7	0	0	12	13	10	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	11	12	10	3.3%	2.8%	
11am-12pm	0	0	0	0	0	8	0	0	0	0	0	0	0	11	0	0	19	22	16	6.2%	4.7%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	0	11	0	0	0	0	0	0	0	16	0	0	27	31	21	8.9%	6.1%	from TIA
1-2pm	0	0	0	0	0	13	0	0	0	0	0	0	0	12	0	0	25	24	25	6.8%	7.0%	
2-3pm	0	0	0	0	0	12	0	0	0	0	0	0	0	9	0	0	21	18	24	5.1%	6.9%	
3-4pm	0	0	0	0	0	36	0	0	0	0	0	0	0	17	0	0	53	34	72	9.7%	20.7%	
4-5pm	0	0	0	0	0	21	0	0	0	0	0	0	0	7	0	0	28	13	41	3.6%	11.6%	
5-6pm	0	0	0	0	0	17	0	0	0	0	0	0	0	5	0	0	22	9	33	2.7%	9.5%	
6-7pm	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	6	4	8	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50%			IN %					
OUT %						50%											OUT %					

2025 South Development (LU #710) - New Trips

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				230	230	
																				0%	0%	<- % Reduction, Sensitivity Test
																				230	230	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	7	11	1	4.6%	0.5%	Area U (435)
7-8am	0	0	0	0	0	2	0	0	0	0	0	0	0	15	0	0	17	30	4	13.1%	1.9%	Area U (25)
8-9am	0	0	0	0	0	4	0	0	0	0	0	0	0	17	0	0	21	33	8	14.4%	3.5%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	8	0	0	13	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	0	0	0	0	7	0	0	0	0	0	0	0	6	0	0	13	12	14	5.4%	5.9%	
11am-12pm	0	0	0	0	0	12	0	0	0	0	0	0	0	7	0	0	19	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	0	12	0	0	0	0	0	0	0	12	0	0	24	23	24	10.2%	10.4%	from TIA
1-2pm	0	0	0	0	0	8	0	0	0	0	0	0	0	11	0	0	19	21	15	9.0%	6.7%	
2-3pm	0	0	0	0	0	8	0	0	0	0	0	0	0	10	0	0	18	19	15	8.2%	6.5%	
3-4pm	0	0	0	0	0	10	0	0	0	0	0	0	0	9	0	0	19	17	20	7.4%	8.5%	
4-5pm	0	0	0	0	0	18	0	0	0	0	0	0	0	7	0	0	25	13	35	5.5%	15.2%	
5-6pm	0	0	0	0	0	18	0	0	0	0	0	0	0	5	0	0	23	10	36	4.2%	15.6%	
6-7pm	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	6	4	7	1.7%	2.9%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50%			IN %					
OUT %						50%											OUT %					

APPENDIX I
Traffic Signal Warrant Analysis

Year 2040 Build
Holy Hill Road & Gateway Crossing

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Holy Hill Road & Gateway Crossing
County: Washington
Village: Germantown

Major Street: Holy Hill Road
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: Gateway Crossing
Critical Approach Speed: 25 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 0%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2040 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	105	84
Number of Hours	0	1

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	53	42
Number of Hours	5	7

Satisfied? No

Condition C: Combination of A & B at 56%

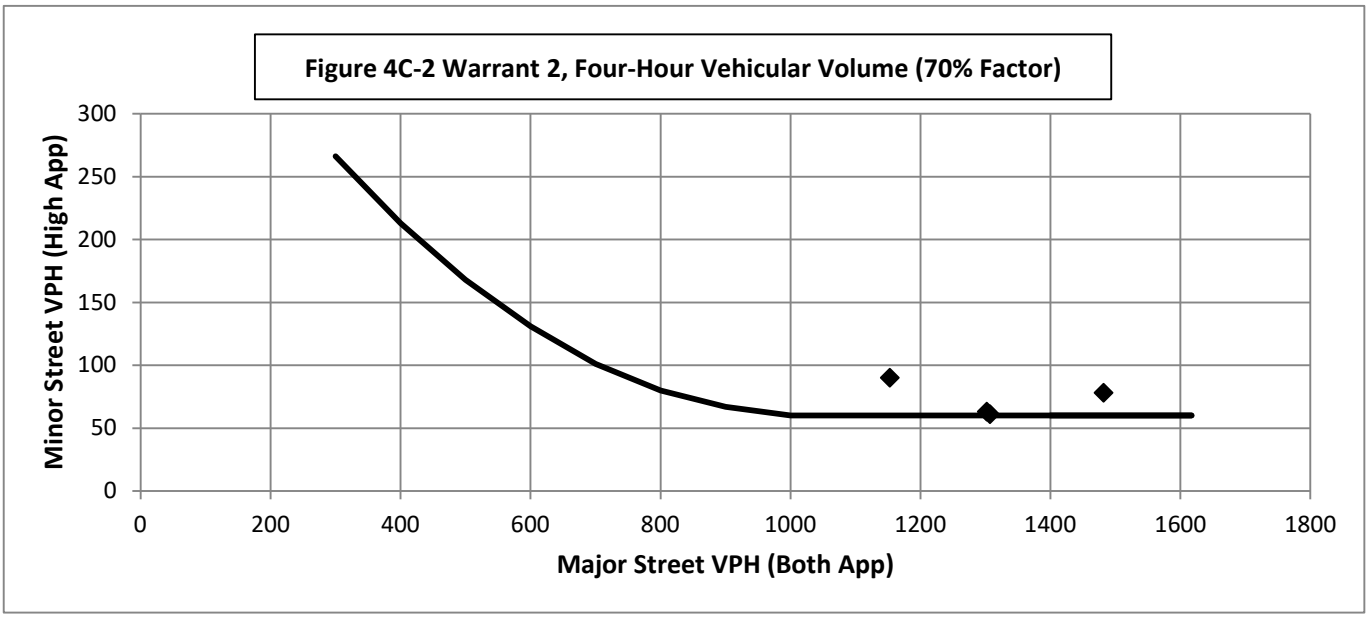
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	1151	9	1160
2	7:00	8:00	1517	17	1534
3	8:00	9:00	1101	26	1127
4	9:00	10:00	964	40	1004
5	10:00	11:00	939	46	985
6	11:00	12:00	1075	50	1125
7	12:00	13:00	1302	63	1365
8	13:00	14:00	1170	40	1210
9	14:00	15:00	1199	55	1254
10	15:00	16:00	1482	78	1560
11	16:00	17:00	1307	61	1368
12	17:00	18:00	1153	90	1243
13	18:00	19:00	0	0	0
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	15:00	16:00	12:00	17:00
Major Road Vol.	1482	1307	1302	1153
Minor Road Vol.	78	61	63	90



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

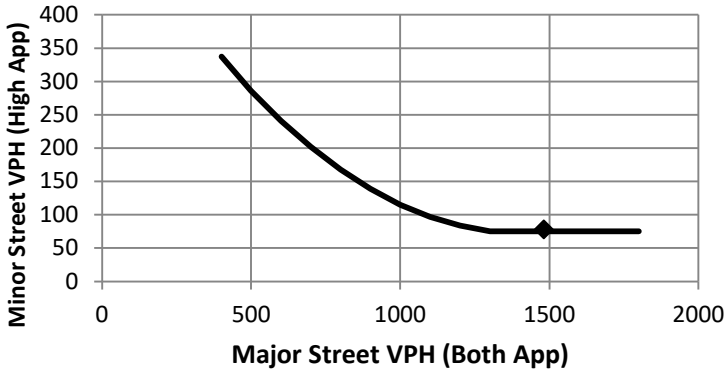
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	No
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
15:00	1482	78

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

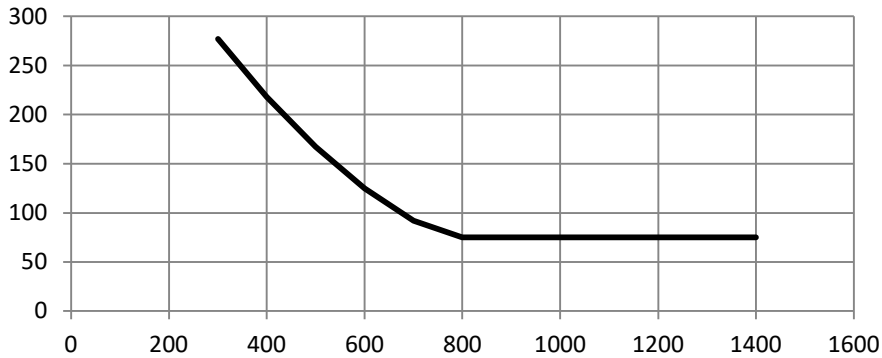
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

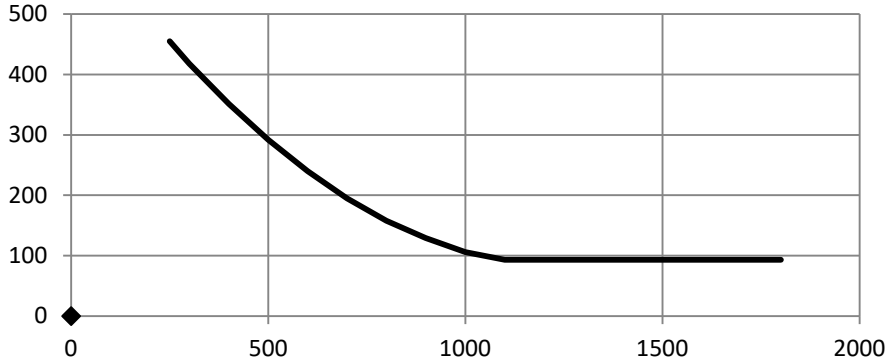


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1560	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	15:00	1482	78	26.13

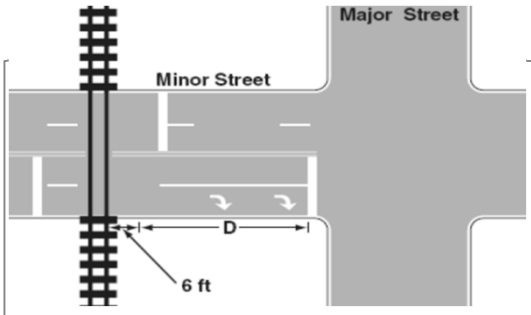
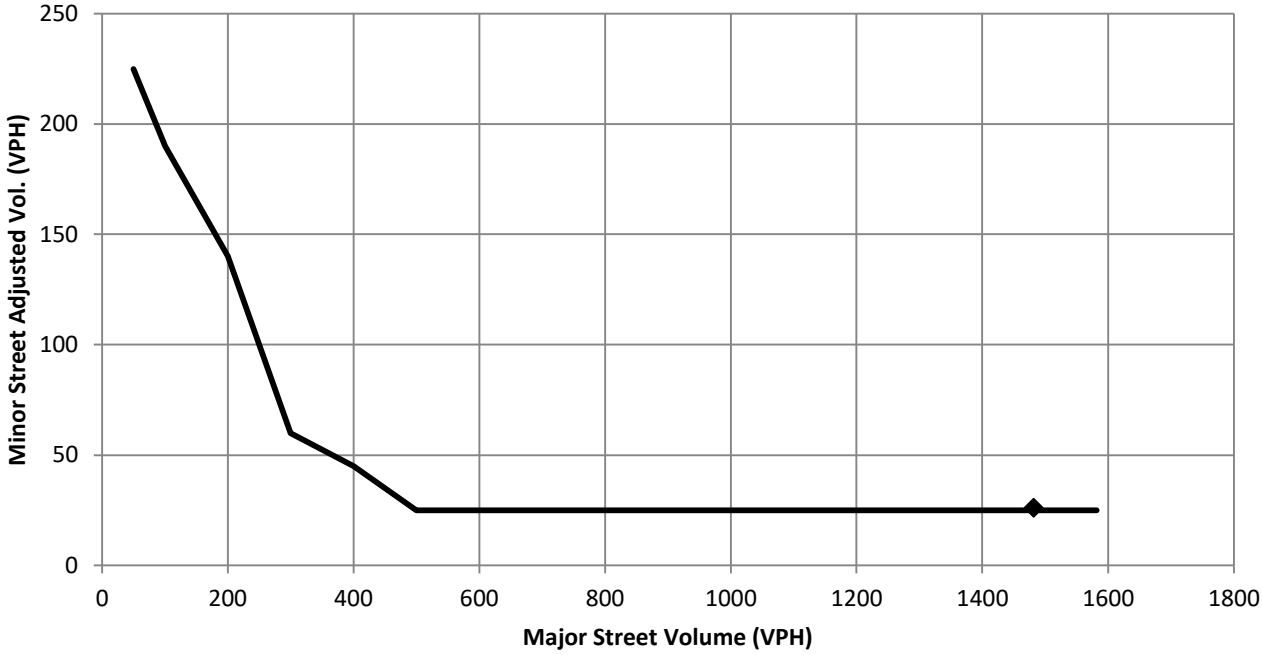


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Assumes 2040 modifications of 4-lane divided cross-section on Holy Hill Road and at least 2 lanes on the NB and SB approaches. For stop control, assume LT/TH Lane and RT Lane (1 lane approach and 0% RT volumes).

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	26	0	4	0	30	54	245	25	0	324	4	0	9	0	13	73	592	162	0	827	1194
	7:00	42	0	11	0	53	71	398	35	0	504	7	0	17	0	24	107	693	213	0	1013	1594
	8:00	58	0	15	0	73	43	361	21	0	425	11	0	26	0	37	65	483	128	0	676	1211
	9:00	83	0	23	0	106	38	369	18	0	425	16	0	40	0	56	54	373	112	0	539	1126
MD	10:00	94	0	27	0	121	37	361	18	0	416	18	0	46	0	64	54	359	110	0	523	1124
	11:00	104	0	30	0	134	29	457	15	0	501	20	0	50	0	70	43	443	88	0	574	1279
	12:00	139	0	43	0	182	41	535	20	0	596	28	0	63	0	91	60	524	122	0	706	1575
	13:00	96	0	28	0	124	36	451	18	0	505	19	0	40	0	59	53	504	108	0	665	1353
PM	14:00	118	0	35	0	153	32	547	16	0	595	22	0	55	0	77	48	458	98	0	604	1429
	15:00	191	0	60	0	251	29	806	13	0	848	37	0	78	0	115	40	506	88	0	634	1848
	16:00	139	0	42	0	181	17	758	7	0	782	27	0	61	0	88	23	453	49	0	525	1576
	17:00	193	0	59	0	252	8	703	3	0	714	38	0	90	0	128	9	407	23	0	439	1533
	18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		1283	0	377	0	1660	435	5991	209	0	6635	247	0	575	0	822	629	5795	1301	0	7725	16842

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach?

% Right Turns Included (Default 0%)

From North (SB)	0%
From East (WB)	100%
From South (NB)	0%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
127	837	187	1024	1151
178	1091	248	1339	1517
108	844	149	993	1101
92	742	130	872	964
91	720	128	848	939
72	900	103	1003	1075
101	1059	142	1201	1302
89	955	126	1081	1170
80	1005	114	1119	1199
69	1312	101	1413	1482
40	1211	56	1267	1307
17	1110	26	1136	1153
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1064	11786	1510	13296	14360

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	9	9	9
0	0	17	17	17
0	0	26	26	26
0	0	40	40	40
0	0	46	46	46
0	0	50	50	50
0	0	63	63	63
0	0	40	40	40
0	0	55	55	55
0	0	78	78	78
0	0	61	61	61
0	0	90	90	90
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	575	575	575

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Gateway Crossing & Holy Hill Road

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals
6-7am	0	0	0	0	0	94	0	0	0	0	0	0	0	218	0	0	312
7-8am	0	0	0	0	0	138	0	0	0	0	0	0	0	210	0	0	348
8-9am	0	0	0	0	0	100	0	0	0	0	0	0	0	132	0	0	232
9-10am	0	0	0	0	0	107	0	0	0	0	0	0	0	103	0	0	210
10-11am	0	0	0	0	0	82	0	0	0	0	0	0	0	85	0	0	167
11am-12pm	0	0	0	0	0	112	0	0	0	0	0	0	0	120	0	0	232
12-1pm	0	0	0	0	0	125	0	0	0	0	0	0	0	101	0	0	226
1-2pm	0	0	0	0	0	115	0	0	0	0	0	0	0	138	0	0	253
2-3pm	0	0	0	0	0	182	0	0	0	0	0	0	0	117	0	0	299
3-4pm	0	0	0	0	0	251	0	0	0	0	0	0	0	124	0	0	375
4-5pm	0	0	0	0	0	278	0	0	0	0	0	0	0	159	0	0	437
5-6pm	0	0	0	0	0	204	0	0	0	0	0	0	0	132	0	0	336
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes

Midday counts at 48th taken during construction/detours in area, resulting in lower than normal counts on Holy Hill Road. Therefore, EB & SB Through Volumes at 48th Street were calculated from the IH-41/45 NB Ramp count.
Midday count was from 9A-3P.

The "Existing' traffic used in the Gateway Crossing warrant analysis was taken from the EB & WB traffic throught the 48th Street intersection as evaluated in the 48th Street warrant analysis.

Year 2040 Background Traffic

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals
6-7am	0	0	0	0	0	115	0	0	0	0	0	0	0	254	0	0	369
7-8am	0	0	0	0	0	168	0	0	0	0	0	0	0	245	0	0	413
8-9am	0	0	0	0	0	122	0	0	0	0	0	0	0	154	0	0	276
9-10am	0	0	0	0	0	131	0	0	0	0	0	0	0	120	0	0	251
10-11am	0	0	0	0	0	100	0	0	0	0	0	0	0	99	0	0	199
11am-12pm	0	0	0	0	0	137	0	0	0	0	0	0	0	140	0	0	277
12-1pm	0	0	0	0	0	153	0	0	0	0	0	0	0	118	0	0	271
1-2pm	0	0	0	0	0	140	0	0	0	0	0	0	0	161	0	0	301
2-3pm	0	0	0	0	0	222	0	0	0	0	0	0	0	136	0	0	358
3-4pm	0	0	0	0	0	306	0	0	0	0	0	0	0	144	0	0	450
4-5pm	0	0	0	0	0	339	0	0	0	0	0	0	0	185	0	0	524
5-6pm	0	0	0	0	0	249	0	0	0	0	0	0	0	154	0	0	403
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Growth Rates						0.9%								0.7%			
PM Growth Rates						1.1%								0.8%			

Notes

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection					
																			AADT IN	AADT OUT		
																			1165	1165		
																			0%	0%	<- % Reduction, Sensitivity Test	
																			1165	1165		
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	55	52	4.7%	4.5%	Existing Kwik Trip daily traffic estimated
7-8am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	66	66	5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	75	73	6.4%	6.3%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	63	64	5.4%	5.5%	Distribution based on 2020 counts
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	61	61	5.2%	5.2%	collected at Kwik Trip driveways:
11am-12pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	65	63	5.6%	5.4%	25% to/from west on 167 (770)
12-1pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	73	6.3%	6.3%	75% to/from east on 167 (2330)
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	68	66	5.8%	5.7%	
2-3pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	70	70	6.0%	6.0%	Distribution to/from I/S same as
3-4pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	72	6.3%	6.2%	evaluated for KT assignment in TIA.
4-5pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	73	6.3%	6.3%	
5-6pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	77	76	6.6%	6.5%	Hourly Distributions: ITE LU#960
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						8%											IN %					
OUT %														8%			OUT %					

By: TSC
Date: 1/13/2021

Exxon (-)

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Exxon traffic was approximately 23%
7-8am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Therefore, subtract 23% of hourly
9-10am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			traffic from Kwik Trip (+) table.
10-11am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
11am-12pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
12-1pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
1-2pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
2-3pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
3-4pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
4-5pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
5-6pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Gateway (+)

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				175	175	
																				0%	0%	<- % Reduction, Sensitivity Test
																				175	175	
																				% AADT IN	% AADT OUT	
6-7am	4	0	1	0	7	0	0	0	0	0	0	0	0	0	22	0	34	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	5	0	2	0	6	0	0	0	0	0	0	0	0	0	18	0	31	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	4	0	1	0	3	0	0	0	0	0	0	0	0	0	8	0	16	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	4	0	1	0	2	0	0	0	0	0	0	0	0	0	5	0	12	6	5	3.6%	2.9%	
10-11am	4	0	1	0	2	0	0	0	0	0	0	0	0	0	5	0	12	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	6	0	2	0	3	0	0	0	0	0	0	0	0	0	8	0	19	11	8	6.2%	4.7%	
12-1pm	8	0	3	0	4	0	0	0	0	0	0	0	0	0	12	0	27	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	9	0	3	0	3	0	0	0	0	0	0	0	0	0	9	0	24	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	9	0	3	0	2	0	0	0	0	0	0	0	0	0	7	0	21	9	12	5.1%	6.9%	
3-4pm	27	0	9	0	4	0	0	0	0	0	0	0	0	0	13	0	53	17	36	9.7%	20.7%	
4-5pm	15	0	5	0	2	0	0	0	0	0	0	0	0	0	5	0	27	6	20	3.6%	11.6%	
5-6pm	13	0	4	0	1	0	0	0	0	0	0	0	0	0	4	0	22	5	17	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					25%										75%		IN %					
OUT %	75%		25%														OUT %					

2040 West Development (LU #110 & #130) - New Trips

Start Time	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Gateway Crossing Right	Gateway Crossing Thru	Gateway Crossing Left	Gateway Crossing U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				2835	2835	
																				0%	0%	<- % Reduction, Sensitivity Test
																				2835	2835	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	15	0	0	0	0	0	0	0	2	0	0	17	301	34	10.6%	1.2%	Area A (820) New
7-8am	0	0	0	0	0	25	0	0	0	0	0	0	0	4	0	0	29	490	77	17.3%	2.7%	Area C (2775) New
8-9am	0	0	0	0	0	15	0	0	0	0	0	0	0	6	0	0	21	295	119	10.4%	4.2%	Area D (2325) New
9-10am	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	20	190	193	6.7%	6.8%	
10-11am	0	0	0	0	0	10	0	0	0	0	0	0	0	11	0	0	21	207	224	7.3%	7.9%	Less 5% Linked Trips for Areas C & D
11am-12pm	0	0	0	0	0	10	0	0	0	0	0	0	0	12	0	0	22	193	238	6.8%	8.4%	Area C (-140) linked
12-1pm	0	0	0	0	0	13	0	0	0	0	0	0	0	15	0	0	28	266	301	9.4%	10.6%	Area D (-115) linked
1-2pm	0	0	0	0	0	12	0	0	0	0	0	0	0	9	0	0	21	230	184	8.1%	6.5%	
2-3pm	0	0	0	0	0	10	0	0	0	0	0	0	0	13	0	0	23	201	264	7.1%	9.3%	
3-4pm	0	0	0	0	0	8	0	0	0	0	0	0	0	18	0	0	26	164	363	5.8%	12.8%	Hourly Distributions: ITE LU#110
4-5pm	0	0	0	0	0	5	0	0	0	0	0	0	0	14	0	0	19	96	286	3.4%	10.1%	
5-6pm	0	0	0	0	0	2	0	0	0	0	0	0	0	22	0	0	24	31	431	1.1%	15.2%	Directional Distribution: "West Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2040 West Development (LU #210) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				245	245	
																				0%	0%	<- % Reduction, Sensitivity Test
																				245	245	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	14	1.6%	5.9%	490 new trips
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	25	3.2%	10.2%	
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	9	21	3.7%	8.6%	
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8	13	3.2%	5.4%	Hourly Distributions: ITE LU#210
10-11am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	10	13	4.2%	5.4%	
11am-12pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	13	12	5.4%	5.1%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	13	14	5.5%	5.6%	from TIA
1-2pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	15	14	6.0%	5.9%	
2-3pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	17	15	7.0%	6.2%	
3-4pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	21	15	8.5%	6.0%	
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	26	18	10.5%	7.5%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	25	18	10.3%	7.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

2040 West Development (LU #220) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				285	285	
																				0%	0%	<- % Reduction, Sensitivity Test
																				285	285	
																				% AADT IN	% AADT OUT	
6-7am	0	0		0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	17	1.1%	5.8%	565 new trips
7-8am	0	0		0	0	0	0	0	0	0	0	0	0	2	0	0	2	7	37	2.6%	12.9%	
8-9am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	26	4.0%	9.1%	
9-10am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	21	3.9%	7.2%	Hourly Distributions: ITE LU#220
10-11am	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	11	13	3.9%	4.7%	
11am-12pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	16	4.9%	5.5%	Directional Distribution: "West Dist"
12-1pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	16	15	5.6%	5.4%	from TIA
1-2pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	14	4.8%	4.9%	
2-3pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	17	17	5.9%	6.0%	
3-4pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	24	15	8.3%	5.2%	
4-5pm	0	0		0	0	1	0	0	0	0	0	0	0	1	0	0	2	29	15	10.0%	5.1%	
5-6pm	0	0		0	0	2	0	0	0	0	0	0	0	1	0	0	3	32	19	11.4%	6.7%	
6-7pm	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

2040 West Development (LU #154) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				915	915	
																				0%	0%	<- % Reduction, Sensitivity Test
																				915	915	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	6	93	19	10.2%	2.1%	
7-8am	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4	67	21	7.3%	2.3%	Area C (1125) New
8-9am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	47	26	5.1%	2.8%	Area D (800) New
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	6	108	24	11.8%	2.6%	
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	5	87	27	9.5%	2.9%	Less 5% Linked Trips for Areas C & D
11am-12pm	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4	35	34	3.8%	3.7%	Area C (-55) linked
12-1pm	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	5	47	63	5.1%	6.9%	Area D (-40) linked
1-2pm	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	54	54	5.9%	5.9%	
2-3pm	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5	55	39	6.0%	4.3%	
3-4pm	0	0	0	0	0	2	0	0	0	0	0	0	0	5	0	0	7	48	92	5.3%	10.0%	Hourly Distributions: ITE LU#154
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	4	28	58	3.1%	6.3%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	5	20	71	2.2%	7.8%	Directional Distribution: "West Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2040 West Development (LU #960 - Kwik Trip Growth to 2040) - Diverted Linked Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				910	910	
																				0%	0%	<- % Reduction, Sensitivity Test
																				910	910	
																				% AADT IN	% AADT OUT	
6-7am	3	0	-3	0	0	0	0	0	-1	0	1	0	0	4	0	0	4	43	41	4.7%	4.5%	5530 daiyl trips at 100% in 2040
7-8am	3	0	-3	0	0	0	0	0	-1	0	1	0	0	5	0	0	5	52	52	5.7%	5.7%	-3100 existing daily trips
8-9am	3	0	-3	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	58	57	6.4%	6.3%	
9-10am	3	0	-3	0	0	0	0	0	-1	0	1	0	0	5	0	0	5	49	50	5.4%	5.5%	=2430 new KT trips in 2025 Build.
10-11am	3	0	-3	0	0	0	0	0	-1	0	1	0	0	5	0	0	5	47	47	5.2%	5.2%	
11am-12pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	5	0	0	5	51	49	5.6%	5.4%	75% (1820) are diverted linked trips
12-1pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	57	57	6.3%	6.3%	25% (610) are pas-by trips
1-2pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	5	0	0	5	53	52	5.8%	5.7%	PB trips do not pass through
2-3pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	55	55	6.0%	6.0%	intersection.
3-4pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	57	56	6.3%	6.2%	
4-5pm	3	0	-3	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	57	57	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	4	0	-4	0	0	0	0	0	-1	0	1	0	0	6	0	0	6	60	59	6.6%	6.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %	6%		-6%			0%			-2%		2%						IN %					
OUT %														10%			OUT %					

2040 East Development (LU #130) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				4670	4670	
																				0%	0%	<- % Reduction, Sensitivity Test
																				4670	4670	
																				% AADT IN	% AADT OUT	
6-7am	12	0	4	0	35	33	20	0	2	0	7	0	59	165	104	0	441	495	56	10.6%	1.2%	Area F (1145) New (12%)
7-8am	26	0	9	0	57	66	32	0	5	0	15	0	97	271	170	0	748	808	126	17.3%	2.7%	Area H (135) (28%)
8-9am	41	0	14	0	34	80	19	0	8	0	24	0	58	166	102	0	546	486	196	10.4%	4.2%	Area H (2515)
9-10am	67	0	22	0	22	114	13	0	13	0	38	0	38	113	66	0	506	313	318	6.7%	6.8%	Area I (1545)
10-11am	77	0	26	0	24	132	14	0	15	0	44	0	41	124	72	0	569	341	369	7.3%	7.9%	Area K (1615)
11am-12pm	82	0	27	0	22	139	13	0	16	0	47	0	38	117	67	0	568	318	392	6.8%	8.4%	Area P (1535) (16%)
12-1pm	104	0	35	0	31	176	18	0	20	0	59	0	53	160	92	0	748	439	495	9.4%	10.6%	Area Q (845)
1-2pm	64	0	21	0	26	111	15	0	12	0	36	0	45	134	79	0	543	378	304	8.1%	6.5%	
2-3pm	91	0	30	0	23	153	13	0	17	0	52	0	40	123	70	0	612	332	434	7.1%	9.3%	
3-4pm	126	0	42	0	19	205	11	0	24	0	72	0	33	107	57	0	696	271	598	5.8%	12.8%	Hourly Distributions: ITE LU#110
4-5pm	99	0	33	0	11	161	6	0	19	0	57	0	19	66	33	0	504	159	472	3.4%	10.1%	
5-6pm	149	0	50	0	4	236	2	0	28	0	85	0	6	38	11	0	609	51	710	1.1%	15.2%	Directional Distribution: "East Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					7%	3%	4%						12%	33%	21%		IN %	12	21	9		
OUT %	21%		7%			33%			4%		12%			3%			OUT %	4	7			

2040 East Development (LU #154) - New Trips

	↓ Gateway Crossing				← Holy Hill Road				↑ Gateway Crossing				→ Holy Hill Road				Intersection					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				1005	1005	
																				0%	0%	<- % Reduction, Sensitivity Test
																				1005	1005	
																				% AADT IN	% AADT OUT	
6-7am	7	0	2	0	12	7	5	0	3	0	1	0	14	21	36	0	108	103	21	10.2%	2.1%	Area F (205) New (10%)
7-8am	8	0	3	0	8	6	3	0	3	0	1	0	10	15	25	0	82	73	23	7.3%	2.3%	Area H (930) (46%)
8-9am	10	0	3	0	6	6	2	0	4	0	1	0	7	11	18	0	68	51	28	5.1%	2.8%	Area K (395)
9-10am	9	0	3	0	14	8	5	0	4	0	1	0	16	24	41	0	125	119	26	11.8%	2.6%	Area P (360) (18%)
10-11am	10	0	3	0	11	8	4	0	4	0	1	0	13	20	33	0	107	95	29	9.5%	2.9%	Area Q (115)
11am-12pm	13	0	4	0	4	8	2	0	5	0	2	0	5	8	13	0	64	38	37	3.8%	3.7%	
12-1pm	24	0	8	0	6	14	2	0	9	0	3	0	7	12	18	0	103	51	69	5.1%	6.9%	
1-2pm	20	0	7	0	7	13	3	0	8	0	3	0	8	13	20	0	102	59	59	5.9%	5.9%	
2-3pm	15	0	5	0	7	10	3	0	6	0	2	0	8	13	21	0	90	60	43	6.0%	4.3%	
3-4pm	35	0	12	0	6	21	2	0	14	0	5	0	7	13	18	0	133	53	101	5.3%	10.0%	Hourly Distributions: ITE LU#154
4-5pm	22	0	7	0	4	13	1	0	9	0	3	0	4	8	11	0	82	31	63	3.1%	6.3%	
5-6pm	27	0	9	0	3	16	1	0	11	0	4	0	3	6	8	0	88	22	78	2.2%	7.8%	Directional Distribution: "East Dist"
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					11.5%	2.5%	4.5%						13.5%	19.5%	34.5%		IN %	34.5	13.5			
OUT %	34.5%		11.5%			19.5%			13.5%		4.5%			2.5%			OUT %	11.5	4.5			

By: TSC
Date: 1/13/2021

2040 East Development (LU #934) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				905	905	
																				0%	0%	<- % Reduction, Sensitivity Test
																				905	905	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9	21	17	2.3%	1.9%	Area G (1415) New (50%)
7-8am	0	0	0	0	0	7	0	0	0	0	0	0	0	7	0	0	14	29	26	3.2%	2.9%	Area O (1415) (50%)
8-9am	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0	16	31	30	3.4%	3.3%	Less Internally Linked Trips
9-10am	0	0	0	0	0	8	0	0	0	0	0	0	0	7	0	0	15	30	29	3.3%	3.2%	Area G 5% (-70)
10-11am	0	0	0	0	0	9	0	0	0	0	0	0	0	8	0	0	17	36	33	4.0%	3.7%	Area O 5% (-70)
11am-12pm	0	0	0	0	0	21	0	0	0	0	0	0	0	17	0	0	38	82	69	9.1%	7.6%	Less Externally Linked Trips
12-1pm	0	0	0	0	0	27	0	0	0	0	0	0	0	27	0	0	54	106	107	11.7%	11.8%	Area G 15% (-210)
1-2pm	0	0	0	0	0	18	0	0	0	0	0	0	0	20	0	0	38	71	79	7.9%	8.7%	Area O 15% (-210)
2-3pm	0	0	0	0	0	13	0	0	0	0	0	0	0	15	0	0	28	52	58	5.8%	6.4%	Less Pass-by Trips
3-4pm	0	0	0	0	0	13	0	0	0	0	0	0	0	13	0	0	26	51	51	5.6%	5.6%	Area G 20% (-230)
4-5pm	0	0	0	0	0	13	0	0	0	0	0	0	0	12	0	0	25	52	49	5.7%	5.4%	Area O 20% (-230)
5-6pm	0	0	0	0	0	16	0	0	0	0	0	0	0	15	0	0	31	62	58	6.8%	6.4%	Hourly Distributions: ITE LU#934
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %						25.0%											IN %	37.5				
OUT %														25%			OUT %	12.5				

2040 East Development (LU #932) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				290	290	
																				0%	0%	<- % Reduction, Sensitivity Test
																				290	290	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	5	3	1.7%	0.9%	Area G (450) New (50%)
7-8am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	7	5	2.5%	1.7%	Area O (450) (50%)
8-9am	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5	10	8	3.4%	2.9%	Less Internally Linked Trips
9-10am	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	11	10	3.8%	3.3%	Area G 5% (-20)
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	7	15	12	5.2%	4.2%	Area O 5% (-20)
11am-12pm	0	0	0	0	0	9	0	0	0	0	0	0	0	5	0	0	14	35	19	11.9%	6.7%	Less Externally Linked Trips
12-1pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	35	35	12.0%	11.9%	Area G 15% (-70)
1-2pm	0	0	0	0	0	4	0	0	0	0	0	0	0	8	0	0	12	17	31	5.9%	10.8%	Area O 15% (-70)
2-3pm	0	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0	7	11	14	3.9%	4.8%	Less Pass-by Trips
3-4pm	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	10	11	3.4%	3.8%	Area G 20% (-70)
4-5pm	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	8	19	11	6.6%	3.8%	Area O 20% (-70)
5-6pm	0	0	0	0	0	8	0	0	0	0	0	0	0	5	0	0	13	32	20	11.0%	6.8%	Hourly Distributions: ITE LU#932
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %						25.0%											IN %					
OUT %														25.0%			OUT %					

2040 East Development (LU #912) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				240	240	
																				0%	0%	<- % Reduction, Sensitivity Test
																				240	240	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6%	0.3%	Area G (375) New (50%)
7-8am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	5	3	2.2%	1.4%	Area O (375) (50%)
8-9am	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	8	20	13	8.2%	5.3%	Less Internally Linked Trips
9-10am	0	0	0	0	0	6	0	0	0	0	0	0	0	5	0	0	11	22	19	9.2%	8.0%	Area G 5% (-20)
10-11am	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	24	23	9.9%	9.4%	Area O 5% (-20)
11am-12pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	24	25	10.0%	10.5%	Less Externally Linked Trips
12-1pm	0	0	0	0	0	7	0	0	0	0	0	0	0	7	0	0	14	27	26	11.2%	10.8%	Area G 15% (-55)
1-2pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	25	24	10.5%	10.2%	Area O 15% (-55)
2-3pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	24	22	9.8%	9.3%	Less Pass-by Trips
3-4pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	22	24	9.2%	9.9%	Area G 20% (-60)
4-5pm	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	11	21	24	8.7%	10.0%	Area O 20% (-60)
5-6pm	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	11	18	23	7.4%	9.6%	Hourly Distributions: ITE LU#912
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Directional Distribution: "East Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %						25.0%											IN %					
OUT %														25.0%			OUT %					

By: TSC
Date: 1/13/2021

2040 East Development (LU #710) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				915	915	
																				0%	0%	<- % Reduction, Sensitivity Test
																				915	915	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	6	0	0	0	0	0	0	0	20	0	0	26	42	5	4.6%	0.5%	Area G (700) New (38%)
7-8am	0	0	0	0	0	19	0	0	0	0	0	0	0	58	0	0	77	120	17	13.1%	1.9%	Area L (700)
8-9am	0	0	0	0	0	28	0	0	0	0	0	0	0	64	0	0	92	132	32	14.4%	3.5%	Area R (430)
9-10am	0	0	0	0	0	24	0	0	0	0	0	0	0	31	0	0	55	59	39	6.4%	4.3%	
10-11am	0	0	0	0	0	30	0	0	0	0	0	0	0	28	0	0	58	49	54	5.4%	5.9%	Hourly Distributions: ITE LU#710
11am-12pm	0	0	0	0	0	49	0	0	0	0	0	0	0	36	0	0	85	57	94	6.2%	10.3%	
12-1pm	0	0	0	0	0	53	0	0	0	0	0	0	0	52	0	0	105	93	95	10.2%	10.4%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	0	36	0	0	0	0	0	0	0	44	0	0	80	82	61	9.0%	6.7%	for diverted linked trips from TIA
2-3pm	0	0	0	0	0	34	0	0	0	0	0	0	0	41	0	0	75	75	59	8.2%	6.5%	
3-4pm	0	0	0	0	0	42	0	0	0	0	0	0	0	39	0	0	81	68	78	7.4%	8.5%	
4-5pm	0	0	0	0	0	70	0	0	0	0	0	0	0	36	0	0	106	50	139	5.5%	15.2%	
5-6pm	0	0	0	0	0	70	0	0	0	0	0	0	0	32	0	0	102	38	143	4.2%	15.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						9.5%								46.5%			IN %	28.5				
OUT %						46.5%								9.5%			OUT %	9.5				

2040 East Development (LU #140) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				590	590	
																				0%	0%	<- % Reduction, Sensitivity Test
																				590	590	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	11	0	0	0	0	0	0	0	74	0	0	85	99	15	16.8%	2.6%	Area I (385) New
7-8am	0	0	0	0	0	14	0	0	0	0	0	0	0	61	0	0	75	81	19	13.8%	3.2%	Area J (790)
8-9am	0	0	0	0	0	12	0	0	0	0	0	0	0	26	0	0	38	34	16	5.7%	2.7%	
9-10am	0	0	0	0	0	13	0	0	0	0	0	0	0	16	0	0	29	21	17	3.6%	2.9%	
10-11am	0	0	0	0	0	13	0	0	0	0	0	0	0	14	0	0	27	19	17	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	21	0	0	0	0	0	0	0	28	0	0	49	37	28	6.2%	4.7%	
12-1pm	0	0	0	0	0	27	0	0	0	0	0	0	0	40	0	0	67	53	36	8.9%	6.1%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	0	31	0	0	0	0	0	0	0	30	0	0	61	40	41	6.8%	7.0%	for diverted linked trips from TIA
2-3pm	0	0	0	0	0	31	0	0	0	0	0	0	0	23	0	0	54	30	41	5.1%	6.9%	
3-4pm	0	0	0	0	0	92	0	0	0	0	0	0	0	43	0	0	135	57	122	9.7%	20.7%	
4-5pm	0	0	0	0	0	51	0	0	0	0	0	0	0	16	0	0	67	21	68	3.6%	11.6%	
5-6pm	0	0	0	0	0	42	0	0	0	0	0	0	0	12	0	0	54	16	56	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75.0%			IN %					
OUT %						75.0%											OUT %					

2040 East Development (LU #210) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				750	750	
																				0%	0%	<- % Reduction, Sensitivity Test
																				750	750	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	33	0	0	0	0	0	0	0	9	0	0	42	12	44	1.6%	5.9%	Area M (710) New
7-8am	0	0	0	0	0	58	0	0	0	0	0	0	0	18	0	0	76	24	77	3.2%	10.2%	Area S (1155)
8-9am	0	0	0	0	0	49	0	0	0	0	0	0	0	21	0	0	70	28	65	3.7%	8.6%	
9-10am	0	0	0	0	0	31	0	0	0	0	0	0	0	18	0	0	49	24	41	3.2%	5.4%	Less Internally Linked Trips
10-11am	0	0	0	0	0	31	0	0	0	0	0	0	0	24	0	0	55	32	41	4.2%	5.4%	Area M 20% (-140)
11am-12pm	0	0	0	0	0	29	0	0	0	0	0	0	0	31	0	0	60	41	38	5.4%	5.1%	Area S 20% (-230)
12-1pm	0	0	0	0	0	32	0	0	0	0	0	0	0	31	0	0	63	41	42	5.5%	5.6%	
1-2pm	0	0	0	0	0	33	0	0	0	0	0	0	0	34	0	0	67	45	44	6.0%	5.9%	Hourly Distributions: ITE LU#210
2-3pm	0	0	0	0	0	35	0	0	0	0	0	0	0	40	0	0	75	53	47	7.0%	6.2%	
3-4pm	0	0	0	0	0	34	0	0	0	0	0	0	0	48	0	0	82	64	45	8.5%	6.0%	Directional Distribution: "East Dist"
4-5pm	0	0	0	0	0	42	0	0	0	0	0	0	0	59	0	0	101	79	56	10.5%	7.5%	for diverted linked trips from TIA
5-6pm	0	0	0	0	0	42	0	0	0	0	0	0	0	58	0	0	100	77	56	10.3%	7.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

By: TSC
Date: 1/13/2021

2040 East Development (LU #840) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4	10	2	1.2%	0.2%	Area N (1820)
7-8am	0	0	0	0	0	19	0	0	0	0	0	0	0	5	0	0	24	74	19	9.0%	2.3%	
8-9am	0	0	0	0	0	23	0	0	0	0	0	0	0	11	0	0	34	93	43	11.3%	5.3%	Less Externally Linked Trips
9-10am	0	0	0	0	0	17	0	0	0	0	0	0	0	14	0	0	31	66	57	8.1%	6.9%	Area N 10% (-185)
10-11am	0	0	0	0	0	19	0	0	0	0	0	0	0	15	0	0	34	75	58	9.2%	7.1%	
11am-12pm	0	0	0	0	0	18	0	0	0	0	0	0	0	19	0	0	37	71	74	8.6%	9.0%	Hourly Distributions: ITE LU#840
12-1pm	0	0	0	0	0	18	0	0	0	0	0	0	0	21	0	0	39	70	85	8.5%	10.4%	
1-2pm	0	0	0	0	0	20	0	0	0	0	0	0	0	19	0	0	39	78	77	9.5%	9.4%	Directional Distribution: "East Dist"
2-3pm	0	0	0	0	0	19	0	0	0	0	0	0	0	23	0	0	42	75	90	9.1%	11.0%	for diverted linked trips from TIA
3-4pm	0	0	0	0	0	14	0	0	0	0	0	0	0	20	0	0	34	57	80	6.9%	9.8%	
4-5pm	0	0	0	0	0	15	0	0	0	0	0	0	0	16	0	0	31	60	62	7.3%	7.5%	
5-6pm	0	0	0	0	0	13	0	0	0	0	0	0	0	21	0	0	34	52	82	6.4%	10.0%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						25.0%											IN %					
OUT %														25%			OUT %					

AADT IN	AADT OUT
820	820
0%	0%
820	820

<- % Reduction, Sensitivity Test

2040 East Development (LU #843) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0.6%	0.0%	Area N (905)
7-8am	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4	13	4	3.2%	1.0%	
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	5	0	0	11	25	21	6.0%	5.0%	Less Externally Linked Trips
9-10am	0	0	0	0	0	9	0	0	0	0	0	0	0	8	0	0	17	35	32	8.5%	7.8%	Area N 10% (-90)
10-11am	0	0	0	0	0	8	0	0	0	0	0	0	0	9	0	0	17	33	36	8.1%	8.7%	
11am-12pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	34	36	8.4%	8.8%	Hourly Distributions: ITE LU#843
12-1pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	36	35	8.8%	8.5%	
1-2pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	36	35	8.8%	8.5%	Directional Distribution: "East Dist"
2-3pm	0	0	0	0	0	7	0	0	0	0	0	0	0	7	0	0	14	29	29	7.1%	7.0%	for diverted linked trips from TIA
3-4pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	36	36	8.7%	8.8%	
4-5pm	0	0	0	0	0	9	0	0	0	0	0	0	0	9	0	0	18	35	37	8.6%	9.1%	
5-6pm	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0	16	30	32	7.3%	7.7%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						25.0%											IN %					
OUT %														25.0%			OUT %					

AADT IN	AADT OUT
410	410
0%	0%
410	410

<- % Reduction, Sensitivity Test

2040 East Development Externally Linked Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	-6	0	0	0	0	0	0	0	-53	0	0	-59	70	8	10.6%	1.2%	Externally Linked trips are to/from
7-8am	0	0	0	0	0	-14	0	0	0	0	0	0	0	-86	0	0	-100	114	18	17.3%	2.7%	different types of land uses in the area,
8-9am	0	0	0	0	0	-21	0	0	0	0	0	0	0	-52	0	0	-73	69	28	10.4%	4.2%	meaning that different distributions would
9-10am	0	0	0	0	0	-34	0	0	0	0	0	0	0	-33	0	0	-67	44	45	6.7%	6.8%	represent the same trips exiting one
10-11am	0	0	0	0	0	-39	0	0	0	0	0	0	0	-36	0	0	-75	48	52	7.3%	7.9%	development and entering another.
11am-12pm	0	0	0	0	0	-41	0	0	0	0	0	0	0	-34	0	0	-75	45	55	6.8%	8.4%	
12-1pm	0	0	0	0	0	-53	0	0	0	0	0	0	0	-47	0	0	-100	62	70	9.4%	10.6%	For simplicites sake, this warrant analysis
1-2pm	0	0	0	0	0	-32	0	0	0	0	0	0	0	-40	0	0	-72	53	43	8.1%	6.5%	assumes one trip distribution for all
2-3pm	0	0	0	0	0	-46	0	0	0	0	0	0	0	-35	0	0	-81	47	61	7.1%	9.3%	externally linked trips. Land Use #110
3-4pm	0	0	0	0	0	-63	0	0	0	0	0	0	0	-29	0	0	-92	38	84	5.8%	12.8%	was chosen as most trips are to/from
4-5pm	0	0	0	0	0	-50	0	0	0	0	0	0	0	-17	0	0	-67	22	67	3.4%	10.1%	the light industrial areas on site.
5-6pm	0	0	0	0	0	-75	0	0	0	0	0	0	0	-5	0	0	-80	7	100	1.1%	15.2%	(residential-Lt; commercial-Lt, etc.)
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														75%			IN %					
OUT %						75%											OUT %					

AADT IN	AADT OUT
660	660
0%	0%
660	660

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2040 East Development (LU #934) - Pass-by Trips

Start Time	Gateway Crossing (↓) Right	Thru	Left	U-Turn	Holy Hill Road (←) Right	Thru	Left	U-Turn	Gateway Crossing (↑) Right	Thru	Left	U-Turn	Holy Hill Road (→) Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	2.3%	1.9%	Land Use#934 Pass-by
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	3.2%	2.9%	Area G (230)
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	3.4%	3.3%	Area O (230)
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	3.3%	3.2%	
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	4.0%	3.7%	Hourly Distributions: ITE LU#934
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	17	9.1%	7.6%	
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	27	11.7%	11.8%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	20	7.9%	8.7%	for diverted linked trips from TIA
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	15	5.8%	6.4%	
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	5.6%	5.6%	Pass-by does not impact Gateway
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	5.7%	5.4%	intersection.
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	15	6.8%	6.4%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AM%																	IN %	32.5				
PM%																	OUT %					

AADT IN	AADT OUT
230	230
0%	0%
230	230

<- % Reduction, Sensitivity Test

2040 East Development (LU #932) - Pass-by Trips

Start Time	Gateway Crossing (↓) Right	Thru	Left	U-Turn	Holy Hill Road (←) Right	Thru	Left	U-Turn	Gateway Crossing (↑) Right	Thru	Left	U-Turn	Holy Hill Road (→) Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1.7%	0.9%	Land Use#932 Pass-by
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2.5%	1.7%	Area G (70)
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	3.4%	2.9%	Area O (70)
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	3.8%	3.3%	
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	5.2%	4.2%	Pass-by does not impact Gateway
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5	11.9%	6.7%	intersection.
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	12.0%	11.9%	
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	5.9%	10.8%	
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3.9%	4.8%	
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3.4%	3.8%	
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	6.6%	3.8%	
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5	11.0%	6.8%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
AM%																	IN %					
PM%																	OUT %					

AADT IN	AADT OUT
70	70
0%	0%
70	70

<- % Reduction, Sensitivity Test

2040 East Development (LU #912) - Pass-by Trips

Start Time	Gateway Crossing (↓) Right	Thru	Left	U-Turn	Holy Hill Road (←) Right	Thru	Left	U-Turn	Gateway Crossing (↑) Right	Thru	Left	U-Turn	Holy Hill Road (→) Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6%	0.3%	Land Use#912 Pass-by
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2.2%	1.4%	Area G (60)
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8.2%	5.3%	Area O (60)
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	9.2%	8.0%	
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	9.9%	9.4%	Pass-by does not impact Gateway
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	10.0%	10.5%	intersection.
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	11.2%	10.8%	
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	10.5%	10.2%	
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	9.8%	9.3%	
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	9.2%	9.9%	
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	8.7%	10.0%	
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	7.4%	9.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

AADT IN	AADT OUT
60	60
0%	0%
60	60

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2040 South Development (LU #130 & 140) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				930	930	
																				0%	0%	<- % Reduction, Sensitivity Test
																				930	930	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	12	0	0	0	0	0	0	0	78	0	0	90	156	24	16.8%	2.6%	Area T (1160)
7-8am	0	0	0	0	0	15	0	0	0	0	0	0	0	64	0	0	79	128	30	13.8%	3.2%	Area U (255)
8-9am	0	0	0	0	0	13	0	0	0	0	0	0	0	27	0	0	40	53	25	5.7%	2.7%	Area U (445)
9-10am	0	0	0	0	0	14	0	0	0	0	0	0	0	17	0	0	31	33	27	3.6%	2.9%	
10-11am	0	0	0	0	0	13	0	0	0	0	0	0	0	16	0	0	29	31	26	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	22	0	0	0	0	0	0	0	29	0	0	51	58	44	6.2%	4.7%	
12-1pm	0	0	0	0	0	29	0	0	0	0	0	0	0	42	0	0	71	83	57	8.9%	6.1%	Directional Distribution: "South Dist"
1-2pm	0	0	0	0	0	33	0	0	0	0	0	0	0	32	0	0	65	63	65	6.8%	7.0%	from TIA
2-3pm	0	0	0	0	0	32	0	0	0	0	0	0	0	24	0	0	56	47	64	5.1%	6.9%	
3-4pm	0	0	0	0	0	97	0	0	0	0	0	0	0	45	0	0	142	90	193	9.7%	20.7%	
4-5pm	0	0	0	0	0	54	0	0	0	0	0	0	0	17	0	0	71	33	108	3.6%	11.6%	
5-6pm	0	0	0	0	0	44	0	0	0	0	0	0	0	13	0	0	57	25	88	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50%			IN %					
OUT %						50%											OUT %					

2040 South Development (LU #710) - New Trips

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				230	230	
																				0%	0%	<- % Reduction, Sensitivity Test
																				230	230	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	7	11	1	4.6%	0.5%	Area U (435)
7-8am	0	0	0	0	0	2	0	0	0	0	0	0	0	15	0	0	17	30	4	13.1%	1.9%	Area U (25)
8-9am	0	0	0	0	0	4	0	0	0	0	0	0	0	17	0	0	21	33	8	14.4%	3.5%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	8	0	0	13	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	0	0	0	0	7	0	0	0	0	0	0	0	6	0	0	13	12	14	5.4%	5.9%	
11am-12pm	0	0	0	0	0	12	0	0	0	0	0	0	0	7	0	0	19	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	0	12	0	0	0	0	0	0	0	12	0	0	24	23	24	10.2%	10.4%	from TIA
1-2pm	0	0	0	0	0	8	0	0	0	0	0	0	0	11	0	0	19	21	15	9.0%	6.7%	
2-3pm	0	0	0	0	0	8	0	0	0	0	0	0	0	10	0	0	18	19	15	8.2%	6.5%	
3-4pm	0	0	0	0	0	10	0	0	0	0	0	0	0	9	0	0	19	17	20	7.4%	8.5%	
4-5pm	0	0	0	0	0	18	0	0	0	0	0	0	0	7	0	0	25	13	35	5.5%	15.2%	
5-6pm	0	0	0	0	0	18	0	0	0	0	0	0	0	5	0	0	23	10	36	4.2%	15.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %														50.0%			IN %					
OUT %						50.0%											OUT %					

Start Time	↓ Gateway Crossing Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Gateway Crossing Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

APPENDIX I
Traffic Signal Warrant Analysis

Year 2025 Build
Holy Hill Road & Goldendale Road

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Holy Hill Road & Goldendale Road
County: Washington
Village: Germantown

Major Street: Holy Hill Road
Critical Approach Speed: 45 mph
Lanes: 1 lane

Minor Street: Goldendale Road
Critical Approach Speed: 55 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 100%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 4 or more
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	350	280
Minor Rd. Req	105	84
Number of Hours	6	7

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	525	420
Minor Rd. Req	53	42
Number of Hours	1	3

Satisfied? No

Condition C: Combination of A & B at 56%

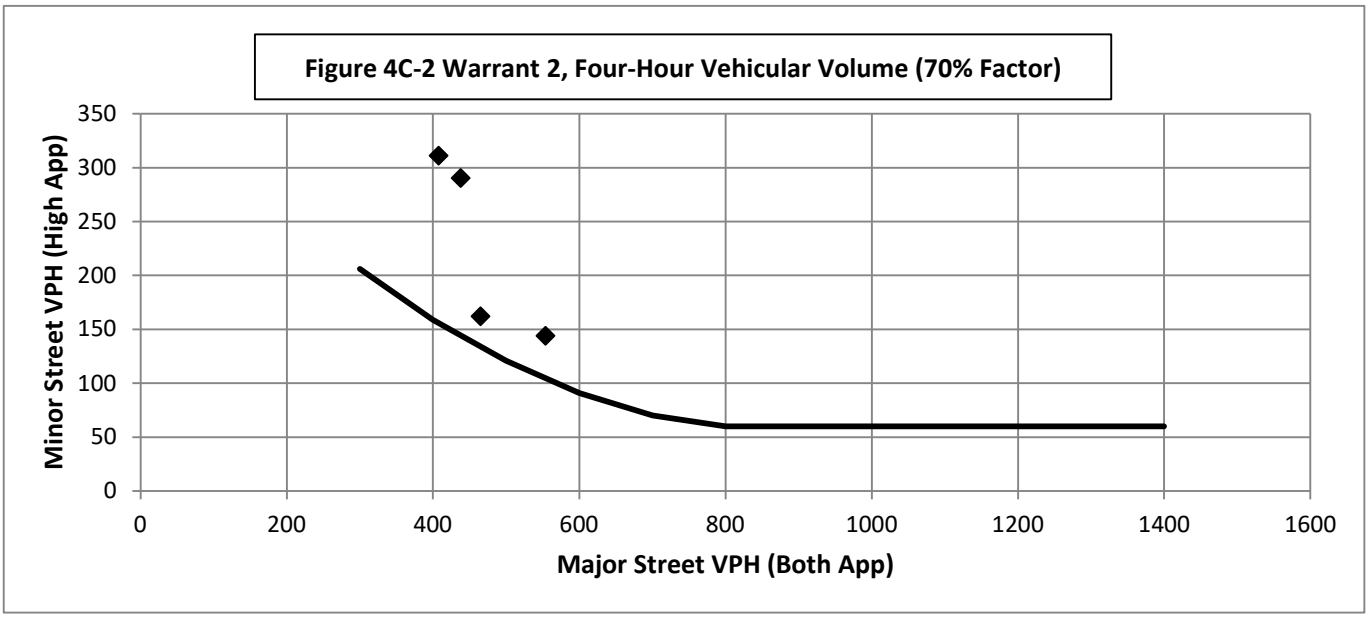
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	465	162	627
2	7:00	8:00	554	144	698
3	8:00	9:00	367	106	473
4	9:00	10:00	189	104	293
5	10:00	11:00	202	99	301
6	11:00	12:00	222	101	323
7	12:00	13:00	289	133	422
8	13:00	14:00	235	98	333
9	14:00	15:00	255	128	383
10	15:00	16:00	438	290	728
11	16:00	17:00	408	311	719
12	17:00	18:00	375	195	570
13	18:00	19:00	47	26	73
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	15:00	16:00	7:00	6:00
Major Road Vol.	438	408	554	465
Minor Road Vol.	290	311	144	162



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

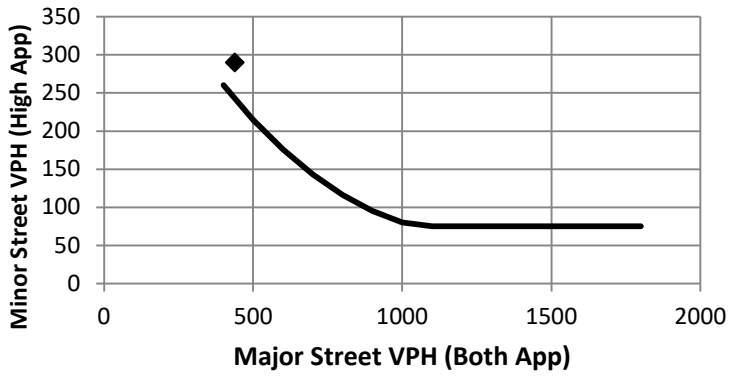
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	No
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
15:00	438	290

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

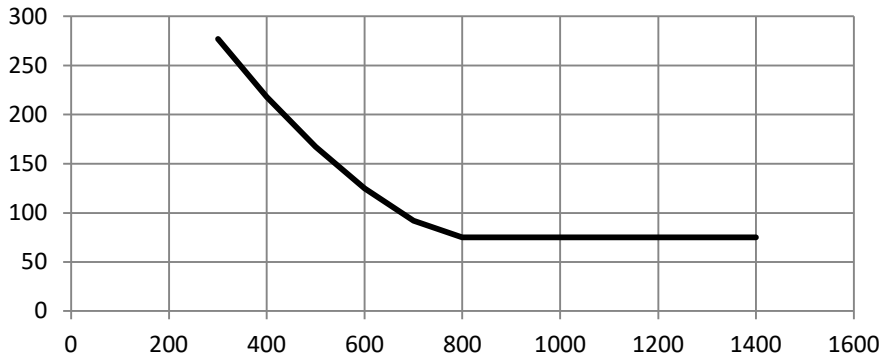
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

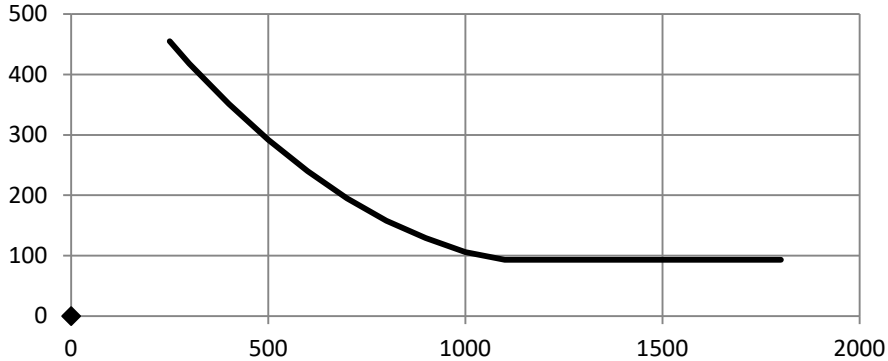


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria			Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour		728	No	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)				
	Hour				
	Volume				

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	15:00	438	290	97.15

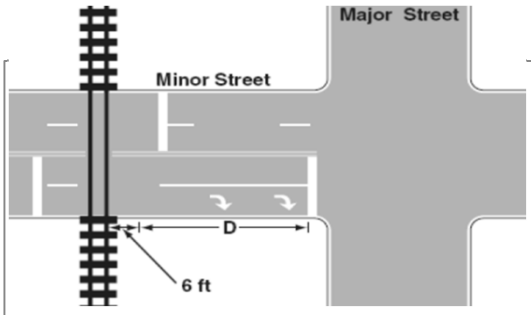
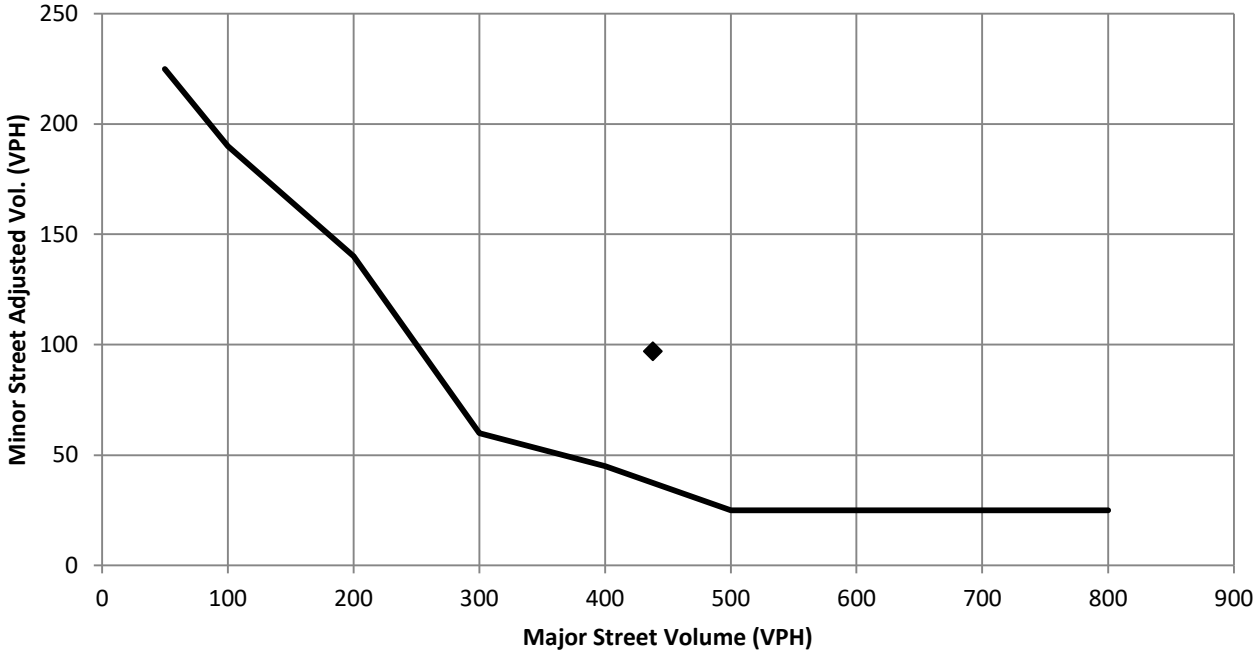


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	50	108	4	0	162	11	88	0	0	99	2	15	57	0	74	167	96	103	0	366	701
	7:00	56	84	4	0	144	16	135	3	0	154	1	32	85	0	118	148	117	135	0	400	816
	8:00	59	41	6	0	106	11	91	2	0	104	4	14	52	0	70	90	83	90	0	263	543
	9:00	61	33	10	0	104	8	40	0	0	48	4	18	44	0	66	50	36	55	0	141	359
MD	10:00	64	26	9	0	99	8	41	0	0	49	2	20	52	0	74	57	34	62	0	153	375
	11:00	68	21	12	0	101	7	43	6	0	56	0	22	69	0	91	61	44	61	0	166	414
	12:00	92	27	14	0	133	13	52	3	0	68	5	24	69	0	98	88	47	86	0	221	520
	13:00	68	17	11	0	96	11	53	1	0	65	4	29	65	0	98	61	41	68	0	170	429
PM	14:00	84	32	12	0	128	12	54	5	0	71	6	30	89	0	125	65	52	67	0	184	508
	15:00	126	41	15	0	182	12	130	2	0	144	2	81	207	0	290	89	121	84	0	294	910
	16:00	98	34	12	0	144	5	127	3	0	135	7	101	203	0	311	75	127	71	0	273	863
	17:00	119	30	15	0	164	7	114	8	0	129	2	64	129	0	195	69	127	50	0	246	734
	18:00	20	3	3	0	26	0	10	0	0	10	0	0	11	0	11	12	17	8	0	37	84
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		965	497	127	0	1589	121	978	33	0	1132	39	450	1132	0	1621	1032	942	940	0	2914	7256

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach?

% Right Turns Included (Default 0%)

From North (SB)	100%
From East (WB)	100%
From South (NB)	100%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
178	184	103	287	465
164	252	138	390	554
101	174	92	266	367
58	76	55	131	189
65	75	62	137	202
68	87	67	154	222
101	99	89	188	289
72	94	69	163	235
77	106	72	178	255
101	251	86	337	438
80	254	74	328	408
76	241	58	299	375
12	27	8	35	47
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1153	1920	973	2893	4046

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
50	108	4	112	162
56	84	4	88	144
59	41	6	47	106
61	33	10	43	104
64	26	9	35	99
68	21	12	33	101
92	27	14	41	133
4	29	65	94	98
84	32	12	44	128
2	81	207	288	290
7	101	203	304	311
2	64	129	193	195
20	3	3	6	26
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
569	650	678	1328	1897

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Goldendale Road & Holy Hill Road

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	23	102	2	0	0	44	0	0	2	4	23	0	116	87	12	0	415	
7-8am	16	77	1	0	0	82	3	0	1	15	42	0	94	103	9	0	443	
8-9am	18	34	2	0	2	58	2	0	4	5	23	0	50	66	15	0	279	
9-10am	7	25	4	0	2	12	0	1	4	10	17	0	22	15	4	0	123	
10-11am	5	17	2	0	1	14	0	0	2	11	23	0	29	11	6	0	121	
11am-12pm	4	11	4	0	1	18	6	0	0	14	33	0	26	17	4	0	138	
12-1pm	10	15	5	0	4	18	3	0	5	13	25	0	38	13	7	0	156	
1-2pm	10	9	5	0	4	23	1	0	4	20	25	0	21	14	5	1	141	
2-3pm	11	22	4	0	5	28	5	0	6	21	51	0	27	21	9	0	210	
3-4pm	13	24	1	0	5	102	2	0	2	69	135	0	30	68	19	0	470	
4-5pm	15	22	2	0	1	110	3	0	7	92	145	0	37	89	33	0	556	
5-6pm	11	15	1	0	5	103	8	0	2	58	83	0	28	80	23	0	417	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Year 2025 Background Traffic

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	27	102	2	0	0	44	0	0	2	4	25	0	127	87	13	0	433	
7-8am	19	77	1	0	0	82	3	0	1	15	45	0	103	103	10	0	459	
8-9am	21	34	2	0	2	58	2	0	4	5	25	0	55	66	16	0	290	
9-10am	8	25	4	0	2	12	0	0	4	10	18	0	24	15	4	0	126	
10-11am	6	17	2	0	1	14	0	0	2	11	25	0	32	11	7	0	128	
11am-12pm	5	11	4	0	1	18	6	0	0	14	36	0	28	17	4	0	144	
12-1pm	12	15	5	0	4	18	3	0	5	13	27	0	41	13	8	0	164	
1-2pm	12	9	5	0	4	23	1	0	4	20	27	0	23	14	5	0	147	
2-3pm	13	22	4	0	5	28	5	0	6	21	55	0	29	21	10	0	219	
3-4pm	15	24	1	0	5	102	2	0	2	69	146	0	33	68	21	0	488	
4-5pm	18	22	2	0	1	110	3	0	7	93	157	0	40	89	36	0	578	
5-6pm	13	15	1	0	5	103	8	0	2	58	90	0	31	80	25	0	431	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Growth Rates	3.8%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	1.1%		1.4%	0.0%	1.4%			
PM Growth Rates	1.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.2%	1.2%		1.2%	0.0%	1.2%			

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road									
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		1165	1165			
																		0%	0%			<- % Reduction, Sensitivity Test
																		1165	1165			
6-7am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	55	52	4.7%	4.5%	Existing Kwik Trip daily traffic estimated
7-8am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	66	66	5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	75	73	6.4%	6.3%	
9-10am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	63	64	5.4%	5.5%	Distribution based on 2020 counts
10-11am	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	61	61	5.2%	5.2%	collected at Kwik Trip driveways:
11am-12pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	65	63	5.6%	5.4%	25% to/from west on 167 (770)
12-1pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	73	6.3%	6.3%	75% to/from east on 167 (2330)
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0	0	10	68	66	5.8%	5.7%	
2-3pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	70	70	6.0%	6.0%	Distribution to/from I/S same as
3-4pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	72	6.3%	6.2%	evaluated for KT assignment in TIA.
4-5pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	73	73	6.3%	6.3%	
5-6pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	77	76	6.6%	6.5%	Hourly Distributions: ITE LU#960
6-7pm	0	0	0	0	0	6	0	0	0	0	0	0	0	6	0	0	12	70	71	6.0%	6.1%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						8%											IN %					
OUT %														8%			OUT %					

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

Goldendale Road & Holy Hill Road

By: TSC
Date: 1/13/2021

Exxon (-)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Exxon traffic was approximately 23%
7-8am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			Therefore, subtract 23% of hourly
9-10am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			traffic from Kwik Trip (+) table.
10-11am	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
11am-12pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
12-1pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
1-2pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
2-3pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
3-4pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
4-5pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
5-6pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
6-7pm	0	0	0	0	0	-1	0	0	0	0	0	0	0	-1	0	0	-2	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Gateway (+)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				175	175	
																				0%	0%	<- % Reduction, Sensitivity Test
																				175	175	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	7	0	0	0	0	0	0	0	1	0	0	8	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	0	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0	8	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	6	5	3.6%	2.9%	
10-11am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5	11	8	6.2%	4.7%	
12-1pm	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	7	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	5	9	12	5.1%	6.9%	
3-4pm	0	0	0	0	0	4	0	0	0	0	0	0	0	9	0	0	13	17	36	9.7%	20.7%	
4-5pm	0	0	0	0	0	2	0	0	0	0	0	0	0	5	0	0	7	6	20	3.6%	11.6%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	5	5	17	2.7%	9.5%	
6-7pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	2	4	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						25%											IN %					
OUT %														25%			OUT %					

2025 West Development (LU #154) - New Trips

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn				380	380	
																				0%	0%	<- % Reduction, Sensitivity Test
																				380	380	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	39	8	10.2%	2.1%	800 new trips
7-8am	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	28	9	7.3%	2.3%	5% linked trips (40)
8-9am	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	19	11	5.1%	2.8%	
9-10am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	45	10	11.8%	2.6%	Hourly Distributions: ITE LU#154
10-11am	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3	36	11	9.5%	2.9%	
11am-12pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	14	14	3.8%	3.7%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	19	26	5.1%	6.9%	from TIA
1-2pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	22	22	5.9%	5.9%	
2-3pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	23	16	6.0%	4.3%	
3-4pm	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3	20	38	5.3%	10.0%	
4-5pm	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	12	24	3.1%	6.3%	
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	8	30	2.2%	7.8%	
6-7pm	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3	10	33	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

By: TSC
Date: 1/13/2021

2025 West Development (LU #130) - New Trips

Start Time	↓ Goldendale Road Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Goldendale Road Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	7	117	13	10.6%	1.2%	2325 new trips
7-8am	0	0	0	0	0	10	0	0	0	0	0	0	0	2	0	0	12	191	30	17.3%	2.7%	5% linked trips (115)
8-9am	0	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0	8	115	46	10.4%	4.2%	
9-10am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	74	75	6.7%	6.8%	Hourly Distributions: ITE LU#110
10-11am	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	8	81	87	7.3%	7.9%	
11am-12pm	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9	75	93	6.8%	8.4%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	0	11	104	117	9.4%	10.6%	from TIA
1-2pm	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9	90	72	8.1%	6.5%	
2-3pm	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9	78	103	7.1%	9.3%	
3-4pm	0	0	0	0	0	3	0	0	0	0	0	0	0	7	0	0	10	64	141	5.8%	12.8%	
4-5pm	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	8	38	112	3.4%	10.1%	
5-6pm	0	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	9	12	168	1.1%	15.2%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	29	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%											IN %					
OUT %														5%			OUT %					

AADT IN	AADT OUT
1105	1105
0%	0%
1105	1105

<- % Reduction, Sensitivity Test

2025 West Development (LU #960 - Kwik Trip Growth to 2025) - Diverted Linked Trips

Start Time	↓ Goldendale Road Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Goldendale Road Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	4.7%	4.5%	5530 daiyl trips at 100% in 2040
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	5.7%	5.7%	-3100 existing daily trips
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	6.4%	6.3%	-1825 trips in 2040 (75% of total growth)
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	5.4%	5.5%	=605 new KT trips in 2025 Build.
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12	5.2%	5.2%	
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	5.6%	5.4%	80% (480) are diverted linked trips
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	6.3%	6.3%	20% (125) are pas-by trips
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	5.8%	5.7%	PB trips do not pass through NB
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	6.0%	6.0%	ramp intersection.
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	6.3%	6.2%	
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	6.6%	6.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	15	6.0%	6.1%	Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %																	IN %					
OUT %																	OUT %					

AADT IN	AADT OUT
240	240
0%	0%
240	240

<- % Reduction, Sensitivity Test

2025 East Development (LU #130) - New Trips (Area H)

Start Time	↓ Goldendale Road Right	Thru	Left	U-Turn	← Holy Hill Road Right	Thru	Left	U-Turn	↑ Goldendale Road Right	Thru	Left	U-Turn	→ Holy Hill Road Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	7	0	0	0	0	14	0	0	0	0	14	0	2	2	1	0	40	140	16	10.6%	1.2%	Area H (135)
7-8am	11	0	0	0	0	23	0	0	0	0	23	0	4	4	2	0	67	229	36	17.3%	2.7%	Area H (2515)
8-9am	7	0	0	0	0	14	0	0	0	0	14	0	6	6	3	0	50	138	56	10.4%	4.2%	
9-10am	4	0	0	0	0	9	0	0	0	0	9	0	9	9	5	0	45	89	90	6.7%	6.8%	
10-11am	5	0	0	0	0	10	0	0	0	0	10	0	11	11	5	0	52	97	105	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	5	0	0	0	0	9	0	0	0	0	9	0	11	11	6	0	51	90	111	6.8%	8.4%	
12-1pm	6	0	0	0	0	13	0	0	0	0	13	0	14	14	7	0	67	125	140	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	5	0	0	0	0	11	0	0	0	0	11	0	9	9	4	0	49	107	86	8.1%	6.5%	from TIA
2-3pm	5	0	0	0	0	9	0	0	0	0	9	0	12	12	6	0	53	94	123	7.1%	9.3%	
3-4pm	4	0	0	0	0	8	0	0	0	0	8	0	17	17	9	0	63	77	170	5.8%	12.8%	
4-5pm	2	0	0	0	0	5	0	0	0	0	5	0	13	13	7	0	45	45	134	3.4%	10.1%	
5-6pm	1	0	0	0	0	2	0	0	0	0	2	0	20	20	10	0	55	15	201	1.1%	15.2%	
6-7pm	0	0	0	0	0	1	0	0	0	0	1	0	3	3	2	0	10	5	34	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	5%					10%					10%						IN %					
OUT %													10%	10%	5%		OUT %					

AADT IN	AADT OUT
1325	1325
0%	0%
1325	1325

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2025 East Development (LU #130) - New Trips (Area I)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	7	1	1	0	8	0	0	0	0	8	0	0	0	0	62	0	87	82	9	10.6%	1.2%	Area I (1545)
7-8am	16	2	2	0	13	0	0	0	0	13	0	0	0	0	101	0	147	134	21	17.3%	2.7%	
8-9am	25	3	3	0	8	0	0	0	0	8	0	0	0	0	61	0	108	81	33	10.4%	4.2%	
9-10am	40	5	5	0	5	0	0	0	0	5	0	0	0	0	39	0	99	52	53	6.7%	6.8%	
10-11am	46	6	6	0	6	0	0	0	0	6	0	0	0	0	43	0	113	57	61	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	49	7	7	0	5	0	0	0	0	5	0	0	0	0	40	0	113	53	65	6.8%	8.4%	
12-1pm	62	8	8	0	7	0	0	0	0	7	0	0	0	0	55	0	147	73	82	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	38	5	5	0	6	0	0	0	0	6	0	0	0	0	47	0	107	63	50	8.1%	6.5%	from TIA
2-3pm	54	7	7	0	6	0	0	0	0	6	0	0	0	0	41	0	121	55	72	7.1%	9.3%	
3-4pm	74	10	10	0	5	0	0	0	0	5	0	0	0	0	34	0	138	45	99	5.8%	12.8%	
4-5pm	59	8	8	0	3	0	0	0	0	3	0	0	0	0	20	0	101	26	78	3.4%	10.1%	
5-6pm	89	12	12	0	1	0	0	0	0	1	0	0	0	0	7	0	122	9	118	1.1%	15.2%	
6-7pm	15	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	21	3	20	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					10%					10%					75%		IN %					
OUT %	75%	10%	10%														OUT %					

AADT IN	AADT OUT
775	775
0%	0%
775	775

<- % Reduction, Sensitivity Test

2025 East Development (LU #154) - New Trips (Area H)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	2	0	0	0	0	5	0	0	0	0	5	0	1	1	1	0	15	47	10	10.2%	2.1%	Area H (930)
7-8am	2	0	0	0	0	3	0	0	0	0	3	0	1	1	1	0	11	34	11	7.3%	2.3%	
8-9am	1	0	0	0	0	2	0	0	0	0	2	0	1	1	1	0	8	24	13	5.1%	2.8%	Hourly Distributions: ITE LU#154
9-10am	3	0	0	0	0	6	0	0	0	0	6	0	1	1	1	0	18	55	12	11.8%	2.6%	
10-11am	2	0	0	0	0	4	0	0	0	0	4	0	1	1	1	0	13	44	13	9.5%	2.9%	Directional Distribution: "East Dist"
11am-12pm	1	0	0	0	0	2	0	0	0	0	2	0	2	2	1	0	10	18	17	3.8%	3.7%	from TIA
12-1pm	1	0	0	0	0	2	0	0	0	0	2	0	3	3	2	0	13	24	32	5.1%	6.9%	
1-2pm	1	0	0	0	0	3	0	0	0	0	3	0	3	3	1	0	14	27	27	5.9%	5.9%	
2-3pm	1	0	0	0	0	3	0	0	0	0	3	0	2	2	1	0	12	28	20	6.0%	4.3%	
3-4pm	1	0	0	0	0	3	0	0	0	0	3	0	5	5	2	0	19	25	47	5.3%	10.0%	
4-5pm	1	0	0	0	0	1	0	0	0	0	1	0	3	3	1	0	10	14	29	3.1%	6.3%	
5-6pm	1	0	0	0	0	1	0	0	0	0	1	0	4	4	2	0	13	10	36	2.2%	7.8%	
6-7pm	1	0	0	0	0	1	0	0	0	0	1	0	4	4	2	0	13	13	41	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	5%					10%					10%						IN %					
OUT %													10%	10%	5%		OUT %					

AADT IN	AADT OUT
465	465
0%	0%
465	465

<- % Reduction, Sensitivity Test

2025 East Development (LU #140) - New Trips (Area I)

	↓ Goldendale Road				← Holy Hill Road				↑ Goldendale Road				→ Holy Hill Road				Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn						
6-7am	4	1	1	0	3	0	0	0	0	3	0	0	0	0	25	0	37	33	5	16.8%	2.6%	Area I (385)
7-8am	5	1	1	0	3	0	0	0	0	3	0	0	0	0	20	0	33	27	6	13.8%	3.2%	
8-9am	4	1	1	0	1	0	0	0	0	1	0	0	0	0	8	0	16	11	5	5.7%	2.7%	Hourly Distributions: ITE LU#140
9-10am	5	1	1	0	1	0	0	0	0	1	0	0	0	0	5	0	14	7	6	3.6%	2.9%	
10-11am	4	1	1	0	1	0	0	0	0	1	0	0	0	0	5	0	13	6	5	3.3%	2.8%	Directional Distribution: "East Dist"
11am-12pm	7	1	1	0	1	0	0	0	0	1	0	0	0	0	9	0	20	12	9	6.2%	4.7%	from TIA
12-1pm	9	1	1	0	2	0	0	0	0	2	0	0	0	0	13	0	28	17	12	8.9%	6.1%	
1-2pm	11	1	1	0	1	0	0	0	0	1	0	0	0	0	10	0	25	13	14	6.8%	7.0%	
2-3pm	10	1	1	0	1	0	0	0	0	1	0	0	0	0	8	0	22	10	13	5.1%	6.9%	
3-4pm	30	4	4	0	2	0	0	0	0	2	0	0	0	0	14	0	56	19	40	9.7%	20.7%	
4-5pm	17	2	2	0	1	0	0	0	0	1	0	0	0	0	5	0	28	7	23	3.6%	11.6%	
5-6pm	14	2	2	0	1	0	0	0	0	1	0	0	0	0	4	0	24	5	19	2.7%	9.5%	
6-7pm	4	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	8	2	5	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %					10%					10%					75%		IN %					
OUT %	75%	10%	10%														OUT %					

AADT IN	AADT OUT
195	195
0%	0%
195	195

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2025 East Development (LU #140) - New Trips (Area J)

Start Time	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		395	395			
																		0%	0%			<- % Reduction, Sensitivity Test
																		395	395			
6-7am	3	0	0	0	0	7	0	0	0	0	7	0	1	1	1	0	20	66	10	16.8%	2.6%	Area J (790)
7-8am	3	0	0	0	0	6	0	0	0	0	6	0	1	1	1	0	18	55	13	13.8%	3.2%	
8-9am	1	0	0	0	0	2	0	0	0	0	2	0	1	1	1	0	8	23	11	5.7%	2.7%	Hourly Distributions: ITE LU#140
9-10am	1	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	6	14	11	3.6%	2.9%	
10-11am	1	0	0	0	0	1	0	0	0	0	1	0	1	1	1	0	6	13	11	3.3%	2.8%	Directional Distribution: "East Dist"
11am-12pm	1	0	0	0	0	2	0	0	0	0	2	0	2	2	1	0	10	24	19	6.2%	4.7%	from TIA
12-1pm	2	0	0	0	0	4	0	0	0	0	4	0	2	2	1	0	15	35	24	8.9%	6.1%	
1-2pm	1	0	0	0	0	3	0	0	0	0	3	0	3	3	1	0	14	27	28	6.8%	7.0%	
2-3pm	1	0	0	0	0	2	0	0	0	0	2	0	3	3	1	0	12	20	27	5.1%	6.9%	
3-4pm	2	0	0	0	0	4	0	0	0	0	4	0	8	8	4	0	30	38	82	9.7%	20.7%	
4-5pm	1	0	0	0	0	1	0	0	0	0	1	0	5	5	2	0	15	14	46	3.6%	11.6%	
5-6pm	1	0	0	0	0	1	0	0	0	0	1	0	4	4	2	0	13	11	38	2.7%	9.5%	
6-7pm	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0	0	4	5	9	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	5%					10%					10%						IN %					
OUT %													10%	10%	5%		OUT %					

2025 South Development (LU #140) - New Trips

Start Time	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		350	350			
																		0%	0%			<- % Reduction, Sensitivity Test
																		350	350			
6-7am	0	3	0	0	0	0	0	0	0	0	5	0	30	0	0	0	38	59	9	16.8%	2.6%	Area U (255)
7-8am	0	2	0	0	0	0	0	0	0	1	6	0	24	0	0	0	33	48	11	13.8%	3.2%	Area U (445)
8-9am	0	1	0	0	0	0	0	0	0	0	5	0	10	0	0	0	16	20	9	5.7%	2.7%	
9-10am	0	1	0	0	0	0	0	0	0	1	5	0	7	0	0	0	14	13	10	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	1	0	0	0	0	0	0	0	1	5	0	6	0	0	0	13	12	10	3.3%	2.8%	
11am-12pm	0	1	0	0	0	0	0	0	0	1	8	0	11	0	0	0	21	22	16	6.2%	4.7%	Directional Distribution: "South Dist"
12-1pm	0	2	0	0	0	0	0	0	0	1	11	0	16	0	0	0	30	31	21	8.9%	6.1%	from TIA
1-2pm	0	1	0	0	0	0	0	0	0	1	13	0	12	0	0	0	27	24	25	6.8%	7.0%	
2-3pm	0	1	0	0	0	0	0	0	0	1	12	0	9	0	0	0	23	18	24	5.1%	6.9%	
3-4pm	0	2	0	0	0	0	0	0	0	4	36	0	17	0	0	0	59	34	72	9.7%	20.7%	
4-5pm	0	1	0	0	0	0	0	0	0	2	21	0	7	0	0	0	31	13	41	3.6%	11.6%	
5-6pm	0	0	0	0	0	0	0	0	0	2	17	0	5	0	0	0	24	9	33	2.7%	9.5%	
6-7pm	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	6	4	8	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %		5%											50%				IN %					
OUT %										5%	50%						OUT %					

2025 South Development (LU #710) - New Trips

Start Time	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Goldendale Road Right	Goldendale Road Thru	Goldendale Road Left	Goldendale Road U-Turn	Holy Hill Road Right	Holy Hill Road Thru	Holy Hill Road Left	Holy Hill Road U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		230	230			
																		0%	0%			<- % Reduction, Sensitivity Test
																		230	230			
6-7am	0	1	0	0	0	0	0	0	0	0	1	0	6	0	0	0	8	11	1	4.6%	0.5%	Area U (435)
7-8am	0	2	0	0	0	0	0	0	0	0	2	0	15	0	0	0	19	30	4	13.1%	1.9%	Area U (25)
8-9am	0	2	0	0	0	0	0	0	0	0	4	0	17	0	0	0	23	33	8	14.4%	3.5%	
9-10am	0	1	0	0	0	0	0	0	0	1	5	0	8	0	0	0	15	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	1	0	0	0	0	0	0	0	1	7	0	6	0	0	0	15	12	14	5.4%	5.9%	
11am-12pm	0	1	0	0	0	0	0	0	0	1	12	0	7	0	0	0	21	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	1	0	0	0	0	0	0	0	1	12	0	12	0	0	0	26	23	24	10.2%	10.4%	from TIA
1-2pm	0	1	0	0	0	0	0	0	0	1	8	0	11	0	0	0	21	21	15	9.0%	6.7%	
2-3pm	0	1	0	0	0	0	0	0	0	1	8	0	10	0	0	0	20	19	15	8.2%	6.5%	
3-4pm	0	1	0	0	0	0	0	0	0	1	10	0	9	0	0	0	21	17	20	7.4%	8.5%	
4-5pm	0	1	0	0	0	0	0	0	0	2	18	0	7	0	0	0	28	13	35	5.5%	15.2%	
5-6pm	0	1	0	0	0	0	0	0	0	2	18	0	5	0	0	0	26	10	36	4.2%	15.6%	
6-7pm	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	6	4	7	1.7%	2.9%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %		5%											50%				IN %					
OUT %										5%	50%						OUT %					

APPENDIX I
All-Way Stop Control Warrant Analysis

Year 2025 Build
Holy Hill Road & Goldendale Road

ASWC Warrant Criteria

MUTCD Yes WisDOT Yes

MUTCD A, V, 5

Met? Criteria

Yes A. Is a signal justified? Yes

B. # of crashes in a 12 month period that can be corrected by multi-way stop control:

Yes C. Minimum Volumes

1. Major road approach volume (total of both) at least 300 vph for min 8 hours?
2. Combined ped, bike, and veh volume on minor approach (total of both) at least 200 units per hour for the same 8 hours as criteria C-1?
3. If the 85th percentile speed on the major road exceeds 40 mph, may use 70% of the values in C-1 and C-2

Major Street 85th percentile mph: 45

Time Period	From	To	Major Road: Both App.	Minor Road: Both App. (VPH)	C-1 (70%)	C-2 (70%)	Both Met?	D (80%)		Both Met?
1	6:00	7:00	465	236	Yes	Yes	Yes	No	No	No
2	7:00	8:00	554	262	Yes	Yes	Yes	No	No	No
3	8:00	9:00	367	176	Yes	Yes	Yes	No	No	No
4	9:00	10:00	189	170	No	Yes	No	No	No	No
5	10:00	11:00	202	173	No	Yes	No	No	No	No
6	11:00	12:00	222	192	Yes	Yes	Yes	No	No	No
7	12:00	13:00	289	231	Yes	Yes	Yes	No	No	No
8	13:00	14:00	235	194	Yes	Yes	Yes	No	No	No
9	14:00	15:00	255	253	Yes	Yes	Yes	No	No	No
10	15:00	16:00	438	472	Yes	Yes	Yes	No	No	No
11	16:00	17:00	408	455	Yes	Yes	Yes	No	No	No
12	17:00	18:00	375	359	Yes	Yes	Yes	No	No	No
13	18:00	19:00	47	37	No	No	No	No	No	No
14	19:00	20:00								
15	20:00	21:00								
16	21:00	22:00								

No D. Use when previous criteria have not been met:

If 80% minimum values of Criteria B, C-1, and C-2 (C-3 excluded) are satisfied, warrant is met.

WisDOT

Met? Criteria

No 1 **Functional Highway Classification**

Approach	Classification
1: (SB)	Major Collector
2: (WB)	Principal Arterial
3: (NB)	Major Collector
4: (EB)	Principal Arterial

No 2 **Average Daily Traffic**

Approach	AADT
Minor 1	930
Minor 2	1300
Major 1	3200
Major 2	1200

3 **Crash History**

# of crashes in a 12 month period that can be corrected by multi-way stop control:

Expected to significantly reduce the overall severity of future crashes?

4 **Alternatives**

Refer to TGM 13-26-5 Section D.

Yes 5 **Mobility Impact**

Will the high-volume "through" street experience significant delays for the benefit of reducing delays for a low-volume side street? No

6 **Right Turn Inclusion**

Refer to WisDOT TSDM 2-3-2

APPENDIX J
Intersection Control Evaluation

STH 167 & IH-41/45 Southbound Ramps

Includes Signal Warrant Analyses

To: DOT ICE Review
From: Tammi Czewski, P.E.
Date: 1/20/2021
RE: STH 167/Holy Hill Road Corridor Study
Village of Richfield/Village of Germantown, Washington County, WI
STH 167 & IH-41/45 Southbound Ramp Intersection

Project Description:

A corridor study was completed for Holy Hill Road from Appleton Avenue (STH 175) to the IH-41/45 northbound ramps in the Village of Richfield, and for Holy Hill Road from the IH-41/45 northbound ramps to Goldendale Road (CTH Y) in the Village of Germantown. Holy Hill Road, west of the IH-41/45 northbound ramp is also designated as STH 167. The corridor study evaluates traffic impacts and potential mitigating improvements with additional traffic generated by buildout of the surrounding vacant lands by the year 2025 and the year 2035. Therefore, the corridor study evaluates the base year 2025 ("initial buildout") and the horizon year 2040 (five years after full buildout).

This ICE report evaluates alternative traffic control options for the STH 167 & IH-41/45 Southbound Ramp intersection with future traffic volume estimations in the study area. The intersection currently operates with stop sign control for the southbound ramp approach.

Alternatives:

Potential traffic control alternatives for the STH 167 & IH-41/45 Southbound Ramp intersection include two-way stop sign control (existing), all-way stop sign control, traffic signal control, and roundabout control. Restricted access control (right-in/right-out or left-in/right-in/right-out) was not evaluated as these options would limit the connectivity between IH-41/45 and STH 167.

Safety Considerations:

Crash data from 2015 through 2019 was collected for the STH 167 and IH-41/45 Southbound Ramp intersection and plotted on a crash diagram. During the five-year period, 28 crashes occurred within 300 feet of the intersection. Of the 28 crashes, 17 (61%) were rear-end crashes from the southbound off-ramp right-turn lane. Three were side-swipe crashes in that same lane. Most of these crashes occurred during the day when the pavement was dry. None of the intersection crashes resulted in fatalities or serious injuries. The bridge over IH-41/45 is slightly raised which may create visibility issues for vehicles making a right-turn onto westbound STH 167. The high rear-end crashes may be occurring due to southbound vehicles initially stopping at the approach, then pulling forward to get a better view of oncoming traffic before completing the right-turn movement.

Feasibility of Alternatives:

The feasibility of each alternative was evaluated with respect to the available right-of-way at the intersection. The inscribed circle diameter for an urban double lane roundabout is from 150-180 feet and doesn't include the additional space needed for sidewalks. Based on the Washington County interactive maps online, there is enough right-of-way to accommodate the larger inscribed circle diameter at the ramp intersections.

Based on the Washington County online maps, there is enough right-of-way to widen STH 167 through the IH-41/45 interchange ramps, although it would require the reconstruction of the STH 167 bridge of IH-41/45.

Operational Analysis:

Peak Hour intersection operations were evaluated for the STH 167 & IH-41/45 Southbound Ramp intersection with each different traffic control alternative and the horizon Year 2040 Build traffic volumes. The Year 2040 Build traffic volumes include background traffic forecasts to the year 2040 plus additional traffic expected from future buildout of vacant lands in the area. Due to the increase in corridor traffic volumes with this development, the Year 2040 Build traffic scenario includes the general improvement of widening the STH 167/Holy Hill Road corridor from a two-lane cross-section to a four-lane cross-section.

- Two-Way Stop Control: The intersection currently operates with stop signs on the southbound ramp approach, which results in unacceptable delays starting with the Year 2025 Background (no development) traffic condition. These delays, however, are only slightly above the thresholds for LOS D. As traffic volumes increase to the Year 2040 Build traffic condition, the movement delays are expected to increase significantly. Even if the median was widened to allow for two-vehicle storage (for two-stage turning movements), movements would remain over capacity and at LOS F.
- All-Way Stop Control: Even with additional lanes on STH 167, the intersection is expected to have significant delays and queues during the peak hour with all-way stop control and Year 2040 Build traffic volumes.
- Roundabout Control: With a two-lane roundabout, movements are expected to operate at unacceptable LOS E and F during both the AM and PM peak hours with the Year 2040 Build traffic volumes. A roundabout with additional circulating lanes would be needed to accommodate the projected traffic flow. As three or more lane roundabouts are not desirable for drivability and safety reasons, roundabout control was dropped from consideration for this intersection.
- Traffic Signal Control: With traffic signal control and additional turn lanes on both STH 167 and the IH-41/45 Southbound Ramp approaches, all movements at the intersection can operate acceptably at LOS D or better during the AM and PM peak hours and Year 2040 Build traffic volumes.

A traffic signal warrant analysis was completed for the STH 167 & IH-41/45 Southbound Ramp intersection. The hourly intersection traffic volumes were compared against the hourly volume thresholds in the MUTCD. As the intersection has only three approach legs and the speed limit on STH 167 is posted at 45 mph, the minor street volume thresholds were inflated to 150% of the MUTCD values, and then all volume thresholds were reduced to 70%. Signal warrants were evaluated for traffic volume scenarios beginning with the Year 2025 Background condition since the analysis showed unacceptable delays during the peak hours. With the Year 2025 Background traffic volumes, none of the

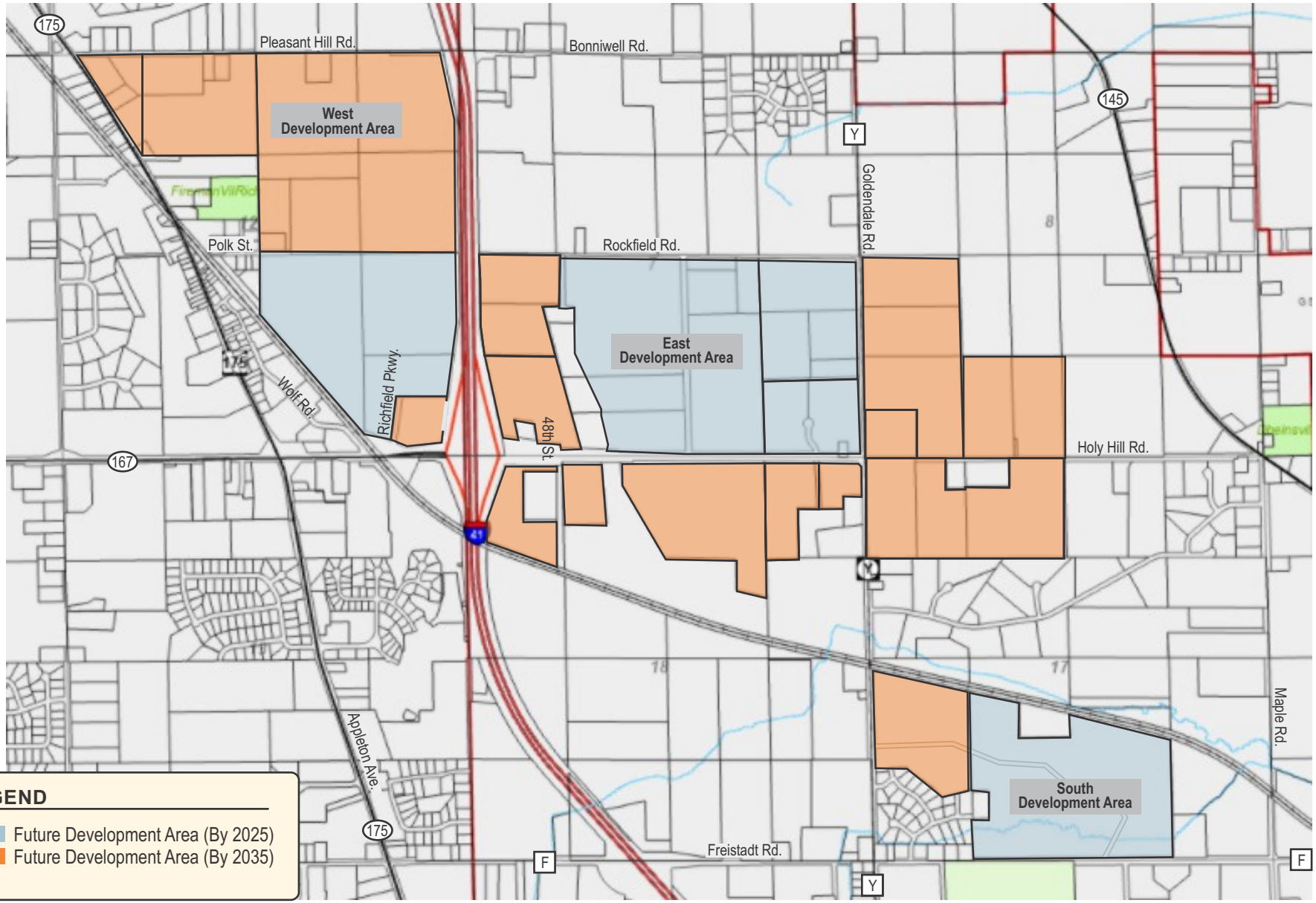
warrants are expected to be met. With additional development buildout for the year 2025 (Year 2025 Build traffic), Warrants 1 and 2 are expected to be met.

Conclusion:

The STH 167 and IH-41/45 Southbound Ramp intersection has a high number of rear-end crashes from the southbound ramp right-turn lane that could be mitigated by traffic signal control. Projected traffic volumes are expected to result in unacceptable delays for all movements, which could further increase crashes for that movement. All-way stop control and roundabout control (two circulating lanes or less) are not expected to mitigate delays with the Year 2040 Build traffic volumes at the STH 167 & IH-41/45 Southbound Ramp intersection. Traffic signal control, along with widening the cross-section of STH 167 and providing additional turn lanes at each approach, is expected to provide enough capacity to accommodate the projected traffic volumes through the year 2040. Traffic signals are expected to be warranted with the Year 2025 Build traffic condition.

Attachments:

- Site Location Map
- Year 2025 Build Traffic Volumes
- Year 2040 Build Traffic Volumes
- Crash Diagram and Crash Statistics
- ROW Constraints
- Year 2040 Build Analysis – All-Way Stop Control
- Year 2040 Build Analysis – Two-Way Stop Control
- Year 2040 Build Analysis – Traffic Signal Control
- Year 2025 Background Traffic Signal Warrant Analysis
- Year 2025 Build Traffic Signal Warrant Analysis



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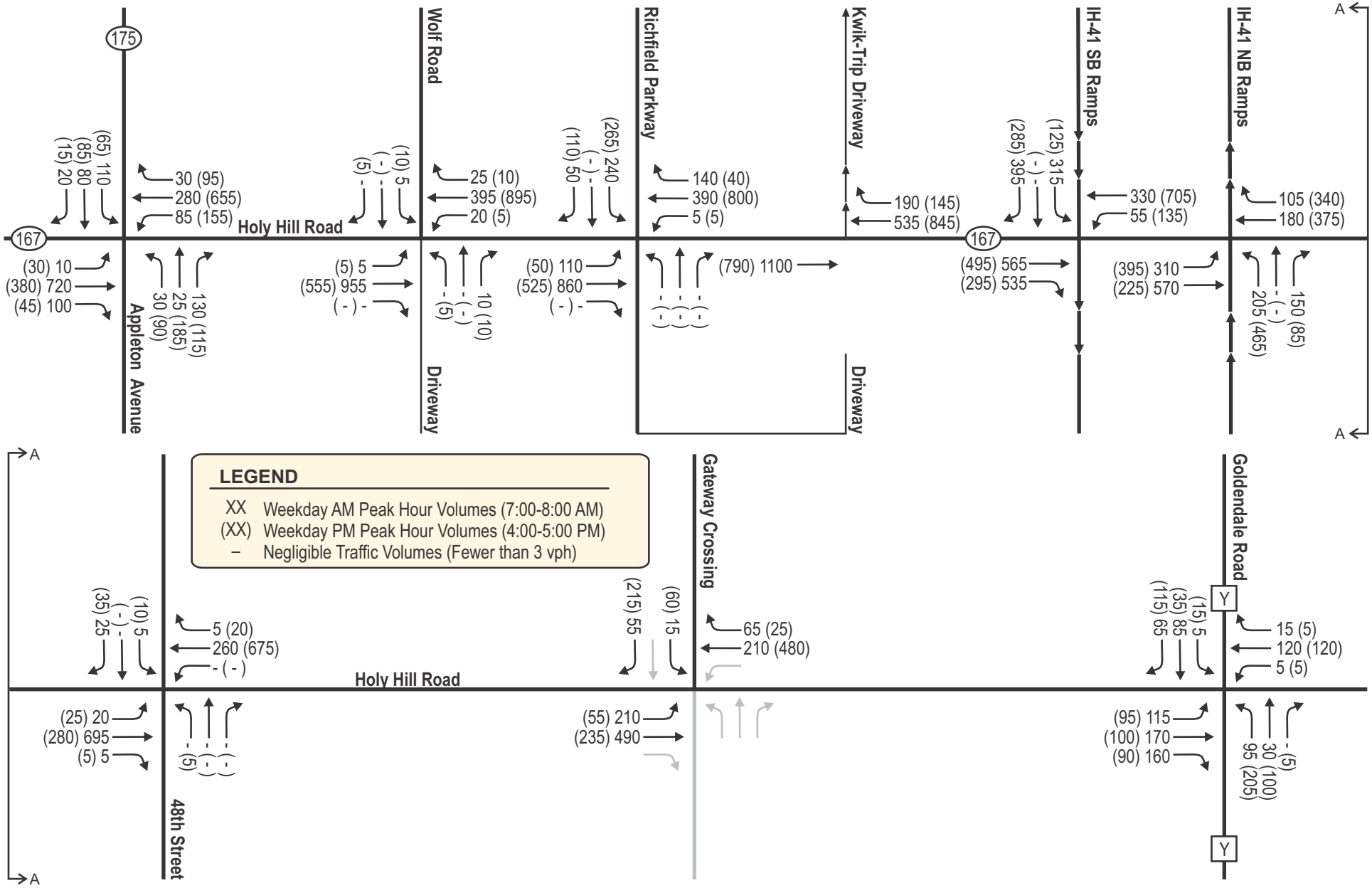
N
NOT TO SCALE

STUDY AREA MAP

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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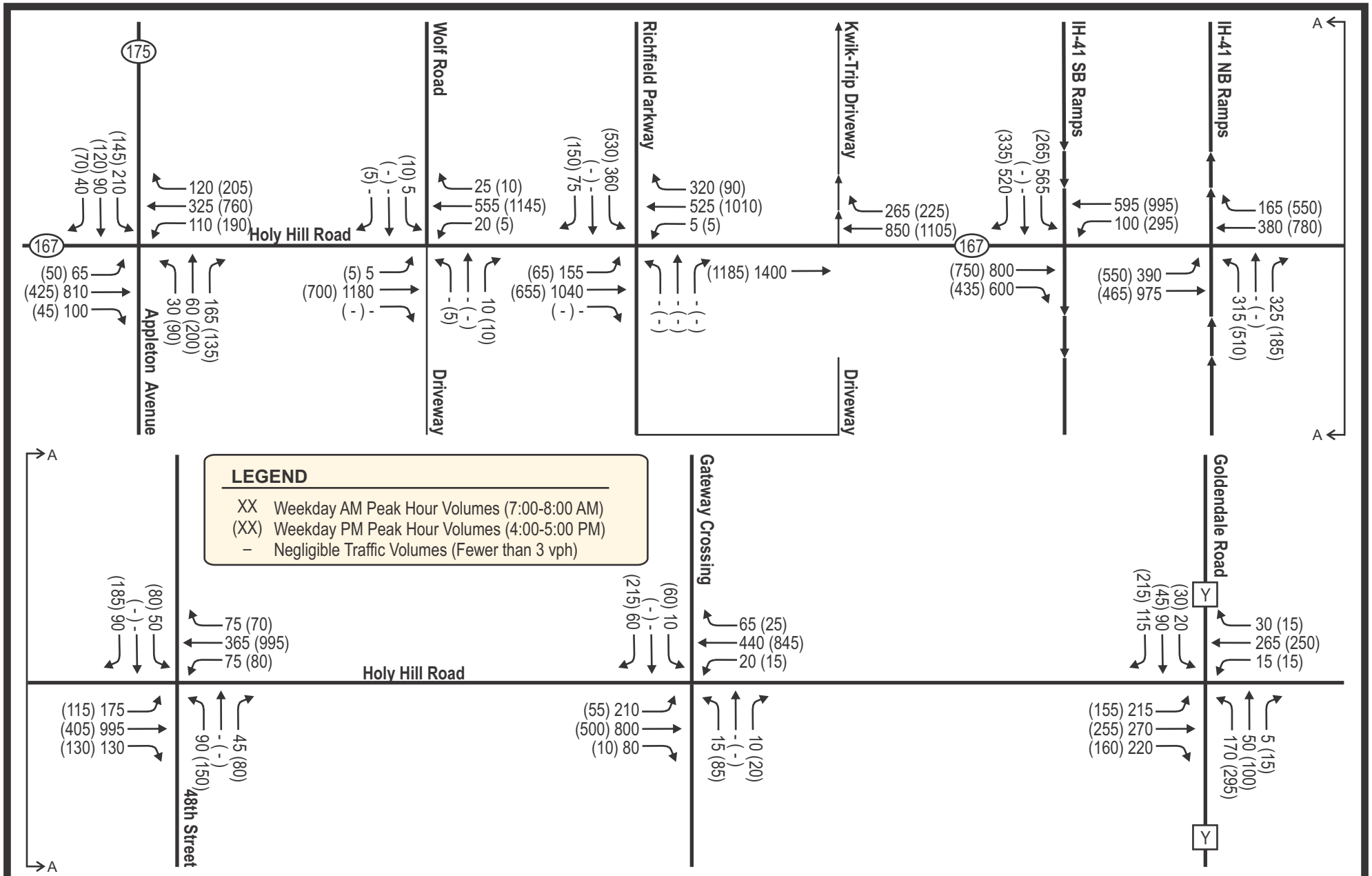
N
NOT TO SCALE

2025 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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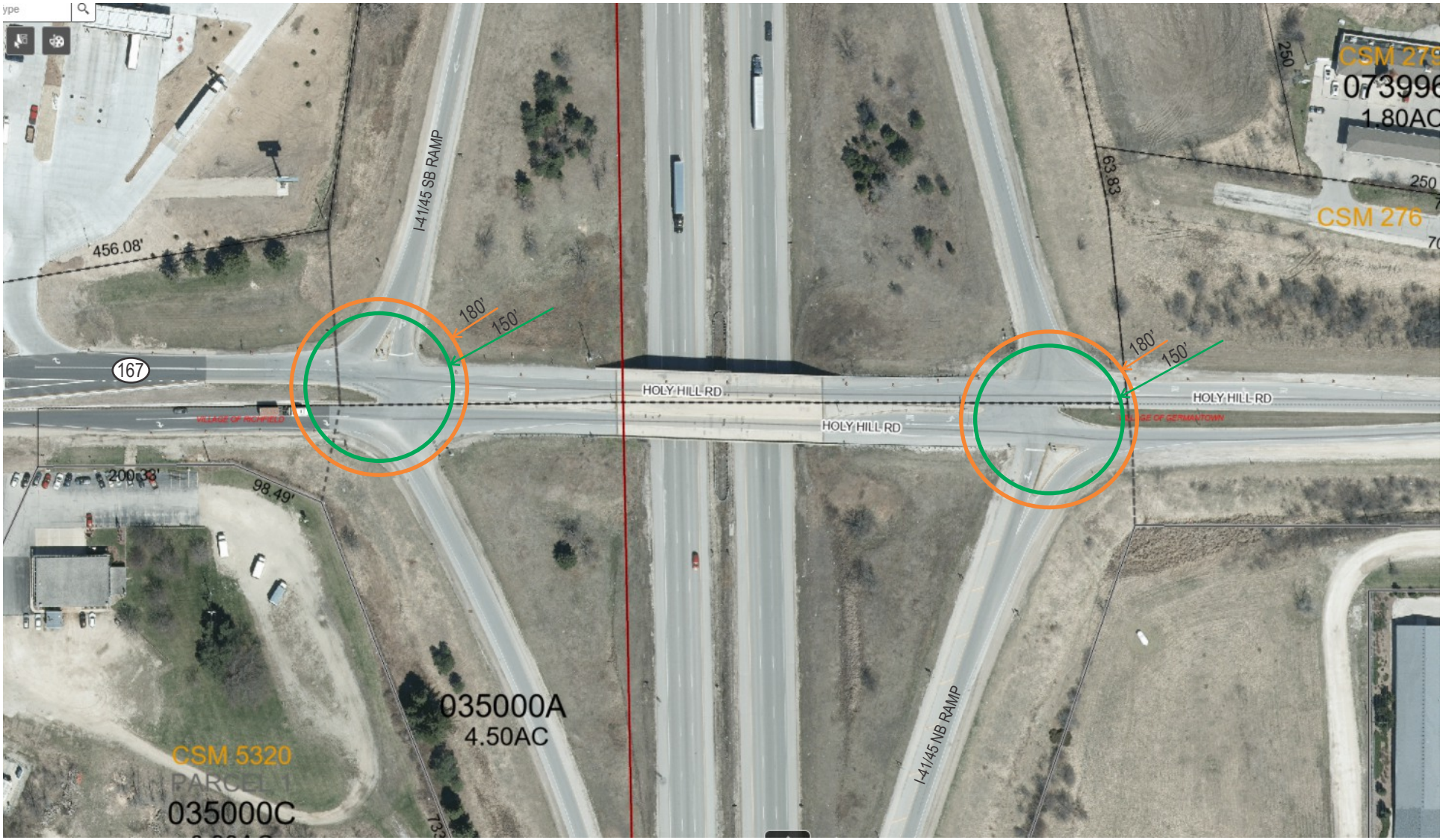
N
NOT TO SCALE

2040 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 01-20-21

N
NOT TO SCALE

ROW CONSTRAINTS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Intersection Collision Diagram

TADI TRAFFIC ANALYSIS & DESIGN, INC.

Location:	STH 167-Holy Hill Road & I41 SB Ramp		**From:**	1/1/2015	**Duration** 5 Years
Municipality:	Germantown		**To:**	12/31/2019	0 Months
County:	Washington		**AADT:**	11,100	MAP
Traffic Control:	Minor Street Stop		**Area Type:**	Suburban	
			GPS Coordinates:	43.250755, -88.182975	

TOTAL CRASHES: 28

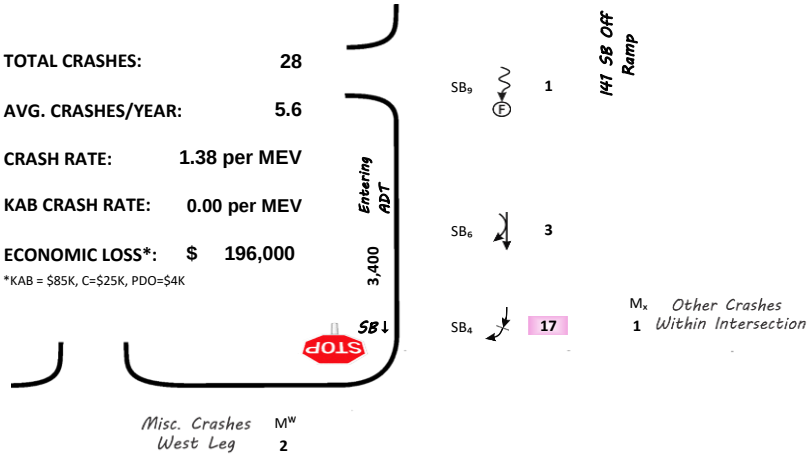
AVG. CRASHES/YEAR: 5.6

CRASH RATE: 1.38 per MEV

KAB CRASH RATE: 0.00 per MEV

ECONOMIC LOSS*: $ 196,000

*KAB = $85K, C=$25K, PDO=$4K



YEAR	K	A	B	C	PDO	TOT.	ECON. LOSS
2015	0	0	0	2	4	6	$ 66,000
2016	0	0	0	1	3	4	$ 37,000
2017	0	0	0	0	4	4	$ 16,000
2018	0	0	0	1	10	11	$ 65,000
2019	0	0	0	0	3	3	$ 12,000
TOTAL	0	0	0	4	24	28	$ 196,000

K = Fatal, A = Incapacitating Injury, B = Non-Incapacitating Injury, C = Possible Injury, PDO = Property Damage Only

WB← 1,600 Entering ADT

N

Holy Hill Road

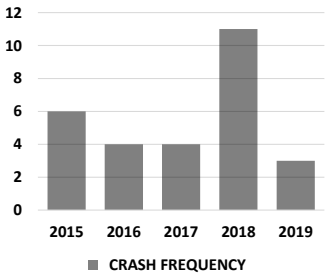
ECON. LOSS COLOR SCALE

- > $300 K
- > $100 K
- Ped/Bike

NB↑ 0 Entering ADT

CRASH TYPE	K	A	B	C	PDO	TOT.	ECON. LOSS
LT-ANGLE	0	0	0	0	1	1	$ 4,000
RT-ANGLE	0	0	0	0	3	3	$ 12,000
PEDESTRIAN	0	0	0	0	0	0	$ -
RT-TURN REAR-END	0	0	0	3	14	17	$ 131,000
REAR-END	0	0	0	0	0	0	$ -
SIDE-SWIPE-SAME	0	0	0	0	3	3	$ 12,000
BICYCLE-RELATED	0	0	0	0	0	0	$ -
PARKED-VEHICLE	0	0	0	0	0	0	$ -
FIXED-OBJECT	0	0	0	0	1	1	$ 4,000
DRIVEWAY-RELATED	0	0	0	0	0	0	$ -
HEAD-ON	0	0	0	0	0	0	$ -
MISC. OTHER	0	0	0	1	2	3	$ 33,000
TOTAL	0	0	0	4	24	28	$ 196,000

ANNUAL CRASH TRENDS



ROAD CONDITIONS		
DRY	23	82%
WET	5	18%
SNOW	0	0%
ICE	0	0%
OTH.	0	0%
TOT.	28	

LIGHT CONDITIONS		
DAY	26	93%
DARK	2	7%
TOT.	28	

DRIVER BEHAVIOR		
ALCOHOL	0	0%
DRUGS	0	0%
SPEED	1	4%

SEASON		
SPRING	6	21%
SUMMER	7	25%
FALL	10	36%
WINTER	5	18%
TOT.	28	

FAILURE TO YIELD		
NB	0	0%
SB	3	11%
EB	0	0%
WB	1	4%
TBD	0	0%
TOT.	4	14%

DISRGRD. CONTROL		
NB	0	0%
SB	0	0%
EB	0	0%
WB	0	0%
TBD	0	0%
TOT.	0	0%

TBD = verification from crash report needed for direction

VEHICLE DAMAGE		
OTHER/UNK.	1	2%
NONE	2	4%
VERY MINOR	3	5%
MINOR	22	40%
MODERATE	21	38%
SEVERE	6	11%
VERY SEVERE	0	0%
TOTAL VEHICLES	55	

NOTES:

DAY/TIME TRENDS

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	UNK		TOT.
MON	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	MON	5
TUE	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	TUE	5
WED	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	WED	7
THU	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	THU	3
FRI	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	0	FRI	5
SAT	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	SAT	2
SUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	SUN	1
	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	UNK		TOT.
TOT.	0	0	0	0	0	1	0	3	1	2	1	1	3	1	1	3	2	5	2	1	1	0	0	0	0	TOT.	28

Crash Data

Corresponds to Collision Diagram

Location:	**STH 167-Holy Hill Road & I41 SB Ramp**	**From:**	**1/1/2015**		
Municipality:	**Germantown**	**To:**	**12/31/2019**	**Duration**	
County:	**Washington**	**AADT:**	**11,100**	**5**	**Years**
Traffic Control:	**Minor Street Stop**	**Area Type:**	**Suburban**	**0**	**Months**

Ref #	Label	Doc. #	Date	Crash Type	Time	Severity	Road Cond.	Light Cond.	Alc. Flag	Drug Flag	Speed Flag	Notes
1	EB_2	LLHLX6T	8/24/2016	RT-ANGLE	6 PM							SBT-EBR
2	EB_2	2SL0Q45WRP	4/7/2017	RT-ANGLE	10 AM							
3	EB_2	2SL0Q6N047	6/20/2018	RT-ANGLE	5 AM		WET	DAY				
4	M^W	CL56PK3	10/13/2015	MISC. OTHER	8 PM			DARK				SBR-WBT SSS
5	M^W	2SL0TJN014	12/10/2017	MISC. OTHER	2 PM							WB SSS W Leg
6	WB_1	C9L0F7HWV6	7/24/2019	LT-ANGLE	9 AM							
7	SB_4	CLRMNGR	5/26/2015	RT-TURN REAR-END	11 AM							Pull ahead, stop
8	SB_4	CLRSV11	6/29/2015	RT-TURN REAR-END	5 PM							Thought pulled ahead
9	SB_4	LLFH7CX	8/4/2015	RT-TURN REAR-END	5 PM	C						Thought pulled ahead
10	SB_4	CLV860F	2/13/2016	RT-TURN REAR-END	1 PM							Thought pulled ahead
11	SB_4	CLRL649	5/17/2016	RT-TURN REAR-END	4 PM	C						Thought pulled ahead
12	SB_4	RX68X7L	9/19/2016	RT-TURN REAR-END	9 AM							Thought pulled ahead
13	SB_4	2SL0T6RP3D	1/4/2017	RT-TURN REAR-END	8 AM							Thought pulled ahead
14	SB_4	2SL0ZB7D7R	10/2/2017	RT-TURN REAR-END	12 PM							Thought pulled ahead
15	SB_4	2SL143FP5R	4/13/2018	RT-TURN REAR-END	4 PM		WET					Thought pulled ahead
16	SB_4	2SL0ZB7DBR	6/14/2018	RT-TURN REAR-END	6 PM							Thought pulled ahead
17	SB_4	C9L09KMLXB	8/15/2018	RT-TURN REAR-END	5 PM							Thought pulled ahead
18	SB_4	2SL0KSK16G	9/15/2018	RT-TURN REAR-END	12 PM							Thought pulled ahead
19	SB_4	KRL0FRKD7Z	10/8/2018	RT-TURN REAR-END	7 AM		WET	DAY				Pull ahead, stop
20	SB_4	2SL0TT97VV	10/10/2018	RT-TURN REAR-END	7 AM							Thought pulled ahead
21	SB_4	2SL0PTJN3S	10/26/2018	RT-TURN REAR-END	5 PM							Pull ahead, stop
22	SB_4	2SL0TDXVNZ	10/31/2018	RT-TURN REAR-END	3 PM	C						Thought pulled ahead
23	SB_4	2SL0TM42CC	3/29/2019	RT-TURN REAR-END	3 PM							Looking left
24	SB_8	CL53QML	1/15/2015	SIDE-SWIPE-SAME	12 PM							Semi wide Rt turn
25	SB_8	2SL0PMCGJM	3/22/2018	SIDE-SWIPE-SAME	5 PM							Pull ahead, stop
26	SB_8	2SL10DBC52	2/11/2019	SIDE-SWIPE-SAME	3 PM		WET					Thought pulled ahead
27	SB_9	2SL0PMCGKT	10/5/2018	FIXED-OBJECT	7 PM		WET	DARK			Y	Sign
28	M_4	CLRMNJC	11/10/2015	MISC. OTHER	7 AM	C						Stopped in median
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Ref #	Label	Doc. #	Date	Crash Type	Time	Severity	Road Cond.	Light Cond.	Alc. Flag	Drug Flag	Speed Flag	Notes
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104												
105												
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Future Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			15.1			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	842	632	105	626	0	0	0	0	0	595	547
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	272.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Future Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	842	632	105	626	0	0	0	0	595	0	547
Number of Lanes	0	2	1	1	2	0	0	0	0	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	3
HCM Control Delay	197.4	122.9	466.5
HCM LOS	F	F	F

Lane	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	100%	100%	0%	0%	100%	100%	0%	0%
Vol Right, %	0%	0%	100%	0%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	400	400	600	100	298	298	565	520
LT Vol	0	0	0	100	0	0	565	0
Through Vol	400	400	0	0	298	298	0	0
RT Vol	0	0	600	0	0	0	0	520
Lane Flow Rate	421	421	632	105	313	313	595	547
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	1.236	1.236	1.419	0.379	1.084	0.922	2.107	1.757
Departure Headway (Hd)	13.32	13.32	10.817	26.444	25.941	24.057	14.476	13.251
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	278	278	341	138	144	153	256	279
Service Time	11.02	11.02	8.517	24.144	23.641	21.757	12.176	10.951
HCM Lane V/C Ratio	1.514	1.514	1.853	0.761	2.174	2.046	2.324	1.961
HCM Control Delay	170.3	170.3	233.5	44.4	161.6	110.6	541.5	385
HCM Lane LOS	F	F	F	E	F	F	F	F
HCM 95th-tile Q	15.9	15.9	24.6	1.6	8.3	6.5	39.4	31.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Future Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			15.1			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	842	632	105	626	0	0	0	0	0	595	547
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	341.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Future Vol, veh/h	0	800	600	100	595	0	0	0	0	565	0	520
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	1082679296		-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	5	5	5	10	10	10	2	2	2	6	6	6
Mvmt Flow	0	842	632	105	626	0	0	0	0	595	0	547

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1474	0	0	1257	2310	313
Stage 1	-	-	-	-	-	-	836	836	-
Stage 2	-	-	-	-	-	-	421	1474	-
Critical Hdwy	-	-	-	4.3	-	-	6.92	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	5.92	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.92	5.62	-
Follow-up Hdwy	-	-	-	2.3	-	-	3.56	4.06	3.36
Pot Cap-1 Maneuver	0	-	-	415	-	0	~ 158	36	671
Stage 1	0	-	-	-	-	0	~ 376	371	-
Stage 2	0	-	-	-	-	0	619	182	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	415	-	-	~ 118	0	671
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 118	0	-
Stage 1	-	-	-	-	-	-	~ 376	0	-
Stage 2	-	-	-	-	-	-	~ 462	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.4	$ 998.8
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	415	-	118	671
HCM Lane V/C Ratio	-	-	0.254	-	5.04	0.816
HCM Control Delay (s)	-	-	16.6	$ 1890.9		29.6
HCM Lane LOS	-	-	C	-	F	D
HCM 95th %tile Q(veh)	-	-	1	-	63.1	8.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	335
Future Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	862	500	339	1144	0	0	0	0	0	305	385
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1212.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	750	435	295	995	0	0	0	0	265	0	335
Future Vol, veh/h	0	750	435	295	995	0	0	0	0	265	0	335
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	215	100	-	-	-	-	-	-	-	65
Veh in Median Storage, #	-	0	-	-	0	-	1082679296		-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	4	4	4	2	2	2	5	5	5
Mvmt Flow	0	862	500	339	1144	0	0	0	0	305	0	385

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	1362	0	0	2253	3184	572
Stage 1	-	-	-	-	-	-	1822	1822	-
Stage 2	-	-	-	-	-	-	431	1362	-
Critical Hdwy	-	-	-	4.18	-	-	6.9	6.6	7
Critical Hdwy Stg 1	-	-	-	-	-	-	5.9	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.9	5.6	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.55	4.05	3.35
Pot Cap-1 Maneuver	0	-	-	490	-	0	~ 34	10	456
Stage 1	0	-	-	-	-	0	~ 110	123	-
Stage 2	0	-	-	-	-	0	614	209	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	490	-	-	~ 10	0	456
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 10	0	-
Stage 1	-	-	-	-	-	-	~ 110	0	-
Stage 2	-	-	-	-	-	-	~ 189	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.2	$ 6200.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	490	-	10	456
HCM Lane V/C Ratio	-	-	0.692	-	30.46	0.844
HCM Control Delay (s)	-	-	27.3	$ 13984.2		42.9
HCM Lane LOS	-	-	D	-	F	E
HCM 95th %tile Q(veh)	-	-	5.3	-	39.7	8.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCS7 Roundabouts Report

General Information

Analyst	TSC
Agency or Co.	TADI
Date Performed	1/15/2021
Analysis Year	2040
Time Analyzed	PM Peak Hour - Build
Project Description	2521 STH 167/Holy Hill Road Corridor Study

Site Information

Intersection	STH 167 & I-41/45 SB Ramp
E/W Street Name	STH 167
N/S Street Name	I-41/45 SB Ramps
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.95
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	0	0	0	1	1	0
Lane Assignment	T		TR		LT		T						L		LTR	
Volume (V), veh/h	0		800	600	0	100	595						0	565	0	520
Percent Heavy Vehicles, %	5		5	5	10	10	10						6	6	6	6
Flow Rate (v_{PCE}), pc/h	0		884	663	0	116	689						0	630	0	580
Right-Turn Bypass	Non-Yielding				None				None				None			
Conflicting Lanes	2				2								2			
Pedestrians Crossing, p/h	0				0								0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000					4.0000	4.0000	
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000					2.8000	2.8000	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	415.48	468.52	663.00	378.35	426.65					641.30	568.70	
Entry Volume veh/h	395.70	446.21	631.43	343.95	387.86					605.00	536.51	
Circulating Flow (v_c), pc/h	746			0			1514			805		
Exiting Flow (v_{ex}), pc/h	1514			1269			0			116		
Capacity (c_{pce}), pc/h	750.16	750.16		1285.71	1285.71					718.87	718.87	
Capacity (c), veh/h	714.44	714.44		1168.83	1168.83					678.18	678.18	
v/c Ratio (x)	0.55	0.62		0.29	0.33					0.89	0.79	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	13.9	16.2		5.8	6.3					37.6	26.3	
Lane LOS	B	C	A	A	A					E	D	
95% Queue, veh	3.4	4.4		1.2	1.5					11.2	7.9	
Approach Delay, s/veh	8.6			6.1						32.3		
Approach LOS	A			A						D		
Intersection Delay, s/veh | LOS	16.1						C					

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HCS7 Roundabouts Report

General Information

Analyst	TSC
Agency or Co.	TADI
Date Performed	1/15/2021
Analysis Year	2040
Time Analyzed	PM Peak Hour - Build
Project Description	2521 STH 167/Holy Hill Road Corridor Study

Site Information

Intersection	STH 167 & I-41/45 SB Ramp
E/W Street Name	STH 167
N/S Street Name	I-41/45 SB Ramps
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.87
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	0	0	0	1	1	0
Lane Assignment	T		TR		LT		T						L		LTR	
Volume (V), veh/h	0		750	435	0	295	995						0	265	0	335
Percent Heavy Vehicles, %	7		7	7	4	4	4						5	5	5	5
Flow Rate (v_{PCE}), pc/h	0		922	535	0	353	1189						0	320	0	404
Right-Turn Bypass	Non-Yielding				None				None				None			
Conflicting Lanes	2				2								2			
Pedestrians Crossing, p/h	0				0								0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.6453	4.0000		4.6453	4.3276					4.6453	4.3276	
Follow-Up Headway (s)	2.6667	2.8000		2.6667	2.5352					2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	433.34	488.66	535.00	724.74	817.26					320.00	404.00	
Entry Volume veh/h	404.99	456.69	500.00	696.87	785.83					304.76	384.76	
Circulating Flow (v_c), pc/h	673			0			1242			1542		
Exiting Flow (v_{ex}), pc/h	1242			1593			0			353		
Capacity (c_{pce}), pc/h	726.83	790.78		1349.98	1420.01					326.76	382.88	
Capacity (c), veh/h	679.28	739.04		1298.06	1365.39					311.20	364.65	
v/c Ratio (x)	0.60	0.62		0.54	0.58					0.98	1.06	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	15.8	15.5		8.6	9.0					83.4	96.9	
Lane LOS	C	C	A	A	A					F	F	
95% Queue, veh	4.0	4.3		3.3	3.9					10.3	13.3	
Approach Delay, s/veh	9.9			8.8						90.9		
Approach LOS	A			A						F		
Intersection Delay, s/veh | LOS	25.3						D					

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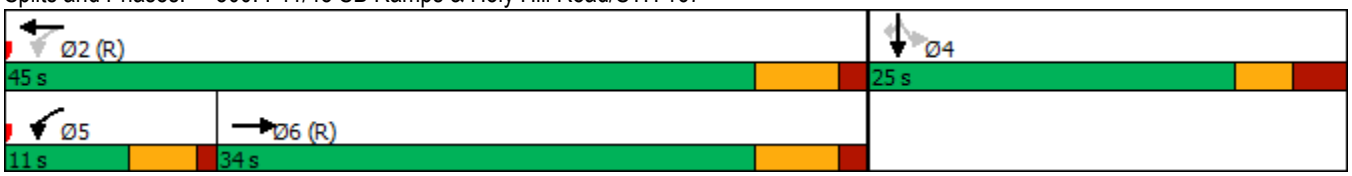
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	177
Future Volume (vph)	0	800	600	100	595	0	0	0	0	565	0	177
Ideal Flow (vphpl)	1900	1953	1900	1900	1953	1900	1900	1900	1900	1900	1835	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			15.1			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	5%	5%	5%	10%	10%	10%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	842	632	105	626	0	0	0	0	297	298	186
Turn Type		NA	Free	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			Free	2						4		4
Detector Phase		6		5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0		6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9		10.5	20.9					15.9	15.9	15.9
Total Split (s)		34.0		11.0	45.0					25.0	25.0	25.0
Total Split (%)		48.6%		15.7%	64.3%					35.7%	35.7%	35.7%
Maximum Green (s)		28.1		6.5	39.1					19.1	19.1	19.1
Yellow Time (s)		4.3		3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6		1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.9		4.5	5.9					5.9	5.9	5.9
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0		3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max		None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.52	0.41	0.30	0.32					0.75	0.78	0.50
Control Delay		14.1	0.7	7.8	3.4					36.9	39.6	27.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		14.1	0.7	7.8	3.4					36.9	39.6	27.1
Queue Length 50th (ft)		106	0	29	46					120	121	66
Queue Length 95th (ft)		m190	m0	36	49					#210	#230	123
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		1626	1538	356	1977					441	426	415
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.52	0.41	0.29	0.32					0.67	0.70	0.45

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 5 (7%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	800	600	100	595	0	0	0	0	565	0	177
Future Volume (veh/h)	0	800	600	100	595	0	0	0	0	565	0	177
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1877	1826	1752	1801	0				1811	1749	1811
Adj Flow Rate, veh/h	0	842	0	105	626	0				595	0	186
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	5	10	10	0				6	6	6
Cap, veh/h	0	1702		403	2108	0				742	0	330
Arrive On Green	0.00	0.32	0.00	0.02	0.20	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	3660	1547	1668	3511	0				3450	0	1535
Grp Volume(v), veh/h	0	842	0	105	626	0				595	0	186
Grp Sat Flow(s),veh/h/ln	0	1783	1547	1668	1711	0				1725	0	1535
Q Serve(g_s), s	0.0	13.4	0.0	2.0	10.9	0.0				11.5	0.0	7.6
Cycle Q Clear(g_c), s	0.0	13.4	0.0	2.0	10.9	0.0				11.5	0.0	7.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1702		403	2108	0				742	0	330
V/C Ratio(X)	0.00	0.49		0.26	0.30	0.00				0.80	0.00	0.56
Avail Cap(c_a), veh/h	0	1702		433	2108	0				941	0	419
HCM Platoon Ratio	1.00	0.67	0.67	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.95	0.95	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	17.0	0.0	9.1	15.0	0.0				26.1	0.0	24.5
Incr Delay (d2), s/veh	0.0	1.0	0.0	0.3	0.3	0.0				4.0	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	9.9	0.0	1.2	8.4	0.0				8.5	0.0	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	18.0	0.0	9.4	15.4	0.0				30.0	0.0	26.0
LnGrp LOS	A	B		A	B	A				C	A	C
Approach Vol, veh/h		842	A		731						781	
Approach Delay, s/veh		18.0			14.5						29.1	
Approach LOS		B			B						C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		49.0		21.0	9.7	39.3
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 39		19.1	6.5	* 28
Max Q Clear Time (g_c+I1), s		12.9		13.5	4.0	15.4
Green Ext Time (p_c), s		4.6		1.6	0.1	4.8

Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

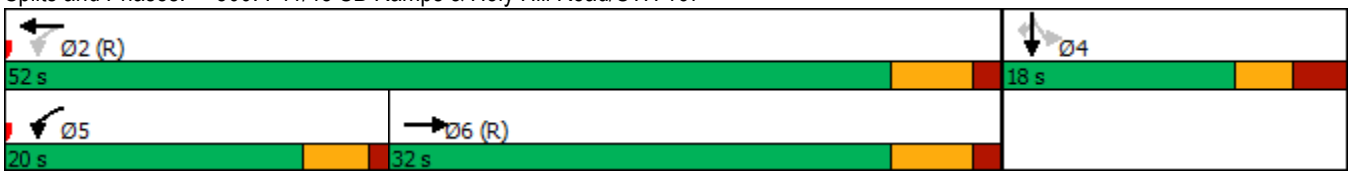
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	114
Future Volume (vph)	0	750	435	295	995	0	0	0	0	265	0	114
Ideal Flow (vphpl)	1900	1953	1900	1900	1953	1900	1900	1900	1900	1900	1835	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		215	100		0	0		0	0		65
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			45			30			30	
Link Distance (ft)		355			663			332			328	
Travel Time (s)		8.1			10.0			7.5			7.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	2%	2%	2%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	862	500	339	1144	0	0	0	0	152	153	131
Turn Type		NA	Free	pm+pt	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			Free	2						4		4
Detector Phase		6		5	2					4	4	4
Switch Phase												
Minimum Initial (s)		15.0		6.0	15.0					10.0	10.0	10.0
Minimum Split (s)		20.9		10.5	20.9					15.9	15.9	15.9
Total Split (s)		32.0		20.0	52.0					18.0	18.0	18.0
Total Split (%)		45.7%		28.6%	74.3%					25.7%	25.7%	25.7%
Maximum Green (s)		26.1		15.5	46.1					12.1	12.1	12.1
Yellow Time (s)		4.3		3.5	4.3					3.0	3.0	3.0
All-Red Time (s)		1.6		1.0	1.6					2.9	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.9		4.5	5.9					5.9	5.9	5.9
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Minimum Gap (s)		3.0		3.0	3.0					3.0	3.0	3.0
Time Before Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Time To Reduce (s)		0.0		0.0	0.0					0.0	0.0	0.0
Recall Mode		C-Max		None	C-Max					None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.56	0.33	0.68	0.48					0.58	0.60	0.53
Control Delay		12.9	0.5	6.7	0.6					36.6	38.0	35.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		12.9	0.5	6.7	0.6					36.6	38.0	35.3
Queue Length 50th (ft)		134	0	0	0					64	64	52
Queue Length 95th (ft)		m158	m0	m0	0					116	117	98
Internal Link Dist (ft)		275			583			252			248	
Turn Bay Length (ft)			215	100								65
Base Capacity (vph)		1533	1509	573	2393					282	272	265
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.56	0.33	0.59	0.48					0.54	0.56	0.49

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 68 (97%), Referenced to phase 2:WBTL and 6:EBT, Start of 1st Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 500: I-41/45 SB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	750	435	295	995	0	0	0	0	265	0	114
Future Volume (veh/h)	0	750	435	295	995	0	0	0	0	265	0	114
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1846	1796	1841	1892	0				1826	1763	1826
Adj Flow Rate, veh/h	0	862	0	339	1144	0				305	0	131
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	7	7	4	4	0				5	5	5
Cap, veh/h	0	1785		526	2475	0				497	0	221
Arrive On Green	0.00	0.51	0.00	0.04	0.23	0.00				0.14	0.00	0.14
Sat Flow, veh/h	0	3600	1522	1753	3690	0				3478	0	1547
Grp Volume(v), veh/h	0	862	0	339	1144	0				305	0	131
Grp Sat Flow(s),veh/h/ln	0	1754	1522	1753	1797	0				1739	0	1547
Q Serve(g_s), s	0.0	11.2	0.0	5.5	19.2	0.0				5.8	0.0	5.5
Cycle Q Clear(g_c), s	0.0	11.2	0.0	5.5	19.2	0.0				5.8	0.0	5.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1785		526	2475	0				497	0	221
V/C Ratio(X)	0.00	0.48		0.65	0.46	0.00				0.61	0.00	0.59
Avail Cap(c_a), veh/h	0	1785		711	2475	0				601	0	267
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.51	0.51	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.2	0.0	8.9	15.9	0.0				28.2	0.0	28.1
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.7	0.3	0.0				1.3	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	7.3	0.0	2.8	12.5	0.0				4.3	0.0	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.1	0.0	9.6	16.2	0.0				29.5	0.0	30.6
LnGrp LOS	A	B		A	B	A				C	A	C
Approach Vol, veh/h		862	A		1483						436	
Approach Delay, s/veh		12.1			14.7						29.8	
Approach LOS		B			B						C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		54.1		15.9	12.6	41.5
Change Period (Y+Rc), s		* 5.9		5.9	4.5	* 5.9
Max Green Setting (Gmax), s		* 46		12.1	15.5	* 26
Max Q Clear Time (g_c+I1), s		21.2		7.8	7.5	13.2
Green Ext Time (p_c), s		8.4		0.7	0.6	5.0

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: STH 167 & IH-41/45 SB Ramps
County: Washington
Village: Richfield

Major Street: STH 167
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: IH-41/45 SB Ramps
Critical Approach Speed: 30 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? Yes
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Background Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**No**
Warrant 3: Peak Hour Volume	**No**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	157.5	126
Number of Hours	0	2

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	79.5	63
Number of Hours	3	4

Satisfied? No

Condition C: Combination of A & B at 56%

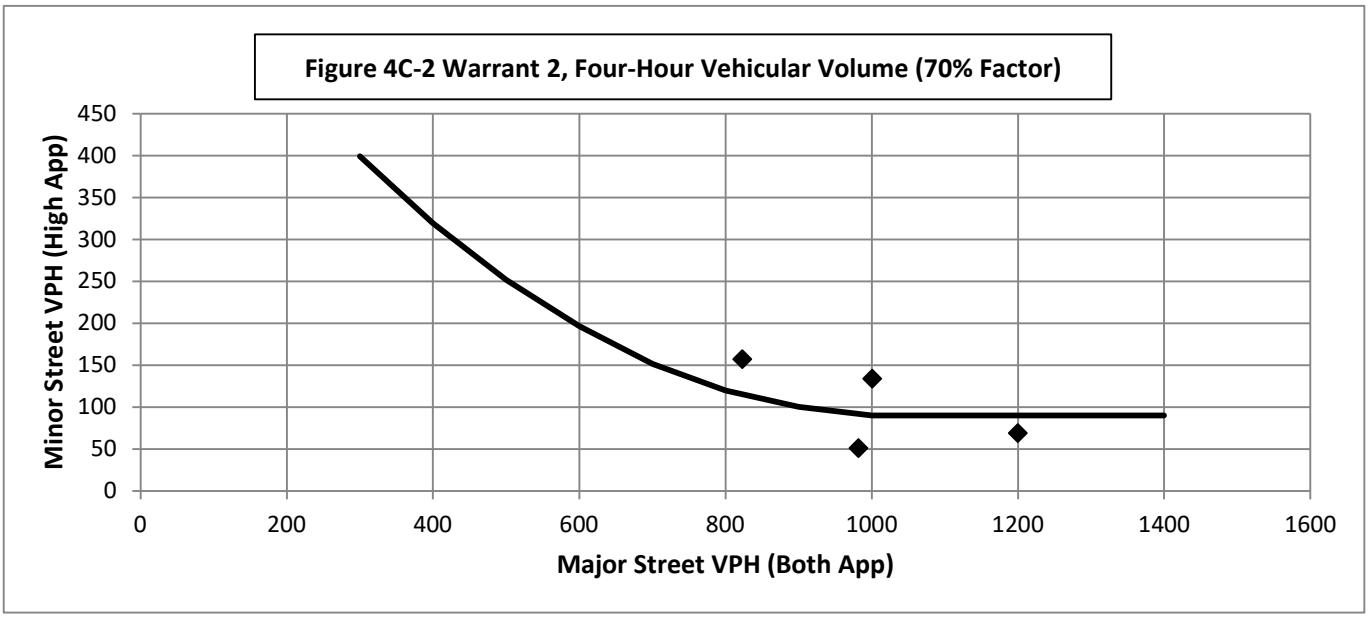
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	823	157	980
2	7:00	8:00	1001	134	1135
3	8:00	9:00	758	85	843
4	9:00	10:00	652	44	696
5	10:00	11:00	594	48	642
6	11:00	12:00	663	49	712
7	12:00	13:00	666	47	713
8	13:00	14:00	699	54	753
9	14:00	15:00	776	53	829
10	15:00	16:00	982	51	1033
11	16:00	17:00	1200	69	1269
12	17:00	18:00	993	46	1039
13	18:00	19:00	648	38	686
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	7:00	6:00	16:00	15:00
Major Road Vol.	1001	823	1200	982
Minor Road Vol.	134	157	69	51



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

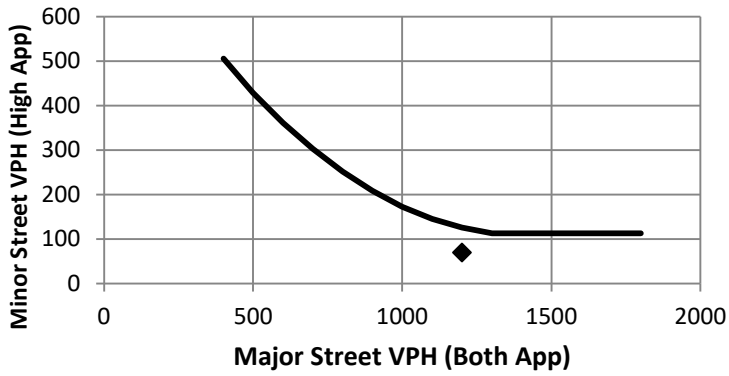
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	1200	69

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

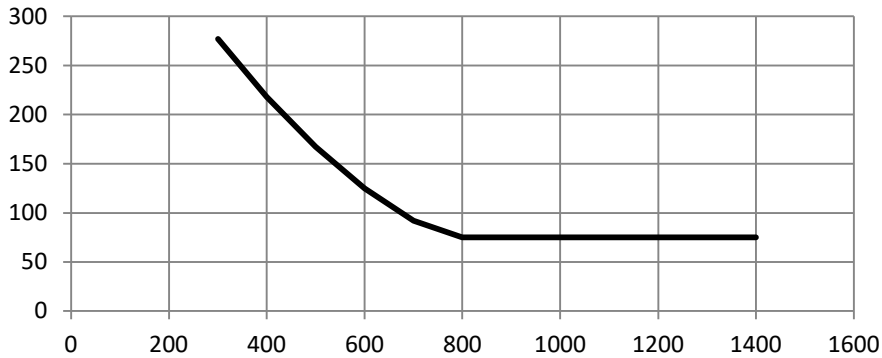
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

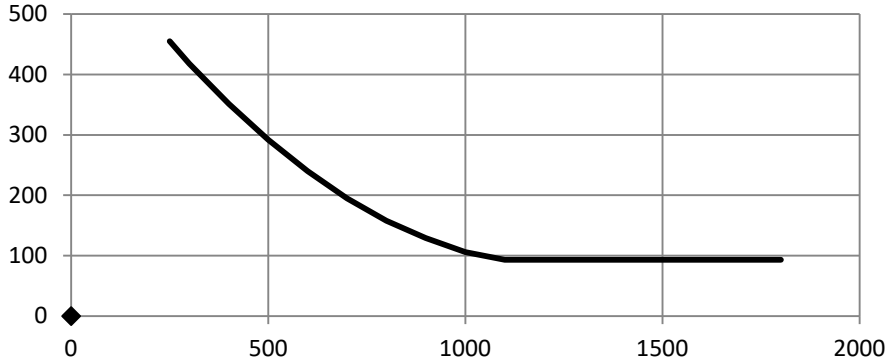


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	No
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1269	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	16:00	1200	69	23.115

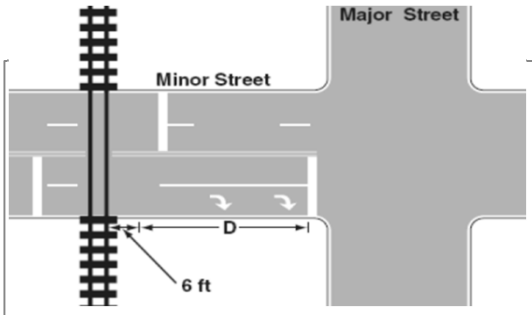
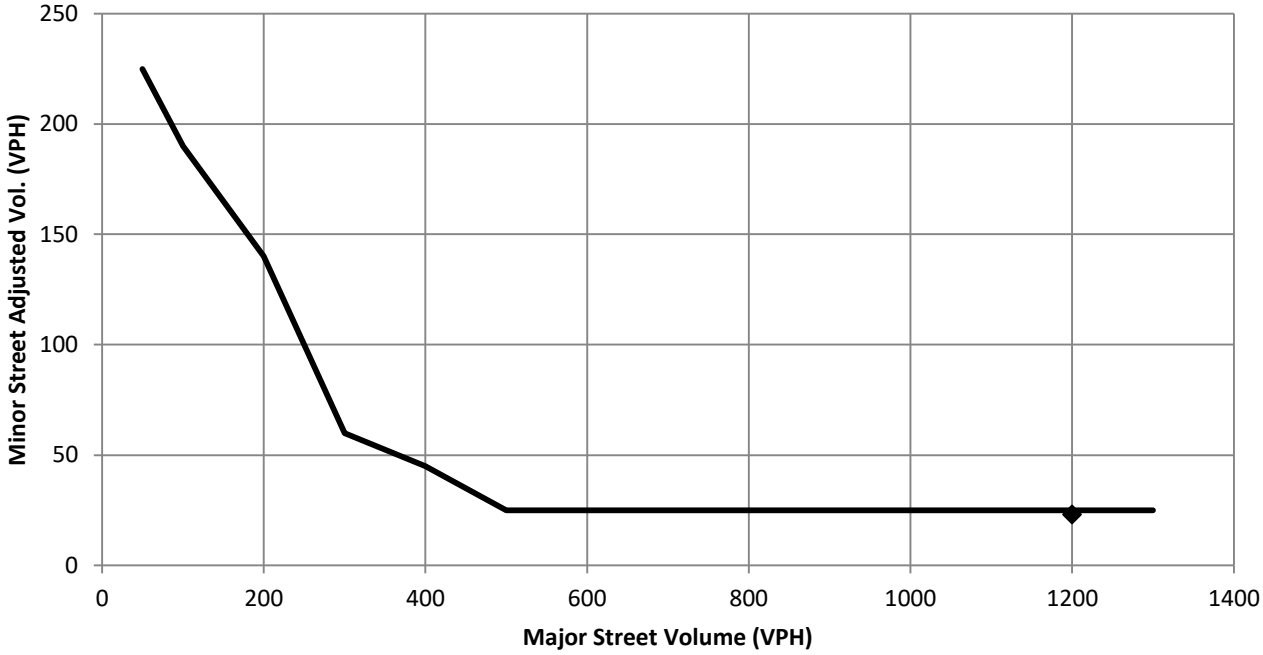


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	213	1	156	0	370	0	134	33	0	167	0	0	0	0	0	400	256	0	0	656	1193
	7:00	288	0	134	0	422	0	150	32	0	182	0	0	0	0	0	465	354	0	0	819	1423
	8:00	202	3	82	0	287	0	204	29	0	233	0	0	0	0	0	278	247	0	0	525	1045
	9:00	139	2	42	0	183	0	204	19	0	223	0	0	0	0	0	209	220	0	0	429	835
MD	10:00	153	1	47	0	201	0	192	10	0	202	0	0	0	0	0	193	199	0	0	392	795
	11:00	179	2	47	0	228	0	227	22	0	249	0	0	0	0	0	192	222	0	0	414	891
	12:00	157	1	46	0	204	0	255	17	0	272	0	0	0	0	0	170	224	0	0	394	870
	13:00	174	2	52	0	228	0	243	27	0	270	0	0	0	0	0	161	268	0	0	429	927
PM	14:00	178	4	49	0	231	0	317	20	0	337	0	0	0	0	0	196	243	0	0	439	1007
	15:00	225	2	49	0	276	0	443	29	0	472	0	0	0	0	0	183	327	0	0	510	1258
	16:00	254	2	67	0	323	0	580	21	0	601	0	0	0	0	0	213	386	0	0	599	1523
	17:00	175	1	45	0	221	0	494	16	0	510	0	0	0	0	0	143	340	0	0	483	1214
	18:00	132	1	37	0	170	0	293	9	0	302	0	0	0	0	0	121	225	0	0	346	818
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		2469	22	853	0	3344	0	3736	284	0	4020	0	0	0	0	0	2924	3511	0	0	6435	13799

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: **E/W**

Major Road Left Turn as Minor Approach? **No**

% Right Turns Included (Default 0%)

From North (SB)	**0%**
From East (WB)	**100%**
From South (NB)	**100%**
From West (EB)	**100%**

Major Road Volume Totals: East/West

Right	Thru	Left	T+LT	Total
400	390	33	423	823
465	504	32	536	1001
278	451	29	480	758
209	424	19	443	652
193	391	10	401	594
192	449	22	471	663
170	479	17	496	666
161	511	27	538	699
196	560	20	580	776
183	770	29	799	982
213	966	21	987	1200
143	834	16	850	993
121	518	9	527	648
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
2924	7247	284	7531	10455

Minor Road Highest Volume: North/South

Right	Thru	Left	T+LT	Total
0	1	156	157	157
0	0	134	134	134
0	3	82	85	85
0	2	42	44	44
0	1	47	48	48
0	2	47	49	49
0	1	46	47	47
0	2	52	54	54
0	4	49	53	53
0	2	49	51	51
0	2	67	69	69
0	1	45	46	46
0	1	37	38	38
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	22	853	875	875

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS: IH-41/45 SB Ramps & STH 167

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	187	1	136	0	0	107	32	0	0	0	0	0	382	223	0	0	1068	
7-8am	256	0	118	0	0	118	30	0	0	0	0	0	442	314	0	0	1278	
8-9am	169	3	73	0	0	167	28	0	0	0	0	0	252	211	0	0	903	
9-10am	113	2	37	0	0	173	18	0	0	0	0	0	187	188	0	0	718	
10-11am	127	1	42	0	0	162	9	0	0	0	0	0	171	169	0	0	681	
11am-12pm	151	2	41	0	0	193	20	1	0	0	0	0	170	190	0	0	768	
12-1pm	127	1	38	0	0	218	14	0	0	0	0	0	144	187	0	0	729	
1-2pm	145	2	44	0	0	208	24	0	0	0	0	0	138	233	0	0	794	
2-3pm	148	4	43	0	0	279	17	0	0	0	0	0	171	208	0	0	870	
3-4pm	192	2	41	0	0	396	20	0	0	0	0	0	158	288	0	0	1097	
4-5pm	220	2	60	0	0	533	16	0	0	0	0	0	187	348	0	0	1366	
5-6pm	143	1	40	0	0	448	12	0	0	0	0	0	116	301	0	0	1061	
6-7pm	103	1	33	0	0	257	8	0	0	0	0	0	96	192	0	0	690	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Year 2025 Background Traffic

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	194	1	147	0	0	110	32	0	0	0	0	0	382	228	0	0	1094	
7-8am	265	0	127	0	0	121	30	0	0	0	0	0	442	321	0	0	1306	
8-9am	175	3	79	0	0	171	28	0	0	0	0	0	252	215	0	0	923	
9-10am	117	2	40	0	0	177	18	0	0	0	0	0	187	192	0	0	733	
10-11am	131	1	45	0	0	166	9	0	0	0	0	0	171	173	0	0	696	
11am-12pm	156	2	44	0	0	198	20	0	0	0	0	0	170	194	0	0	784	
12-1pm	131	1	41	0	0	223	14	0	0	0	0	0	144	191	0	0	745	
1-2pm	150	2	48	0	0	213	24	0	0	0	0	0	138	238	0	0	813	
2-3pm	153	4	46	0	0	286	17	0	0	0	0	0	171	212	0	0	889	
3-4pm	199	2	44	0	0	406	20	0	0	0	0	0	158	294	0	0	1123	
4-5pm	228	2	65	0	0	546	16	0	0	0	0	0	187	355	0	0	1399	
5-6pm	148	1	43	0	0	459	12	0	0	0	0	0	116	307	0	0	1086	
6-7pm	107	1	36	0	0	263	8	0	0	0	0	0	96	196	0	0	707	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Growth Rates	0.4%	0.0%	1.3%			0.3%	0.0%						0.0%	0.3%				
PM Growth Rates	0.6%	0.0%	1.0%			0.4%	0.0%						0.0%	0.3%				

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167									
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	25	0	0	0	0	30	0	0	0	0	0	0	24	28	0	0	107	55	52	4.7%	4.5%	Existing Kwik Trip daily traffic estimated
7-8am	30	0	0	0	0	36	0	0	0	0	0	0	30	36	0	0	132	66	66	5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
8-9am	35	0	0	0	0	41	0	0	0	0	0	0	34	39	0	0	149	75	73	6.4%	6.3%	
9-10am	29	0	0	0	0	34	0	0	0	0	0	0	29	35	0	0	127	63	64	5.4%	5.5%	Distribution based on 2020 counts
10-11am	28	0	0	0	0	33	0	0	0	0	0	0	28	33	0	0	122	61	61	5.2%	5.2%	collected at Kwik Trip driveways:
11am-12pm	30	0	0	0	0	35	0	0	0	0	0	0	29	34	0	0	128	65	63	5.6%	5.4%	25% to/from west on 167 (770)
12-1pm	34	0	0	0	0	39	0	0	0	0	0	0	34	39	0	0	146	73	73	6.3%	6.3%	75% to/from east on 167 (2330)
1-2pm	31	0	0	0	0	37	0	0	0	0	0	0	30	36	0	0	134	68	66	5.8%	5.7%	
2-3pm	32	0	0	0	0	38	0	0	0	0	0	0	32	38	0	0	140	70	70	6.0%	6.0%	Distribution to/from ramp I/S same as
3-4pm	34	0	0	0	0	39	0	0	0	0	0	0	33	39	0	0	145	73	72	6.3%	6.2%	evaluated for KT assignment in TIA.
4-5pm	34	0	0	0	0	39	0	0	0	0	0	0	34	39	0	0	146	73	73	6.3%	6.3%	
5-6pm	35	0	0	0	0	42	0	0	0	0	0	0	35	41	0	0	153	77	76	6.6%	6.5%	Hourly Distributions: ITE LU#960
6-7pm	32	0	0	0	0	38	0	0	0	0	0	0	33	38	0	0	141	70	71	6.0%	6.1%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	46%					54%											IN %					
OUT %													46%	54%			OUT %					

AADT IN	AADT OUT	
1165	1165	
0%	0%	<- % Reduction, Sensitivity Test
1165	1165	

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

IH-41/45 SB Ramps & STH 167

By: TSC
Date: 1/13/2021

Exxon (-)

Start Time	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	-6	0	0	0	0	-7	0	0	0	0	0	0	-6	-6	0	0	-25	0	0			Exxon traffic was approximately 23%
7-8am	-7	0	0	0	0	-8	0	0	0	0	0	0	-7	-8	0	0	-30	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	-8	0	0	0	0	-9	0	0	0	0	0	0	-8	-9	0	0	-34	0	0			Therefore, subtract 23% of hourly
9-10am	-7	0	0	0	0	-8	0	0	0	0	0	0	-7	-8	0	0	-30	0	0			traffic from Kwik Trip (+) table.
10-11am	-6	0	0	0	0	-8	0	0	0	0	0	0	-6	-8	0	0	-28	0	0			
11am-12pm	-7	0	0	0	0	-8	0	0	0	0	0	0	-7	-8	0	0	-30	0	0			
12-1pm	-8	0	0	0	0	-9	0	0	0	0	0	0	-8	-9	0	0	-34	0	0			
1-2pm	-7	0	0	0	0	-9	0	0	0	0	0	0	-7	-8	0	0	-31	0	0			
2-3pm	-7	0	0	0	0	-9	0	0	0	0	0	0	-7	-9	0	0	-32	0	0			
3-4pm	-8	0	0	0	0	-9	0	0	0	0	0	0	-8	-9	0	0	-34	0	0			
4-5pm	-8	0	0	0	0	-9	0	0	0	0	0	0	-8	-9	0	0	-34	0	0			
5-6pm	-8	0	0	0	0	-10	0	0	0	0	0	0	-8	-9	0	0	-35	0	0			
6-7pm	-7	0	0	0	0	-9	0	0	0	0	0	0	-8	-9	0	0	-33	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Gateway (+)

Start Time	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				175	175	
																				0%	0%	<- % Reduction, Sensitivity Test
																				175	175	
																				% AADT IN	% AADT OUT	
6-7am	0	0	9	0	0	1	1	0	0	0	0	0	0	6	0	0	17	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	0	0	7	0	0	1	2	0	0	0	0	0	0	5	0	0	15	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	0	0	3	0	0	1	1	0	0	0	0	0	0	2	0	0	7	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	0	0	2	0	0	1	1	0	0	0	0	0	0	1	0	0	5	6	5	3.6%	2.9%	
10-11am	0	0	2	0	0	1	1	0	0	0	0	0	0	1	0	0	5	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	3	0	0	2	2	0	0	0	0	0	0	2	0	0	9	11	8	6.2%	4.7%	
12-1pm	0	0	5	0	0	2	3	0	0	0	0	0	0	3	0	0	13	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	0	0	4	0	0	2	3	0	0	0	0	0	0	2	0	0	11	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	0	0	3	0	0	2	3	0	0	0	0	0	0	2	0	0	10	9	12	5.1%	6.9%	
3-4pm	0	0	5	0	0	7	9	0	0	0	0	0	0	3	0	0	24	17	36	9.7%	20.7%	
4-5pm	0	0	2	0	0	4	5	0	0	0	0	0	0	1	0	0	12	6	20	3.6%	11.6%	
5-6pm	0	0	2	0	0	3	4	0	0	0	0	0	0	1	0	0	10	5	17	2.7%	9.5%	
6-7pm	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3	2	4	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											20%			IN %					
OUT %						20%	25%										OUT %					

Start Time	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	IH-41/45 SB Ramps Right	IH-41/45 SB Ramps Thru	IH-41/45 SB Ramps Left	IH-41/45 SB Ramps U-Turn	STH 167 Right	STH 167 Thru	STH 167 Left	STH 167 U-Turn	Intersection Totals	IN	OUT	AADT IN	AADT OUT	Notes
																				0	0	
																				0%	0%	<- % Reduction, Sensitivity Test
																				0	0	
																				% AADT IN	% AADT OUT	
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: STH 167 & IH-41/45 SB Ramps
County: Washington
Village: Richfield

Major Street: STH 167
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: IH-41/45 SB Ramps
Critical Approach Speed: 30 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 0%
From East (WB) 100%
From South (NB) 100%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? Yes
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**Yes**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	Yes
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**No**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	157.5	126
Number of Hours	3	6

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	79.5	63
Number of Hours	11	12

Satisfied? Yes

Condition C: Combination of A & B at 56%

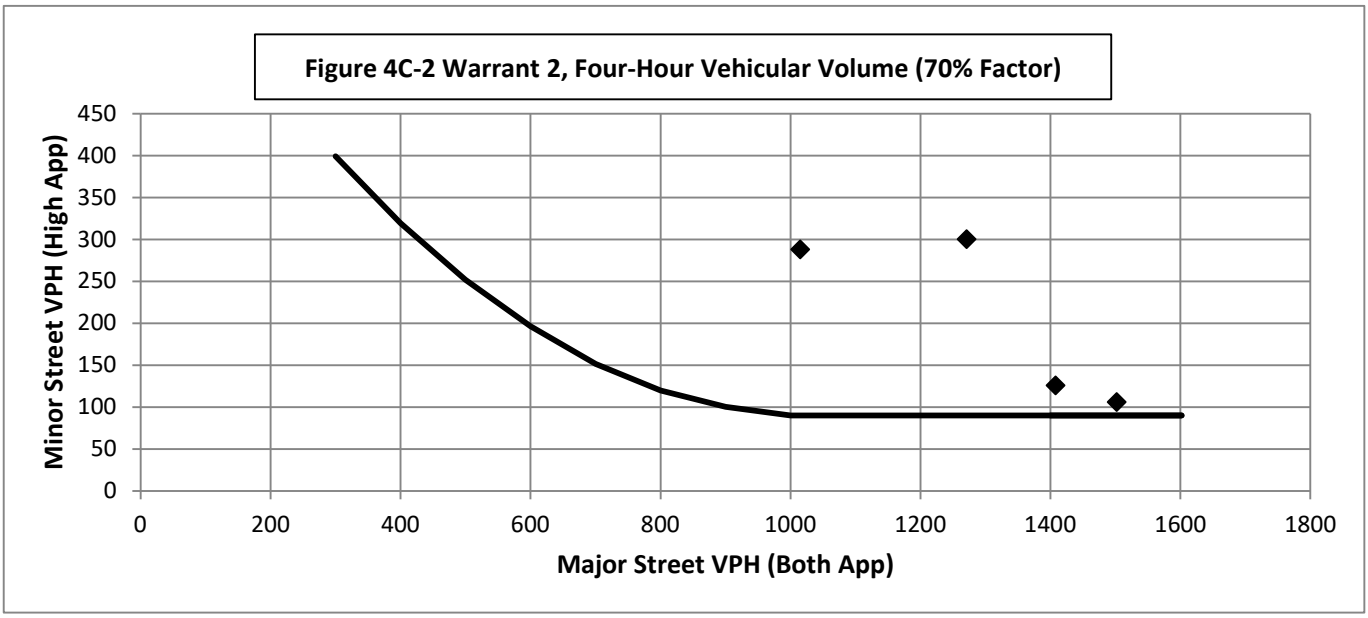
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	1015	288	1303
2	7:00	8:00	1271	300	1571
3	8:00	9:00	979	180	1159
4	9:00	10:00	896	116	1012
5	10:00	11:00	854	120	974
6	11:00	12:00	932	117	1049
7	12:00	13:00	1023	144	1167
8	13:00	14:00	970	136	1106
9	14:00	15:00	1076	122	1198
10	15:00	16:00	1408	126	1534
11	16:00	17:00	1502	106	1608
12	17:00	18:00	1361	66	1427
13	18:00	19:00	770	47	817
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	16:00	7:00	15:00	6:00
Major Road Vol.	1502	1271	1408	1015
Minor Road Vol.	106	300	126	288



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

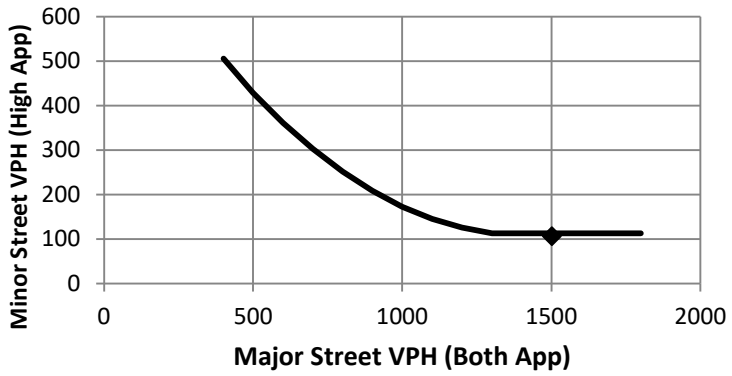
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	1502	106

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

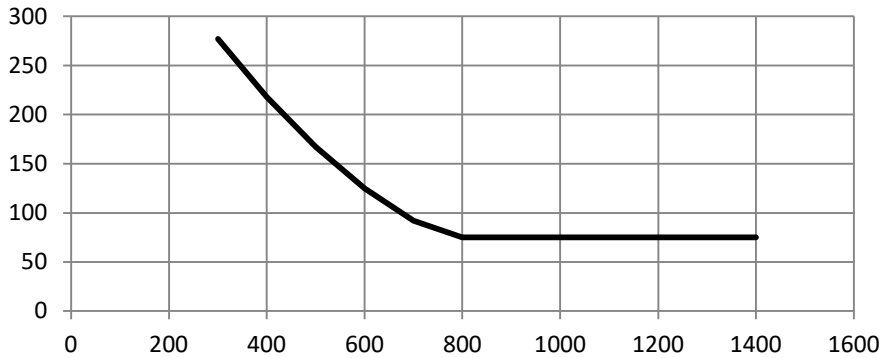
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

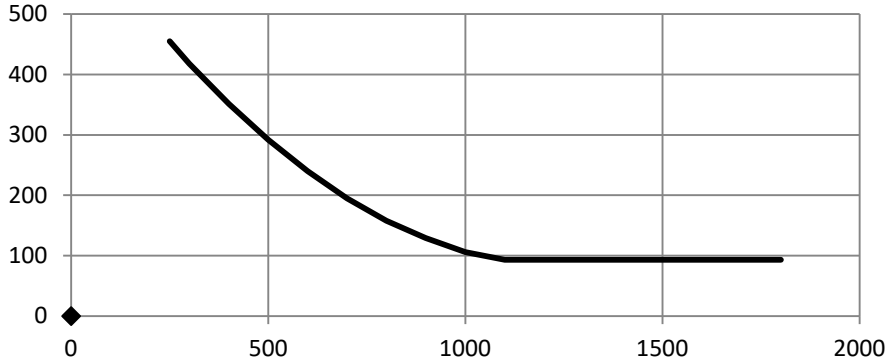


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	Yes
	Warrant 1, Condition B (80%)		Yes	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1608	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	16:00	1502	106	35.51

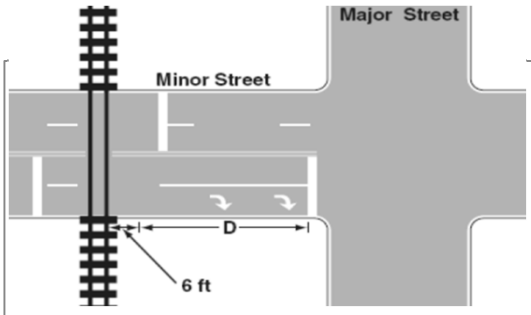
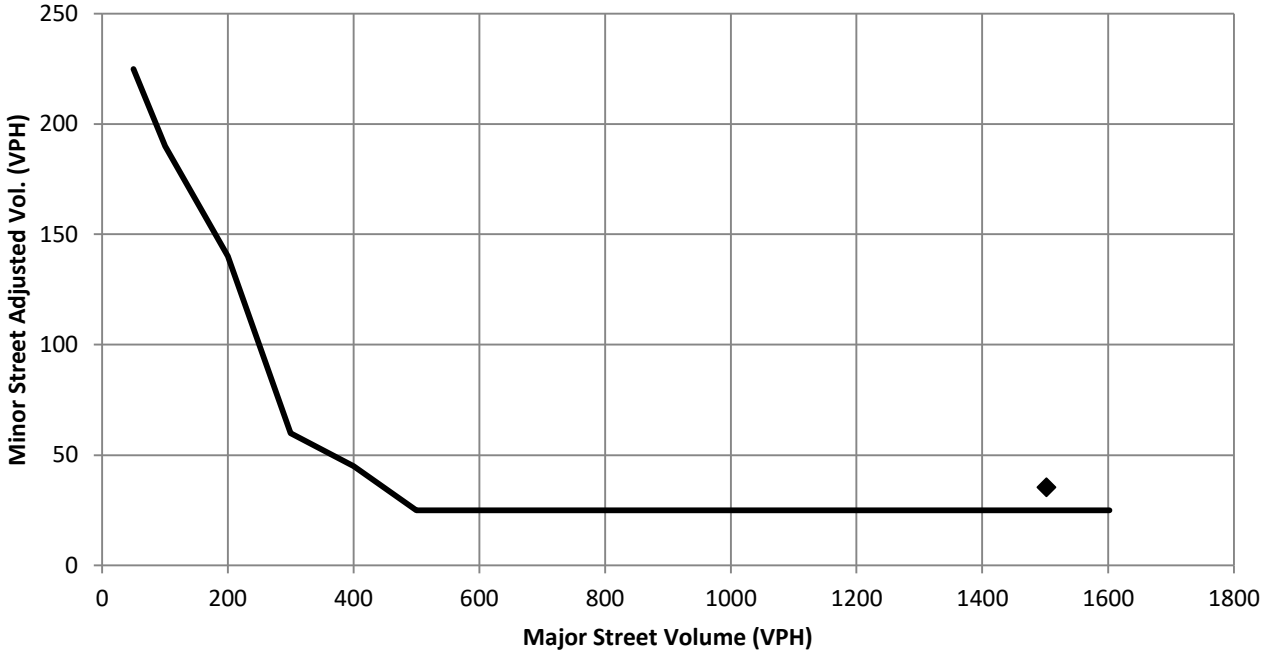


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	260	0	288	0	548	0	207	42	0	249	0	0	0	0	0	410	356	0	0	766	1563
	7:00	353	0	300	0	653	0	255	49	0	304	0	0	0	0	0	483	484	0	0	967	1924
	8:00	243	0	180	0	423	0	286	52	0	338	0	0	0	0	0	301	340	0	0	641	1402
	9:00	175	0	116	0	291	0	292	59	0	351	0	0	0	0	0	240	305	0	0	545	1187
MD	10:00	188	0	120	0	308	0	283	56	0	339	0	0	0	0	0	227	288	0	0	515	1162
	11:00	206	0	117	0	323	0	316	74	0	390	0	0	0	0	0	229	313	0	0	542	1255
	12:00	194	0	144	0	338	0	372	86	0	458	0	0	0	0	0	219	346	0	0	565	1361
	13:00	208	0	136	0	344	0	337	74	0	411	0	0	0	0	0	196	363	0	0	559	1314
PM	14:00	208	0	122	0	330	0	417	80	0	497	0	0	0	0	0	238	341	0	0	579	1406
	15:00	250	0	126	0	376	0	582	138	0	720	0	0	0	0	0	242	446	0	0	688	1784
	16:00	269	0	106	0	375	0	679	96	0	775	0	0	0	0	0	260	467	0	0	727	1877
	17:00	181	0	66	0	247	0	603	117	0	720	0	0	0	0	0	208	433	0	0	641	1608
	18:00	136	0	47	0	183	0	330	31	0	361	0	0	0	0	0	146	263	0	0	409	953
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		2871	0	1868	0	4739	0	4959	954	0	5913	0	0	0	0	0	3399	4745	0	0	8144	18796

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach? No

% Right Turns Included (Default 0%)

From North (SB)	0%
From East (WB)	100%
From South (NB)	100%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
410	563	42	605	1015
483	739	49	788	1271
301	626	52	678	979
240	597	59	656	896
227	571	56	627	854
229	629	74	703	932
219	718	86	804	1023
196	700	74	774	970
238	758	80	838	1076
242	1028	138	1166	1408
260	1146	96	1242	1502
208	1036	117	1153	1361
146	593	31	624	770
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
3399	9704	954	10658	14057

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	288	288	288
0	0	300	300	300
0	0	180	180	180
0	0	116	116	116
0	0	120	120	120
0	0	117	117	117
0	0	144	144	144
0	0	136	136	136
0	0	122	122	122
0	0	126	126	126
0	0	106	106	106
0	0	66	66	66
0	0	47	47	47
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	1868	1868	1868

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS: **IH-41/45 SB Ramps & STH 167**

By: TSC
Date: 1/13/2021

Year 2025 Existing Traffic

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167				Intersection	
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	Notes
6-7am	213	1	156	0	0	134	33	0	0	0	0	0	400	256	0	0	1193	
7-8am	288	0	134	0	0	150	32	0	0	0	0	0	465	354	0	0	1423	
8-9am	202	3	82	0	0	204	29	0	0	0	0	0	278	247	0	0	1045	
9-10am	139	2	42	0	0	204	19	0	0	0	0	0	209	220	0	0	835	
10-11am	153	1	47	0	0	192	10	0	0	0	0	0	193	199	0	0	795	
11am-12pm	179	2	47	0	0	227	22	0	0	0	0	0	192	222	0	0	891	
12-1pm	157	1	46	0	0	255	17	0	0	0	0	0	170	224	0	0	870	
1-2pm	174	2	52	0	0	243	27	0	0	0	0	0	161	268	0	0	927	
2-3pm	178	4	49	0	0	317	20	0	0	0	0	0	196	243	0	0	1007	
3-4pm	225	2	49	0	0	443	29	0	0	0	0	0	183	327	0	0	1258	
4-5pm	254	2	67	0	0	580	21	0	0	0	0	0	213	386	0	0	1523	
5-6pm	175	1	45	0	0	494	16	0	0	0	0	0	143	340	0	0	1214	
6-7pm	132	1	37	0	0	293	9	0	0	0	0	0	121	225	0	0	818	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Year 2025 Background Traffic

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167				Intersection	
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	Notes
6-7am	213	0	156	0	0	134	33	0	0	0	0	0	400	256	0	0	1192	2025 Existing = 2025 Background in this sheet.
7-8am	288	0	134	0	0	150	32	0	0	0	0	0	465	354	0	0	1423	
8-9am	202	0	82	0	0	204	29	0	0	0	0	0	278	247	0	0	1042	The 2025 Existing volumes on this sheet were the resulting 2025
9-10am	139	0	42	0	0	204	19	0	0	0	0	0	209	220	0	0	833	Background traffic volumes from the 2025 Background warrant study
10-11am	153	0	47	0	0	192	10	0	0	0	0	0	193	199	0	0	794	for the STH 167/IH-41/45 Southbound Ramps intersection.
11am-12pm	179	0	47	0	0	227	22	0	0	0	0	0	192	222	0	0	889	
12-1pm	157	0	46	0	0	255	17	0	0	0	0	0	170	224	0	0	869	
1-2pm	174	0	52	0	0	243	27	0	0	0	0	0	161	268	0	0	925	
2-3pm	178	0	49	0	0	317	20	0	0	0	0	0	196	243	0	0	1003	
3-4pm	225	0	49	0	0	443	29	0	0	0	0	0	183	327	0	0	1256	
4-5pm	254	0	67	0	0	580	21	0	0	0	0	0	213	386	0	0	1521	
5-6pm	175	0	45	0	0	494	16	0	0	0	0	0	143	340	0	0	1213	
6-7pm	132	0	37	0	0	293	9	0	0	0	0	0	121	225	0	0	817	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

AM Growth Rates	1.0%		1.0%			1.0%	1.0%						1.0%	1.0%		
PM Growth Rates	1.0%		1.0%			1.0%	1.0%						1.0%	1.0%		

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

2025 West Development (LU #154) - New Trips

	↓ IH-41/45 SB Ramps				← STH 167				↑ IH-41/45 SB Ramps				→ STH 167				Intersection						
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	12	0	0	0	0	14	0	0	0	0	0	0	2	3	0	0	31	39	8	10.2%	2.1%	800 new trips
7-8am	8	0	0	0	0	10	0	0	0	0	0	0	3	3	0	0	24	28	9	7.3%	2.3%	5% linked trips (40)
8-9am	6	0	0	0	0	7	0	0	0	0	0	0	3	4	0	0	20	19	11	5.1%	2.8%	
9-10am	14	0	0	0	0	16	0	0	0	0	0	0	3	4	0	0	37	45	10	11.8%	2.6%	Hourly Distributions: ITE LU#154
10-11am	11	0	0	0	0	13	0	0	0	0	0	0	3	4	0	0	31	36	11	9.5%	2.9%	
11am-12pm	4	0	0	0	0	5	0	0	0	0	0	0	4	5	0	0	18	14	14	3.8%	3.7%	Directional Distribution: "West Dist"
12-1pm	6	0	0	0	0	7	0	0	0	0	0	0	8	9	0	0	30	19	26	5.1%	6.9%	from TIA
1-2pm	7	0	0	0	0	8	0	0	0	0	0	0	7	8	0	0	30	22	22	5.9%	5.9%	
2-3pm	7	0	0	0	0	8	0	0	0	0	0	0	5	6	0	0	26	23	16	6.0%	4.3%	
3-4pm	6	0	0	0	0	7	0	0	0	0	0	0	11	13	0	0	37	20	38	5.3%	10.0%	
4-5pm	4	0	0	0	0	4	0	0	0	0	0	0	7	8	0	0	23	12	24	3.1%	6.3%	
5-6pm	2	0	0	0	0	3	0	0	0	0	0	0	9	11	0	0	25	8	30	2.2%	7.8%	
6-7pm	3	0	0	0	0	4	0	0	0	0	0	0	10	12	0	0	29	10	33	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	30%					35%											IN %					
OUT %													30%	35%			OUT %					

AADT IN	AADT OUT	
380	380	
0%	0%	<- % Reduction, Sensitivity Test
380	380	

By: TSC
Date: 1/13/2021

2025 West Development (LU #130) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN / % AADT IN	AADT OUT / % AADT OUT	Notes
6-7am	35	0	0	0	0	41	0	0	0	0	0	0	4	5	0	0	85	117	13	10.6%	1.2%	2325 new trips
7-8am	57	0	0	0	0	67	0	0	0	0	0	0	9	11	0	0	144	191	30	17.3%	2.7%	5% linked trips (115)
8-9am	35	0	0	0	0	40	0	0	0	0	0	0	14	16	0	0	105	115	46	10.4%	4.2%	
9-10am	22	0	0	0	0	26	0	0	0	0	0	0	23	26	0	0	97	74	75	6.7%	6.8%	Hourly Distributions: ITE LU#110
10-11am	24	0	0	0	0	28	0	0	0	0	0	0	26	30	0	0	108	81	87	7.3%	7.9%	
11am-12pm	23	0	0	0	0	26	0	0	0	0	0	0	28	33	0	0	110	75	93	6.8%	8.4%	Directional Distribution: "West Dist"
12-1pm	31	0	0	0	0	36	0	0	0	0	0	0	35	41	0	0	143	104	117	9.4%	10.6%	from TIA
1-2pm	27	0	0	0	0	32	0	0	0	0	0	0	22	25	0	0	106	90	72	8.1%	6.5%	
2-3pm	23	0	0	0	0	27	0	0	0	0	0	0	31	36	0	0	117	78	103	7.1%	9.3%	
3-4pm	19	0	0	0	0	22	0	0	0	0	0	0	42	49	0	0	132	64	141	5.8%	12.8%	
4-5pm	11	0	0	0	0	13	0	0	0	0	0	0	34	39	0	0	97	38	112	3.4%	10.1%	
5-6pm	4	0	0	0	0	4	0	0	0	0	0	0	50	59	0	0	117	12	168	1.1%	15.2%	
6-7pm	1	0	0	0	0	1	0	0	0	0	0	0	9	10	0	0	21	4	29	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %	30%					35%											IN %					
OUT %													30%	35%			OUT %					

AADT IN: 1105 | AADT OUT: 1105
0% | 0% <- % Reduction, Sensitivity Test
1105 | 1105

2025 West Development (LU #960 - Kwik Trip Growth to 2025) - Diverted Linked Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN / % AADT IN	AADT OUT / % AADT OUT	Notes
6-7am	0	0	0	0	0	7	-4	0	0	0	0	0	4	7	0	0	14	11	11	4.7%	4.5%	5530 daily trips at 100% in 2040
7-8am	0	0	0	0	0	8	-6	0	0	0	0	0	6	8	0	0	16	14	14	5.7%	5.7%	-3100 existing daily trips
8-9am	0	0	0	0	0	9	-6	0	0	0	0	0	6	9	0	0	18	15	15	6.4%	6.3%	-1825 trips in 2040 (75% of total growth)
9-10am	0	0	0	0	0	8	-5	0	0	0	0	0	5	8	0	0	16	13	13	5.4%	5.5%	=605 new KT trips in 2025 Build.
10-11am	0	0	0	0	0	7	-5	0	0	0	0	0	5	7	0	0	14	12	12	5.2%	5.2%	
11am-12pm	0	0	0	0	0	8	-5	0	0	0	0	0	5	8	0	0	16	13	13	5.6%	5.4%	80% (480) are diverted linked trips
12-1pm	0	0	0	0	0	9	-6	0	0	0	0	0	6	9	0	0	18	15	15	6.3%	6.3%	20% (125) are pas-by trips
1-2pm	0	0	0	0	0	8	-6	0	0	0	0	0	6	8	0	0	16	14	14	5.8%	5.7%	PB trips do not pass through NB
2-3pm	0	0	0	0	0	8	-6	0	0	0	0	0	6	8	0	0	16	14	14	6.0%	6.0%	ramp intersection.
3-4pm	0	0	0	0	0	9	-6	0	0	0	0	0	6	9	0	0	18	15	15	6.3%	6.2%	
4-5pm	0	0	0	0	0	9	-6	0	0	0	0	0	6	9	0	0	18	15	15	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	0	0	0	0	0	10	-6	0	0	0	0	0	6	10	0	0	20	16	16	6.6%	6.5%	
6-7pm	0	0	0	0	0	8	-6	0	0	0	0	0	6	8	0	0	16	14	15	6.0%	6.1%	Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %						60%	-40%						40%	60%			IN %					
OUT %																	OUT %					

AADT IN: 240 | AADT OUT: 240
0% | 0% <- % Reduction, Sensitivity Test
240 | 240

2025 East Development (LU #130) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	AADT IN / % AADT IN	AADT OUT / % AADT OUT	Notes
6-7am	0	0	67	0	0	5	6	0	0	0	0	0	0	45	0	0	123	223	25	10.6%	1.2%	Area H (135)
7-8am	0	0	109	0	0	11	14	0	0	0	0	0	0	73	0	0	207	363	57	17.3%	2.7%	Area H (2515)
8-9am	0	0	65	0	0	18	22	0	0	0	0	0	0	44	0	0	149	218	88	10.4%	4.2%	Area I (1545)
9-10am	0	0	42	0	0	29	36	0	0	0	0	0	0	28	0	0	135	141	143	6.7%	6.8%	
10-11am	0	0	46	0	0	33	42	0	0	0	0	0	0	31	0	0	152	153	166	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	0	0	43	0	0	35	44	0	0	0	0	0	0	29	0	0	151	143	176	6.8%	8.4%	
12-1pm	0	0	59	0	0	45	56	0	0	0	0	0	0	39	0	0	199	197	223	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	0	0	51	0	0	27	34	0	0	0	0	0	0	34	0	0	146	170	137	8.1%	6.5%	from TIA
2-3pm	0	0	45	0	0	39	49	0	0	0	0	0	0	30	0	0	163	149	195	7.1%	9.3%	
3-4pm	0	0	37	0	0	54	67	0	0	0	0	0	0	24	0	0	182	122	269	5.8%	12.8%	
4-5pm	0	0	21	0	0	42	53	0	0	0	0	0	0	14	0	0	130	71	212	3.4%	10.1%	
5-6pm	0	0	7	0	0	64	80	0	0	0	0	0	0	5	0	0	156	23	319	1.1%	15.2%	
6-7pm	0	0	2	0	0	11	14	0	0	0	0	0	0	2	0	0	29	8	55	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											20%			IN %					
OUT %						20%	25%										OUT %					

AADT IN: 2100 | AADT OUT: 2100
0% | 0% <- % Reduction, Sensitivity Test
2100 | 2100

By: TSC
Date: 1/13/2021

2025 East Development (LU #154) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		465	465			
																		0%	0%			<- % Reduction, Sensitivity Test
																		465	465			
6-7am	0	0	14	0	0	2	3	0	0	0	0	0	0	9	0	0	28	47	10	10.2%	2.1%	Area H (930)
7-8am	0	0	10	0	0	2	3	0	0	0	0	0	0	7	0	0	22	34	11	7.3%	2.3%	
8-9am	0	0	7	0	0	3	3	0	0	0	0	0	0	5	0	0	18	24	13	5.1%	2.8%	Hourly Distributions: ITE LU#154
9-10am	0	0	17	0	0	2	3	0	0	0	0	0	0	11	0	0	33	55	12	11.8%	2.6%	
10-11am	0	0	13	0	0	3	3	0	0	0	0	0	0	9	0	0	28	44	13	9.5%	2.9%	Directional Distribution: "East Dist"
11am-12pm	0	0	5	0	0	3	4	0	0	0	0	0	0	4	0	0	16	18	17	3.8%	3.7%	from TIA
12-1pm	0	0	7	0	0	6	8	0	0	0	0	0	0	5	0	0	26	24	32	5.1%	6.9%	
1-2pm	0	0	8	0	0	5	7	0	0	0	0	0	0	5	0	0	25	27	27	5.9%	5.9%	
2-3pm	0	0	8	0	0	4	5	0	0	0	0	0	0	6	0	0	23	28	20	6.0%	4.3%	
3-4pm	0	0	8	0	0	9	12	0	0	0	0	0	0	5	0	0	34	25	47	5.3%	10.0%	
4-5pm	0	0	4	0	0	6	7	0	0	0	0	0	0	3	0	0	20	14	29	3.1%	6.3%	
5-6pm	0	0	3	0	0	7	9	0	0	0	0	0	0	2	0	0	21	10	36	2.2%	7.8%	
6-7pm	0	0	4	0	0	8	10	0	0	0	0	0	0	3	0	0	25	13	41	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											20%			IN %					
OUT %						20%	25%										OUT %					

2025 East Development (LU #140) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		590	590			
																		0%	0%			<- % Reduction, Sensitivity Test
																		590	590			
6-7am	0	0	30	0	0	3	4	0	0	0	0	0	0	20	0	0	57	99	15	16.8%	2.6%	Area I (385)
7-8am	0	0	24	0	0	4	5	0	0	0	0	0	0	16	0	0	49	81	19	13.8%	3.2%	Area J (790)
8-9am	0	0	10	0	0	3	4	0	0	0	0	0	0	7	0	0	24	34	16	5.7%	2.7%	
9-10am	0	0	6	0	0	3	4	0	0	0	0	0	0	4	0	0	17	21	17	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	0	6	0	0	3	4	0	0	0	0	0	0	4	0	0	17	19	17	3.3%	2.8%	
11am-12pm	0	0	11	0	0	6	7	0	0	0	0	0	0	7	0	0	31	37	28	6.2%	4.7%	Directional Distribution: "East Dist"
12-1pm	0	0	16	0	0	7	9	0	0	0	0	0	0	11	0	0	43	53	36	8.9%	6.1%	from TIA
1-2pm	0	0	12	0	0	8	10	0	0	0	0	0	0	8	0	0	38	40	41	6.8%	7.0%	
2-3pm	0	0	9	0	0	8	10	0	0	0	0	0	0	6	0	0	33	30	41	5.1%	6.9%	
3-4pm	0	0	17	0	0	24	31	0	0	0	0	0	0	11	0	0	83	57	122	9.7%	20.7%	
4-5pm	0	0	6	0	0	14	17	0	0	0	0	0	0	4	0	0	41	21	68	3.6%	11.6%	
5-6pm	0	0	5	0	0	11	14	0	0	0	0	0	0	3	0	0	33	16	56	2.7%	9.5%	
6-7pm	0	0	2	0	0	3	4	0	0	0	0	0	0	1	0	0	10	7	14	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											20%			IN %					
OUT %						20%	25%										OUT %					

2025 South Development (LU #140) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		350	350			
																		0%	0%			<- % Reduction, Sensitivity Test
																		350	350			
6-7am	0	0	18	0	0	1	0	0	0	0	0	0	0	9	0	0	28	59	9	16.8%	2.6%	Area U (255)
7-8am	0	0	14	0	0	2	1	0	0	0	0	0	0	7	0	0	24	48	11	13.8%	3.2%	Area U (445)
8-9am	0	0	6	0	0	1	0	0	0	0	0	0	0	3	0	0	10	20	9	5.7%	2.7%	
9-10am	0	0	4	0	0	2	1	0	0	0	0	0	0	2	0	0	9	13	10	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	0	4	0	0	2	1	0	0	0	0	0	0	2	0	0	9	12	10	3.3%	2.8%	
11am-12pm	0	0	7	0	0	2	1	0	0	0	0	0	0	3	0	0	13	22	16	6.2%	4.7%	Directional Distribution: "South Dist"
12-1pm	0	0	9	0	0	3	1	0	0	0	0	0	0	5	0	0	18	31	21	8.9%	6.1%	from TIA
1-2pm	0	0	7	0	0	4	1	0	0	0	0	0	0	4	0	0	16	24	25	6.8%	7.0%	
2-3pm	0	0	5	0	0	4	1	0	0	0	0	0	0	3	0	0	13	18	24	5.1%	6.9%	
3-4pm	0	0	10	0	0	11	4	0	0	0	0	0	0	5	0	0	30	34	72	9.7%	20.7%	
4-5pm	0	0	4	0	0	6	2	0	0	0	0	0	0	2	0	0	14	13	41	3.6%	11.6%	
5-6pm	0	0	3	0	0	5	2	0	0	0	0	0	0	1	0	0	11	9	33	2.7%	9.5%	
6-7pm	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3	4	8	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											15%			IN %					
OUT %						15%	5%										OUT %					

By: TSC
Date: 1/13/2021

2025 South Development (LU #710) - New Trips

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		230	230			
																		0%	0%			<- % Reduction, Sensitivity Test
																		230	230			
6-7am	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	5	11	1	4.6%	0.5%	Area U (435)
7-8am	0	0	9	0	0	1	0	0	0	0	0	0	0	5	0	0	15	30	4	13.1%	1.9%	Area U (25)
8-9am	0	0	10	0	0	1	0	0	0	0	0	0	0	5	0	0	16	33	8	14.4%	3.5%	
9-10am	0	0	5	0	0	2	1	0	0	0	0	0	0	2	0	0	10	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	0	4	0	0	2	1	0	0	0	0	0	0	2	0	0	9	12	14	5.4%	5.9%	
11am-12pm	0	0	4	0	0	4	1	0	0	0	0	0	0	2	0	0	11	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	0	7	0	0	4	1	0	0	0	0	0	0	3	0	0	15	23	24	10.2%	10.4%	from TIA
1-2pm	0	0	6	0	0	2	1	0	0	0	0	0	0	3	0	0	12	21	15	9.0%	6.7%	
2-3pm	0	0	6	0	0	2	1	0	0	0	0	0	0	3	0	0	12	19	15	8.2%	6.5%	
3-4pm	0	0	5	0	0	3	1	0	0	0	0	0	0	3	0	0	12	17	20	7.4%	8.5%	
4-5pm	0	0	4	0	0	5	2	0	0	0	0	0	0	2	0	0	13	13	35	5.5%	15.2%	
5-6pm	0	0	3	0	0	5	2	0	0	0	0	0	0	2	0	0	12	10	36	4.2%	15.6%	
6-7pm	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	3	4	7	1.7%	2.9%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %			30%											15%			IN %					
OUT %						15%	5%										OUT %					

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		0	0			
																		0%	0%			<- % Reduction, Sensitivity Test
																		0	0			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Start Time	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 SB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		0	0			
																		0%	0%			<- % Reduction, Sensitivity Test
																		0	0			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

APPENDIX J
Intersection Control Evaluation

STH 167 & IH-41/45 Northbound Ramps

Includes Signal Warrant Analyses

To: DOT ICE Review
From: Tammi Czewski, P.E.
Date: 1/15/2021
RE: STH 167/Holy Hill Road Corridor Study
Village of Richfield/Village of Germantown, Washington County, WI
STH 167 & IH-41/45 Northbound Ramp Intersection

Project Description:

A corridor study was completed for Holy Hill Road from Appleton Avenue (STH 175) to the IH-41/45 northbound ramps in the Village of Richfield, and for Holy Hill Road from the IH-41/45 northbound ramps to Goldendale Road (CTH Y) in the Village of Germantown. Holy Hill Road, west of the IH-41/45 northbound ramp is also designated as STH 167. The corridor study evaluates traffic impacts and potential mitigating improvements with additional traffic generated by buildout of the surrounding vacant lands by the year 2025 and the year 2035. Therefore, the corridor study evaluates the base year 2025 ("initial buildout") and the horizon year 2040 (five years after full buildout).

This ICE report evaluates alternative traffic control options for the STH 167 & IH-41/45 Northbound Ramp intersection with future traffic volume estimations in the study area. The intersection currently operates with all-way stop sign control.

Alternatives:

Potential traffic control alternatives for the STH 167 & IH-41/45 Northbound Ramp intersection include two-way stop sign control, all-way stop sign control (existing), traffic signal control, and roundabout control. Restricted access control (right-in/right-out or left-in/right-in/right-out) was not evaluated as these options would limit the connectivity between IH-41/45 and STH 167.

Safety Considerations:

Crash data from 2015 through 2019 was collected for the STH 167 and IH-41/45 Northbound Ramp intersection and plotted on a crash diagram. During the five-year period, 10 crashes occurred within 300 feet of the intersection. Seven of these crashes (70%) occurred during the PM peak hours when the northbound left-turn traffic volumes are very high (about 300-450 vehicles per hour). Five (50%) of the crashes were right-angle crashes and five (50%) were rear-end crashes. Four crashes (40%) were due to northbound traffic's failure to yield.

Feasibility of Alternatives:

The feasibility of each alternative was evaluated with respect to the available right-of-way at the intersection. The inscribed circle diameter for an urban double lane roundabout is from 150-180 feet and does not include the additional space needed for sidewalks. Based on the Washington County interactive maps online, there is enough right-of-way to accommodate the larger inscribed circle diameter at the ramp intersections.

Based on the Washington County online maps, there is enough right-of-way to widen STH 167 through the IH-41/45 interchange ramps, although it would require the reconstruction of the STH 167 bridge of IH-41/45.

Operational Analysis:

Peak Hour intersection operations were evaluated for the STH 167 & IH-41/45 Northbound Ramp intersection with each different traffic control alternative and the horizon Year 2040 Build traffic volumes. The Year 2040 Build traffic volumes include background traffic forecasts to the year 2040 plus additional traffic expected from future buildout of vacant lands in the area. Due to the increase in corridor traffic volumes with this development, the Year 2040 Build traffic scenario includes the general improvement of widening the STH 167/Holy Hill Road corridor from a two-lane cross-section to a four-lane cross-section.

- Two-Way Stop Control: With two-way stop control (stop signs on the northbound ramp approach), significant delays and queues are expected during the AM and PM peak hours with the Year 2040 Build traffic volumes. Even if the median was widened to allow for two-vehicle storage (for two-stage turning movements), movements would remain over capacity and at LOS F.
- All-Way Stop Control: The intersection currently operates with all-way stop control, which results in unacceptable traffic operations starting with the Year 2025 Background (no development) traffic condition. Even with additional lanes on STH 167, the intersection is expected to have significant delays and queues during the peak hour with the Year 2040 Build traffic volumes.
- Roundabout Control: With a two-lane roundabout, movements are expected to operate at unacceptable LOS E and F during both the AM and PM peak hours with the Year 2040 Build traffic volumes. A roundabout with additional circulating lanes would be needed to accommodate the projected traffic flow. As three or more lane roundabouts are not desirable for drivability and safety reasons, roundabout control was dropped from consideration for this intersection.
- Traffic Signal Control: With traffic signal control and additional turn lanes on both STH 167 and the IH-41/45 Northbound Ramp approaches, all movements at the intersection can operate acceptably at LOS D or better during the AM and PM peak hours and Year 2040 Build traffic volumes.

A traffic signal warrant analysis was completed for the STH 167 & IH-41/45 Northbound Ramp intersection. The hourly intersection traffic volumes were compared against the hourly volume thresholds in the MUTCD. As the intersection has only three approach legs and the speed limit on STH 167 is posted at 45 mph, the minor street volume thresholds were inflated to 150% of the MUTCD values, and then all volume thresholds were reduced to 70%. Signal warrants were evaluated for traffic volume scenarios beginning with the Year 2025 Background condition since the analysis showed unacceptable delays during the peak hours. With the Year 2025 Background traffic volumes, only

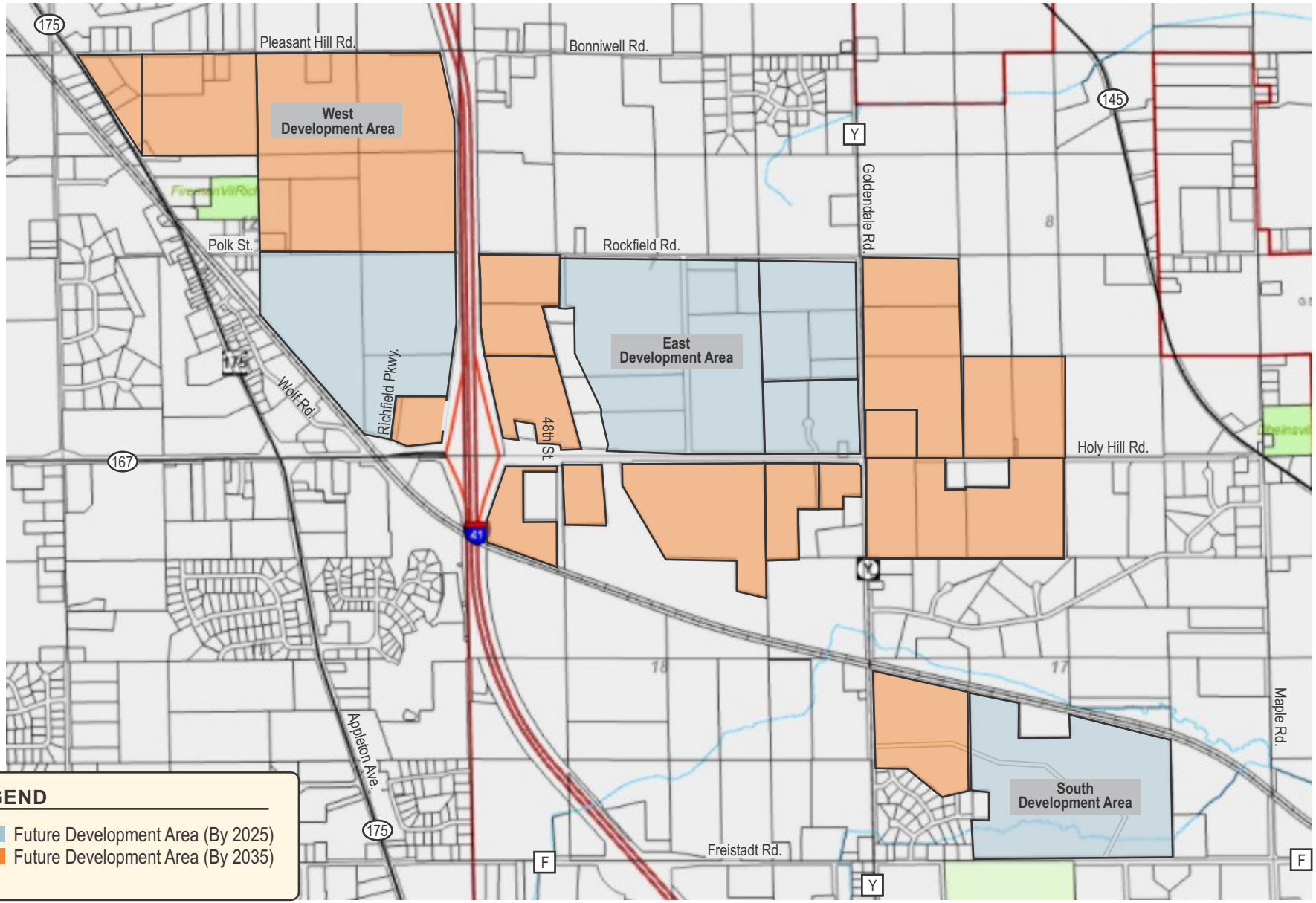
Warrant 3, Peak Hour Volume is expected to be met. With additional development buildout for the year 2025 (Year 2025 Build traffic), Warrants 1, 2, and 3 are expected to be met.

Conclusion:

While no crash patterns emerged (other than failure to yield) that could justify a traffic signal, current peak hour volumes result in unacceptable delays and queues during the PM peak hour with the existing all-way stop control. Alternative traffic control, such as two-way stop control or roundabout control (with two circulating lanes or less) are not expected to mitigate delays with the Year 2040 Build traffic volumes at the STH 167 & IH-41/45 Northbound Ramp intersection. Traffic signal control, along with widening the cross-section of STH 167 and providing additional turn lanes at each approach, is expected to provide enough capacity to accommodate the projected traffic volumes. Although traffic signals are not expected to be fully warranted until the Year 2025 Build traffic condition, traffic signals are recommended to mitigate the delays and queues expected with the Year 2025 Background traffic condition.

Attachments:

- Site Location Map
- Year 2025 Build Traffic Volumes
- Year 2040 Build Traffic Volumes
- ROW Constraints
- Crash Diagram and Crash Statistics
- Year 2040 Build Analysis – All-Way Stop Control
- Year 2040 Build Analysis – Two-Way Stop Control
- Year 2040 Build Analysis – Roundabout Control
- Year 2040 Build Analysis – Traffic Signal Control
- Year 2025 Background Traffic Signal Warrant Analysis
- Year 2025 Build Traffic Signal Warrant Analysis

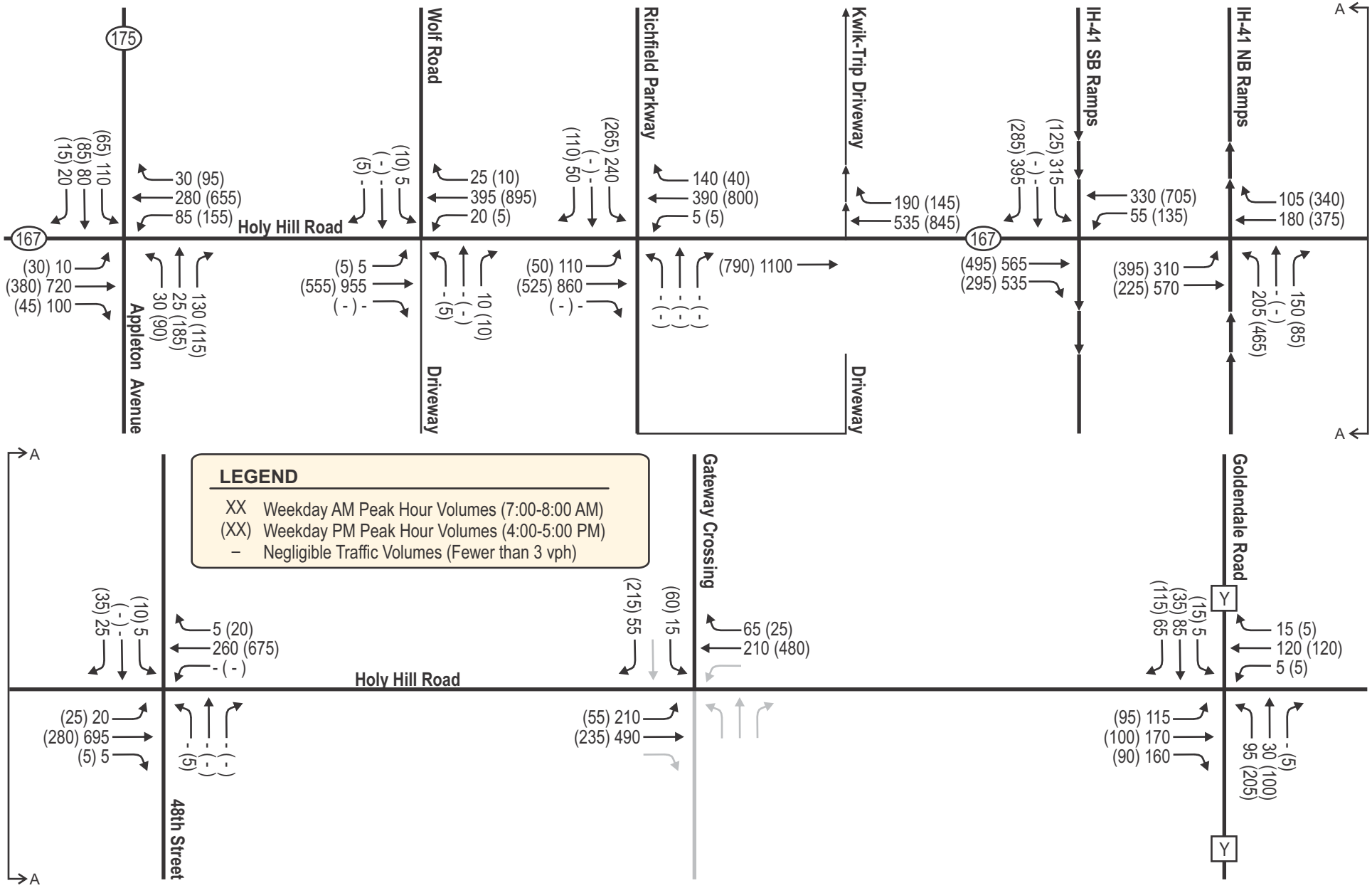


TADI
TRAFFIC ANALYSIS & DESIGN, INC.
2521: 01-20-21

N
NOT TO SCALE

STUDY AREA MAP

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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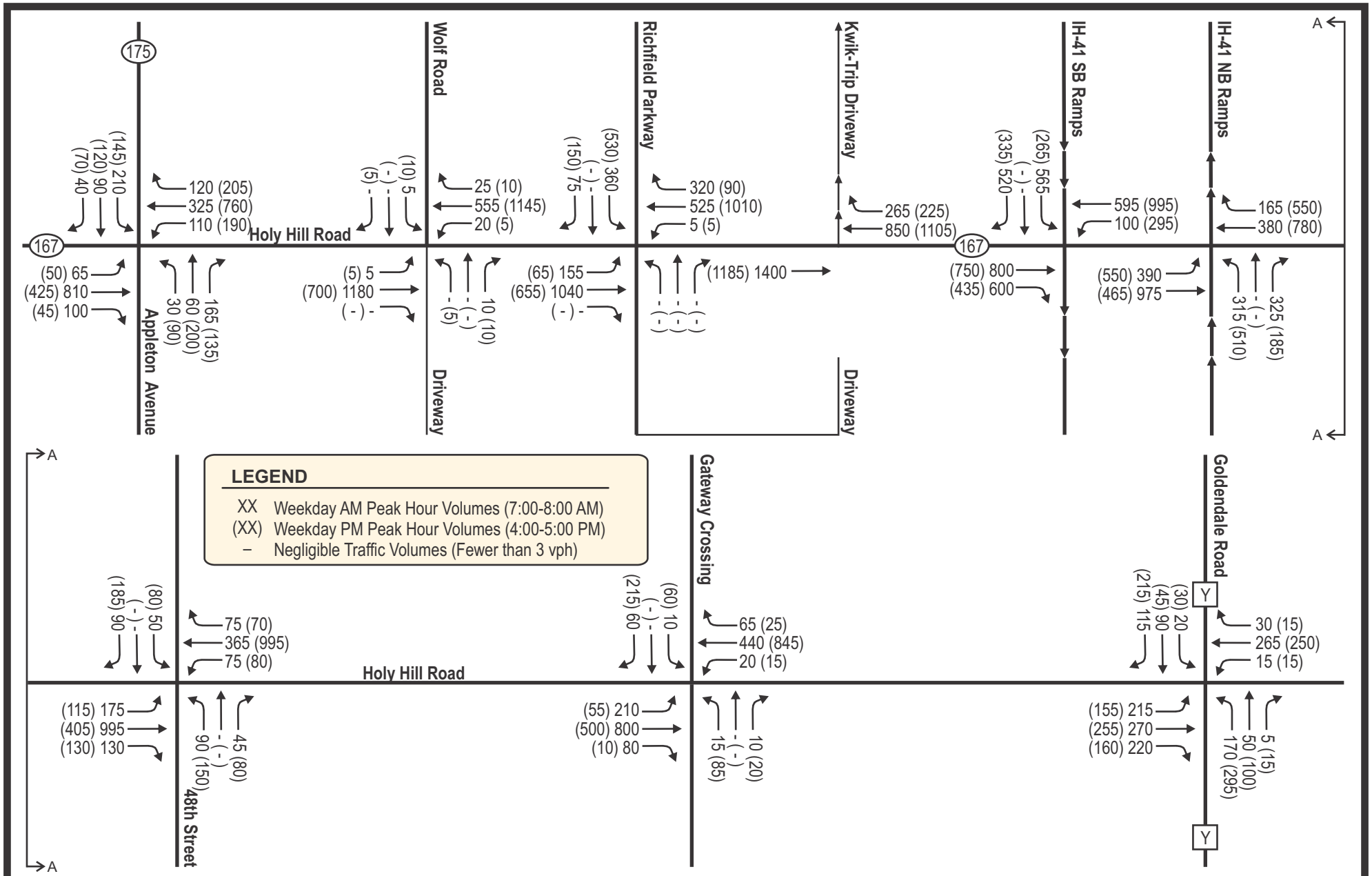
N
NOT TO SCALE

2025 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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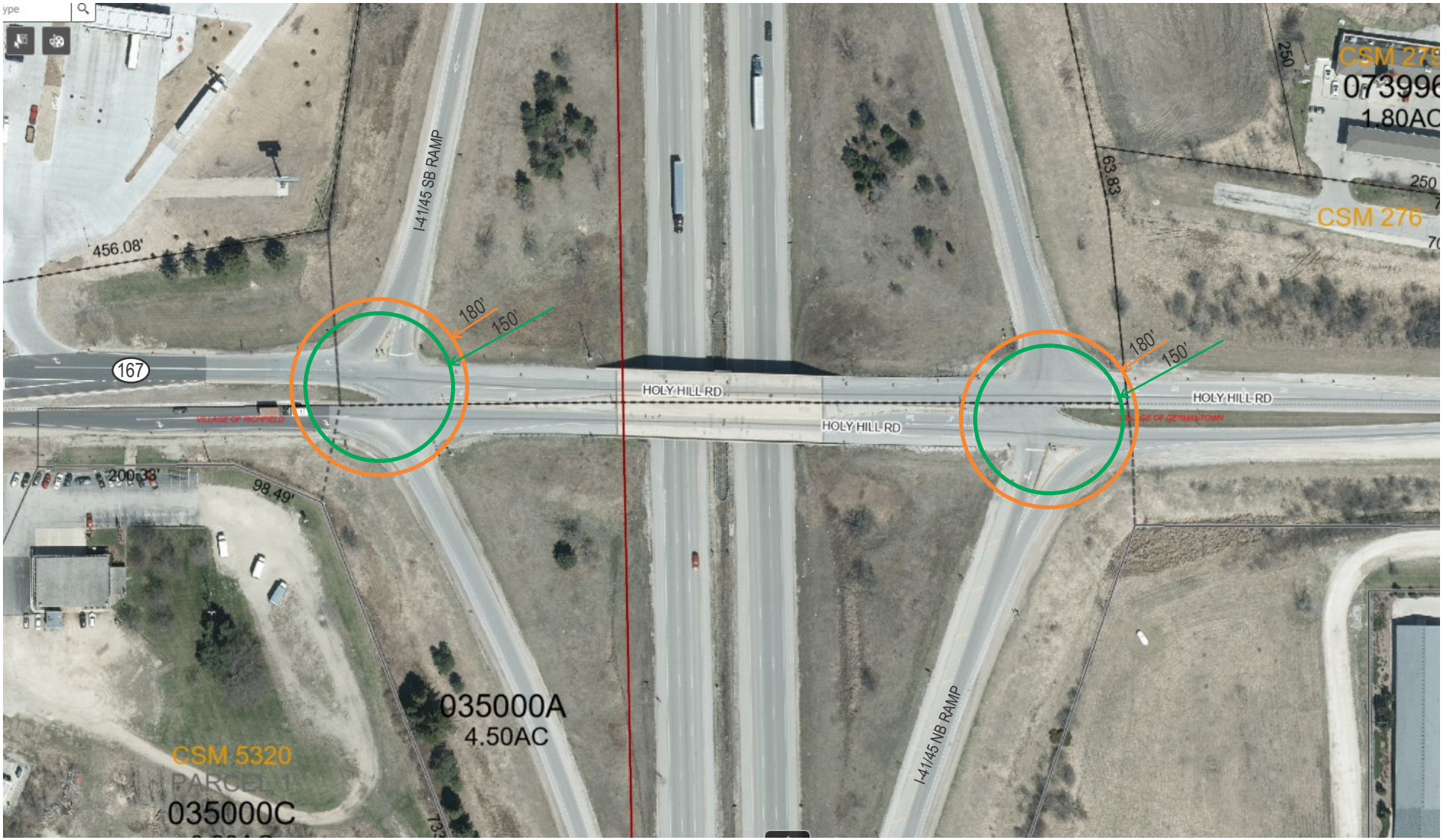
N
NOT TO SCALE

2040 BUILD TRAFFIC VOLUMES

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN



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N
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ROW CONSTRAINTS

STH 167/HOLY HILL ROAD CORRIDOR STUDY - RICHFIELD, WISCONSIN

Intersection Collision Diagram

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Location:	STH 167-Holy Hill Road & I41 NB Ramp	**From:**	1/1/2015	**Duration** 5	Years
Municipality:	Germantown	**To:**	12/31/2019	0	Months
County:	Washington	**AADT:**	9,400		MAP
Traffic Control:	All-Way Stop	**Area Type:**	Suburban		
		GPS Coordinates:	43.250662, -88.180444		

TOTAL CRASHES: 10

AVG. CRASHES/YEAR: 2.0

CRASH RATE: 0.58 per MEV

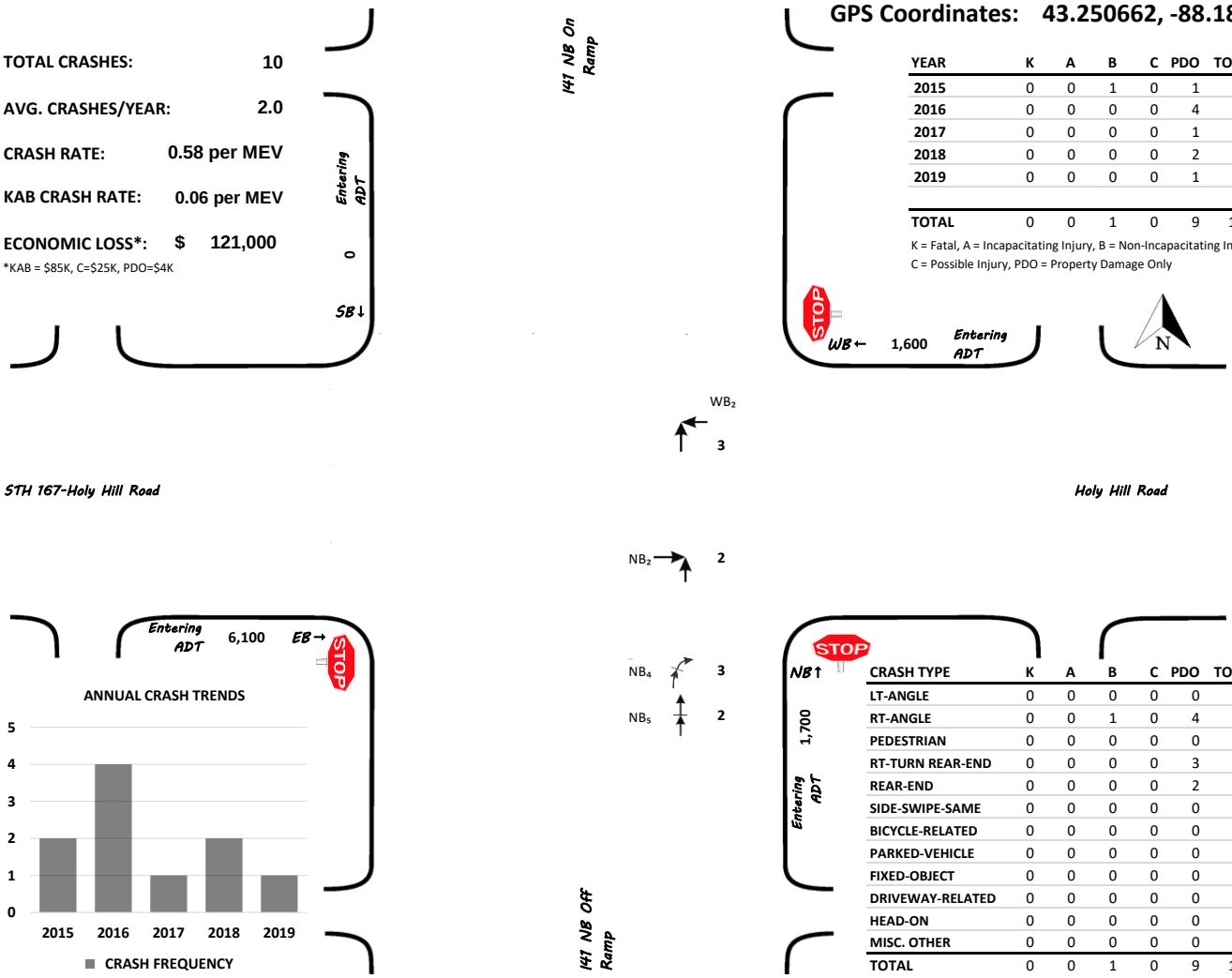
KAB CRASH RATE: 0.06 per MEV

ECONOMIC LOSS*: $ 121,000

*KAB = $85K, C=$25K, PDO=$4K

YEAR	K	A	B	C	PDO	TOT.	ECON. LOSS
2015	0	0	1	0	1	2	$ 89,000
2016	0	0	0	0	4	4	$ 16,000
2017	0	0	0	0	1	1	$ 4,000
2018	0	0	0	0	2	2	$ 8,000
2019	0	0	0	0	1	1	$ 4,000
TOTAL	0	0	1	0	9	10	$ 121,000

K = Fatal, A = Incapacitating Injury, B = Non-Incapacitating Injury, C = Possible Injury, PDO = Property Damage Only



ECON. LOSS COLOR SCALE
- > $300 K
- > $100 K
- Ped/Bike

ANNUAL CRASH TRENDS

CRASH TYPE	K	A	B	C	PDO	TOT.	ECON. LOSS
LT-ANGLE	0	0	0	0	0	0	$ -
RT-ANGLE	0	0	1	0	4	5	$ 101,000
PEDESTRIAN	0	0	0	0	0	0	$ -
RT-TURN REAR-END	0	0	0	0	3	3	$ 12,000
REAR-END	0	0	0	0	2	2	$ 8,000
SIDE-SWIPE-SAME	0	0	0	0	0	0	$ -
BICYCLE-RELATED	0	0	0	0	0	0	$ -
PARKED-VEHICLE	0	0	0	0	0	0	$ -
FIXED-OBJECT	0	0	0	0	0	0	$ -
DRIVEWAY-RELATED	0	0	0	0	0	0	$ -
HEAD-ON	0	0	0	0	0	0	$ -
MISC. OTHER	0	0	0	0	0	0	$ -
TOTAL	0	0	1	0	9	10	$ 121,000

ROAD CONDITIONS		
DRY	8	80%
WET	2	20%
SNOW	0	0%
ICE	0	0%
OTH.	0	0%
TOT.	10	

LIGHT CONDITIONS		
DAY	5	50%
DARK	5	50%
TOT.	10	

DRIVER BEHAVIOR		
ALCOHOL	0	0%
DRUGS	0	0%
SPEED	2	20%

SEASON		
SPRING	1	10%
SUMMER	2	20%
FALL	5	50%
WINTER	2	20%
TOT.	10	

FAILURE TO YIELD		
NB	4	40%
SB	0	0%
EB	0	0%
WB	1	10%
TBD	0	0%
TOT.	5	50%

DISRGRD. CONTROL		
NB	0	0%
SB	0	0%
EB	0	0%
WB	0	0%
TBD	0	0%
TOT.	0	0%

TBD = verification from crash report needed for direction

VEHICLE DAMAGE		
OTHER/UNK.	1	5%
NONE	0	0%
VERY MINOR	1	5%
MINOR	7	37%
MODERATE	5	26%
SEVERE	5	26%
VERY SEVERE	0	0%
TOTAL VEHICLES	19	

NOTES:

DAY/TIME TRENDS

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	UNK		TOT.
MON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	MON	1
TUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	TUE	2
WED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	WED	3
THU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	THU	1
FRI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	FRI	2
SAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SAT	0
SUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	SUN	1
	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	UNK		TOT.
TOT.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4	1	0	0	1	0	0	0	TOT.	10

Crash Data

Corresponds to Collision Diagram

Location:	**STH 167-Holy Hill Road & I41 NB Ramp**	**From:**	**1/1/2015**		
Municipality:	**Germantown**	**To:**	**12/31/2019**	**Duration**	
County:	**Washington**	**AADT:**	**9,400**	**5**	**Years**
Traffic Control:	**All-Way Stop**	**Area Type:**	**Suburban**	**0**	**Months**

Ref #	Label	Doc. #	Date	Crash Type	Time	Severity	Road Cond.	Light Cond.	Alc. Flag	Drug Flag	Speed Flag	Notes
1	WB_2	LLHMNHB	12/25/2016	RT-ANGLE	5 PM		WET	DARK				
2	WB_2	C9L09LVN0S	12/11/2017	RT-ANGLE	4 PM			DARK				
3	WB_2	2SL10DBC4M	10/24/2018	RT-ANGLE	5 PM							
4	NB_2	LLFH7DG	10/20/2015	RT-ANGLE	6 PM	B	WET	DARK			Y	Slid on wet road
5	NB_2	LLHLX82	11/10/2016	RT-ANGLE	5 PM			DARK				
6	NB_4	LLFH7CK	6/16/2015	RT-TURN REAR-END	2 PM							Thought pulled ahead
7	NB_4	LLHL5ZW	7/29/2016	RT-TURN REAR-END	5 PM							Thought pulled ahead
8	NB_4	LLHL60Q	9/21/2016	RT-TURN REAR-END	3 PM							Stopped for traffic
9	NB_5	C9L09V8VRK	3/16/2018	REAR-END	9 PM			DARK			Y	
10	NB_5	C9L0FB001S	9/11/2019	REAR-END	3 PM							

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Future Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	394	985	0	0	384	167	0	318	328	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	103.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Future Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	394	985	0	0	384	167	318	0	328	0	0	0
Number of Lanes	1	2	0	0	2	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	136.7	35.2	89.5
HCM LOS	F	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	315	325	390	488	488	190	190	165
LT Vol	315	0	390	0	0	0	0	0
Through Vol	0	0	0	488	488	190	190	0
RT Vol	0	325	0	0	0	0	0	165
Lane Flow Rate	318	328	394	492	492	192	192	167
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	1.04	0.964	1.118	1.329	1.083	0.654	0.654	0.45
Departure Headway (Hd)	12.714	11.492	10.527	10.006	8.128	14.235	14.235	11.588
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	286	318	347	369	448	255	255	313
Service Time	10.414	9.192	8.227	7.706	5.828	11.935	11.935	9.288
HCM Lane V/C Ratio	1.112	1.031	1.135	1.333	1.098	0.753	0.753	0.534
HCM Control Delay	102.1	77.2	117.2	193.8	95.2	40.3	40.3	23.4
HCM Lane LOS	F	F	F	F	F	E	E	C
HCM 95th-tile Q	11.2	10	14.8	22.7	15.9	4.1	4.1	2.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Future Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	632	534	0	0	897	632	0	586	213	0	0	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	299.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Future Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	632	534	0	0	897	632	586	0	213	0	0	0
Number of Lanes	1	2	0	0	2	1	0	1	1	0	0	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	335.1	224.1	391.6
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%	0%
Vol Thru, %	0%	0%	0%	100%	100%	100%	100%	0%
Vol Right, %	0%	100%	0%	0%	0%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	510	185	550	233	233	390	390	550
LT Vol	510	0	550	0	0	0	0	0
Through Vol	0	0	0	233	233	390	390	0
RT Vol	0	185	0	0	0	0	0	550
Lane Flow Rate	586	213	632	267	267	448	448	632
Geometry Grp	8	8	8	8	8	8	8	8
Degree of Util (X)	2.075	0.682	2.116	0.858	0.721	1.313	1.313	1.426
Departure Headway (Hd)	12.212	10.985	19.938	19.409	17.463	15.979	15.979	13.4
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	305	332	190	190	211	233	233	278
Service Time	9.912	8.685	17.638	17.109	15.163	13.679	13.679	11.1
HCM Lane V/C Ratio	1.921	0.642	3.326	1.405	1.265	1.923	1.923	2.273
HCM Control Delay	521.2	34.3	560.2	82.4	55.4	209.1	209.1	245.3
HCM Lane LOS	F	D	F	F	F	F	F	F
HCM 95th-tile Q	44.7	4.7	30	6.3	4.7	15.8	15.8	21.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Future Volume (vph)	390	975	0	0	380	165	315	0	325	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	394	985	0	0	384	167	0	318	328	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	251

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Future Vol, veh/h	390	975	0	0	380	165	315	0	325	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	-	-	200	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	2	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	6	6	6	8	8	8	11	11	11	2	2	2
Mvmt Flow	394	985	0	0	384	167	318	0	328	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	551	0	-	-	-	0	1965	2324	493
Stage 1	-	-	-	-	-	-	1773	1773	-
Stage 2	-	-	-	-	-	-	192	551	-
Critical Hdwy	4.22	-	-	-	-	-	7.02	6.72	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	6.02	5.72	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.02	5.72	-
Follow-up Hdwy	2.26	-	-	-	-	-	3.61	4.11	3.41
Pot Cap-1 Maneuver	988	-	0	0	-	-	~ 49	33	498
Stage 1	-	-	0	0	-	-	~ 110	122	-
Stage 2	-	-	0	0	-	-	795	492	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	988	-	-	-	-	-	~ 29	0	498
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 62	0	-
Stage 1	-	-	-	-	-	-	~ 66	0	-
Stage 2	-	-	-	-	-	-	795	0	-

Approach	EB	WB	NB
HCM Control Delay, s	3.2	0	$ 993.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	62	498	988	-	-	-
HCM Lane V/C Ratio	5.132	0.659	0.399	-	-	-
HCM Control Delay (s)	$ 1992	25.1	11	-	-	-
HCM Lane LOS	F	D	B	-	-	-
HCM 95th %tile Q(veh)	35.4	4.7	1.9	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Future Volume (vph)	550	465	0	0	780	550	510	0	185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	632	534	0	0	897	632	0	586	213	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	52.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Future Vol, veh/h	550	465	0	0	780	550	510	0	185	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	-	-	200	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	8	8	8	2	2	2	5	5	5	2	2	2
Mvmt Flow	632	534	0	0	897	632	586	0	213	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	1529	0	-	-	-	0	2247	3327	267
Stage 1	-	-	-	-	-	-	1798	1798	-
Stage 2	-	-	-	-	-	-	449	1529	-
Critical Hdwy	4.26	-	-	-	-	-	6.9	6.6	7
Critical Hdwy Stg 1	-	-	-	-	-	-	5.9	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.9	5.6	-
Follow-up Hdwy	2.28	-	-	-	-	-	3.55	4.05	3.35
Pot Cap-1 Maneuver	~ 404	-	0	0	-	-	~ 34	8	722
Stage 1	-	-	0	0	-	-	~ 114	126	-
Stage 2	-	-	0	0	-	-	601	173	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	~ 404	-	-	-	-	-	0	0	722
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	0	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	601	0	-

Approach	EB	WB	NB
HCM Control Delay, s	157.5	0	
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	-	722	~ 404	-	-	-
HCM Lane V/C Ratio	-	0.295	1.565	-	-	-
HCM Control Delay (s)	-	12.1	290.7	-	-	-
HCM Lane LOS	-	B	F	-	-	-
HCM 95th %tile Q(veh)	-	1.2	35.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

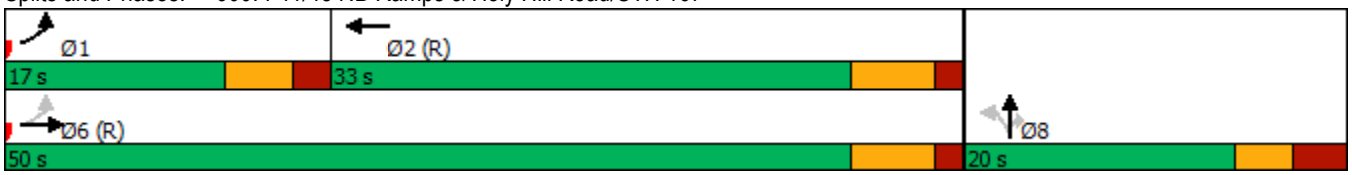
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	390	975	0	0	380	165	315	0	111	0	0	0
Future Volume (vph)	390	975	0	0	380	165	315	0	111	0	0	0
Ideal Flow (vphpl)	1900	1974	1900	1900	1953	1900	1900	1835	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	8%	8%	8%	11%	11%	11%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	394	985	0	0	384	167	159	159	112	0	0	0
Turn Type	pm+pt	NA			NA	Free	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases	6					Free	8		8			
Detector Phase	1	6			2		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0		10.0	10.0	10.0			
Minimum Split (s)	13.5	20.9			20.9		15.9	15.9	15.9			
Total Split (s)	17.0	50.0			33.0		20.0	20.0	20.0			
Total Split (%)	24.3%	71.4%			47.1%		28.6%	28.6%	28.6%			
Maximum Green (s)	11.5	44.1			27.1		14.1	14.1	14.1			
Yellow Time (s)	3.5	4.3			4.3		3.0	3.0	3.0			
All-Red Time (s)	2.0	1.6			1.6		2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.5	5.9			5.9		5.9	5.9	5.9			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max		None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.31	0.42			0.25	0.11	0.59	0.61	0.44			
Control Delay	2.4	2.9			10.9	0.2	35.7	36.9	31.1			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	2.4	2.9			10.9	0.2	35.7	36.9	31.1			
Queue Length 50th (ft)	0	8			58	0	66	67	43			
Queue Length 95th (ft)	0	58			82	0	123	124	86			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	1314	2321			1541	1495	311	300	293			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.30	0.42			0.25	0.11	0.51	0.53	0.38			

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 36 (51%), Referenced to phase 2:WBT and 6:EBTL, Start of 1st Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	390	975	0	0	380	165	315	0	111	0	0	0
Future Volume (veh/h)	390	975	0	0	380	165	315	0	111	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1882	0	0	1831	1781	1737	1678	1737			
Adj Flow Rate, veh/h	394	985	0	0	384	0	318	0	112			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	6	6	0	0	8	8	11	11	11			
Cap, veh/h	1516	2462	0	0	1725		473	0	210			
Arrive On Green	0.11	0.69	0.00	0.00	0.99	0.00	0.14	0.00	0.14			
Sat Flow, veh/h	3346	3669	0	0	3571	1510	3309	0	1472			
Grp Volume(v), veh/h	394	985	0	0	384	0	318	0	112			
Grp Sat Flow(s),veh/h/ln	1673	1788	0	0	1740	1510	1654	0	1472			
Q Serve(g_s), s	3.4	8.3	0.0	0.0	0.1	0.0	6.4	0.0	4.9			
Cycle Q Clear(g_c), s	3.4	8.3	0.0	0.0	0.1	0.0	6.4	0.0	4.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	1516	2462	0	0	1725		473	0	210			
V/C Ratio(X)	0.26	0.40	0.00	0.00	0.22		0.67	0.00	0.53			
Avail Cap(c_a), veh/h	1684	2462	0	0	1725		666	0	297			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.79	0.79	0.00	0.00	0.98	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.2	4.7	0.0	0.0	0.1	0.0	28.5	0.0	27.8			
Incr Delay (d2), s/veh	0.1	0.4	0.0	0.0	0.3	0.0	1.7	0.0	2.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.7	4.1	0.0	0.0	0.2	0.0	4.6	0.0	3.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	5.1	0.0	0.0	0.4	0.0	30.1	0.0	29.9			
LnGrp LOS	A	A	A	A	A		C	A	C			
Approach Vol, veh/h		1379			384	A		430				
Approach Delay, s/veh		5.1			0.4			30.1				
Approach LOS		A			A			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	13.5	40.6				54.1		15.9				
Change Period (Y+Rc), s	5.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	11.5	* 27				* 44		14.1				
Max Q Clear Time (g_c+I1), s	5.4	2.1				10.3		8.4				
Green Ext Time (p_c), s	0.8	2.6				8.7		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

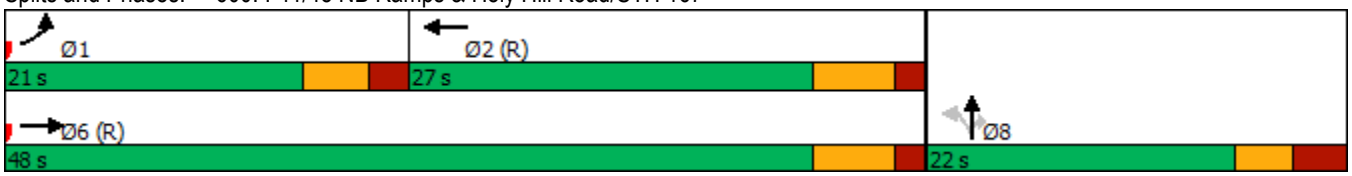
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	550	465	0	0	780	550	510	0	63	0	0	0
Future Volume (vph)	550	465	0	0	780	550	510	0	63	0	0	0
Ideal Flow (vphpl)	1900	1974	1900	1900	1953	1900	1900	1835	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	70		0	0		200	0		125	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		663			761			369			358	
Travel Time (s)		15.1			17.3			8.4			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	8%	8%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	632	534	0	0	897	632	293	293	72	0	0	0
Turn Type	Prot	NA			NA	Free	Perm	NA	Perm			
Protected Phases	1	6			2			8				
Permitted Phases						Free	8		8			
Detector Phase	1	6			2		8	8	8			
Switch Phase												
Minimum Initial (s)	8.0	15.0			15.0		10.0	10.0	10.0			
Minimum Split (s)	13.5	20.9			20.9		15.9	15.9	15.9			
Total Split (s)	21.0	48.0			27.0		22.0	22.0	22.0			
Total Split (%)	30.0%	68.6%			38.6%		31.4%	31.4%	31.4%			
Maximum Green (s)	15.5	42.1			21.1		16.1	16.1	16.1			
Yellow Time (s)	3.5	4.3			4.3		3.0	3.0	3.0			
All-Red Time (s)	2.0	1.6			1.6		2.9	2.9	2.9			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.5	5.9			5.9		5.9	5.9	5.9			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Minimum Gap (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Time Before Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Time To Reduce (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Recall Mode	None	C-Max			C-Max		None	None	None			
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.89	0.25			0.79	0.40	0.82	0.85	0.21			
Control Delay	26.1	1.2			20.9	0.5	46.1	50.0	23.8			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	26.1	1.2			20.9	0.5	46.1	50.0	23.8			
Queue Length 50th (ft)	114	7			158	0	125	126	25			
Queue Length 95th (ft)	#190	0			190	0	#234	#241	55			
Internal Link Dist (ft)		583			681			289			278	
Turn Bay Length (ft)	70					200			125			
Base Capacity (vph)	717	2124			1140	1583	375	362	353			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.88	0.25			0.79	0.40	0.78	0.81	0.20			

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 36 (51%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 600: I-41/45 NB Ramps & Holy Hill Road/STH 167



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	550	465	0	0	780	550	510	0	63	0	0	0
Future Volume (veh/h)	550	465	0	0	780	550	510	0	63	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1781	1851	0	0	1923	1870	1826	1763	1826			
Adj Flow Rate, veh/h	632	534	0	0	897	0	586	0	72			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	8	8	0	0	2	2	5	5	5			
Cap, veh/h	723	2215	0	0	1212		701	0	312			
Arrive On Green	0.07	0.21	0.00	0.00	0.44	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	3291	3609	0	0	3749	1585	3478	0	1547			
Grp Volume(v), veh/h	632	534	0	0	897	0	586	0	72			
Grp Sat Flow(s),veh/h/ln	1646	1758	0	0	1826	1585	1739	0	1547			
Q Serve(g_s), s	13.3	8.9	0.0	0.0	14.3	0.0	11.3	0.0	2.7			
Cycle Q Clear(g_c), s	13.3	8.9	0.0	0.0	14.3	0.0	11.3	0.0	2.7			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	723	2215	0	0	1212		701	0	312			
V/C Ratio(X)	0.87	0.24	0.00	0.00	0.74		0.84	0.00	0.23			
Avail Cap(c_a), veh/h	729	2215	0	0	1212		800	0	356			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.33	1.33	1.00	1.00	1.00			
Upstream Filter(I)	0.80	0.80	0.00	0.00	0.58	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.5	13.8	0.0	0.0	17.1	0.0	26.8	0.0	23.4			
Incr Delay (d2), s/veh	9.4	0.2	0.0	0.0	2.4	0.0	6.9	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	10.5	6.6	0.0	0.0	8.0	0.0	8.8	0.0	1.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.9	14.0	0.0	0.0	19.5	0.0	33.8	0.0	23.8			
LnGrp LOS	D	B	A	A	B		C	A	C			
Approach Vol, veh/h		1166			897	A		658				
Approach Delay, s/veh		28.6			19.5			32.7				
Approach LOS		C			B			C				

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	20.9	29.1				50.0		20.0				
Change Period (Y+Rc), s	5.5	* 5.9				* 5.9		5.9				
Max Green Setting (Gmax), s	15.5	* 21				* 42		16.1				
Max Q Clear Time (g_c+I1), s	15.3	16.3				10.9		13.3				
Green Ext Time (p_c), s	0.1	2.5				4.0		0.8				

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCS7 Roundabouts Report

General Information

Analyst	TSC
Agency or Co.	TADI
Date Performed	1/15/2021
Analysis Year	2040
Time Analyzed	PM Peak Hour - Build
Project Description	2521 STH 167/Holy Hill Road Corridor Study

Site Information

Intersection	STH 167 & I-41/45 NB Ramp
E/W Street Name	STH 167
N/S Street Name	I-41/45 NB Ramps
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.99
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	1	0	0	0	0	0
Lane Assignment	LT		T		T		TR		L		LTR					
Volume (V), veh/h	0	390	975		0		380	165	0	315	0	325				
Percent Heavy Vehicles, %	6	6	6		8		8	8	11	11	11	11				
Flow Rate (v_{PCE}), pc/h	0	418	1044		0		415	180	0	353	0	364				
Right-Turn Bypass	None				Non-Yielding				Yielding				None			
Conflicting Lanes	2				2				2							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	4.0000			
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	2.8000			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	687.14	774.86		195.05	219.95	180.00	353.00	0.00	364.00			
Entry Volume veh/h	648.25	731.00		180.60	203.66	166.67	318.02	0.00	327.93			
Circulating Flow (v_c), pc/h	0			771			1462			768		
Exiting Flow (v_{ex}), pc/h	1044			768			418			0		
Capacity (c_{pce}), pc/h	1285.71	1285.71		736.74	736.74		447.28	447.28	604.90			
Capacity (c), veh/h	1212.94	1212.94		682.17	682.17		402.95	402.95	544.96			
v/c Ratio (x)	0.53	0.60		0.26	0.30		0.79	0.00	0.60			

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	9.0	10.4		8.5	9.0		39.1	8.9	19.1			
Lane LOS	A	B		A	A	A	E	A	C			
95% Queue, veh	3.3	4.3		1.1	1.3		6.8	0.0	4.0			
Approach Delay, s/veh	9.7			6.1			28.9					
Approach LOS	A			A			D					
Intersection Delay, s/veh | LOS	13.8						B					

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HCS7 Roundabouts Report

General Information

Analyst	TSC
Agency or Co.	TADI
Date Performed	1/15/2021
Analysis Year	2040
Time Analyzed	PM Peak Hour - Build
Project Description	2521 STH 167/Holy Hill Road Corridor Study

Site Information

Intersection	STH 167 & I-41/45 NB Ramp
E/W Street Name	STH 167
N/S Street Name	I-41/45 NB Ramps
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.87
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	1	0	0	0	0	0
Lane Assignment	LT		T		T		TR		L		LTR					
Volume (V), veh/h	0	550	465		0		780	550	0	510	0	185				
Percent Heavy Vehicles, %	8	8	8		2		2	2	5	5	5	5				
Flow Rate (v_{PCE}), pc/h	0	683	577		0		914	645	0	616	0	223				
Right-Turn Bypass	None				Non-Yielding				Yielding				None			
Conflicting Lanes	2				2				2							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.0000	4.0000		4.0000	4.0000		4.0000	4.0000	4.0000			
Follow-Up Headway (s)	2.8000	2.8000		2.8000	2.8000		2.8000	2.8000	2.8000			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	592.20	667.80		429.58	484.42	645.00	326.48	289.52	223.00			
Entry Volume veh/h	548.33	618.33		421.16	474.92	632.35	310.93	275.73	212.38			
Circulating Flow (v_c), pc/h	0			1299			1260			1530		
Exiting Flow (v_{ex}), pc/h	577			1530			683			0		
Capacity (c_{pce}), pc/h	1285.71	1285.71		503.16	503.16		517.53	517.53	847.55			
Capacity (c), veh/h	1190.48	1190.48		493.29	493.29		492.89	492.89	807.19			
v/c Ratio (x)	0.46	0.52		0.85	0.96		0.63	0.56	0.26			

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	7.9	8.8		41.0	60.6		22.1	19.0	7.4			
Lane LOS	A	A		E	F	A	C	C	A			
95% Queue, veh	2.5	3.1		8.8	12.2		4.3	3.4	1.1			
Approach Delay, s/veh	8.4			30.1			17.1					
Approach LOS	A			D			C					
Intersection Delay, s/veh | LOS	19.9						C					

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Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: STH 167 & IH-41/45 NB Ramps
County: Washington
Village: Richfield

Major Street: STH 167
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: IH-41/45 NB Ramps
Critical Approach Speed: 30 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 100%
From East (WB) 100%
From South (NB) 0%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? Yes
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Background Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**No**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**No**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	157.5	126
Number of Hours	5	11

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	79.5	63
Number of Hours	3	6

Satisfied? No

Condition C: Combination of A & B at 56%

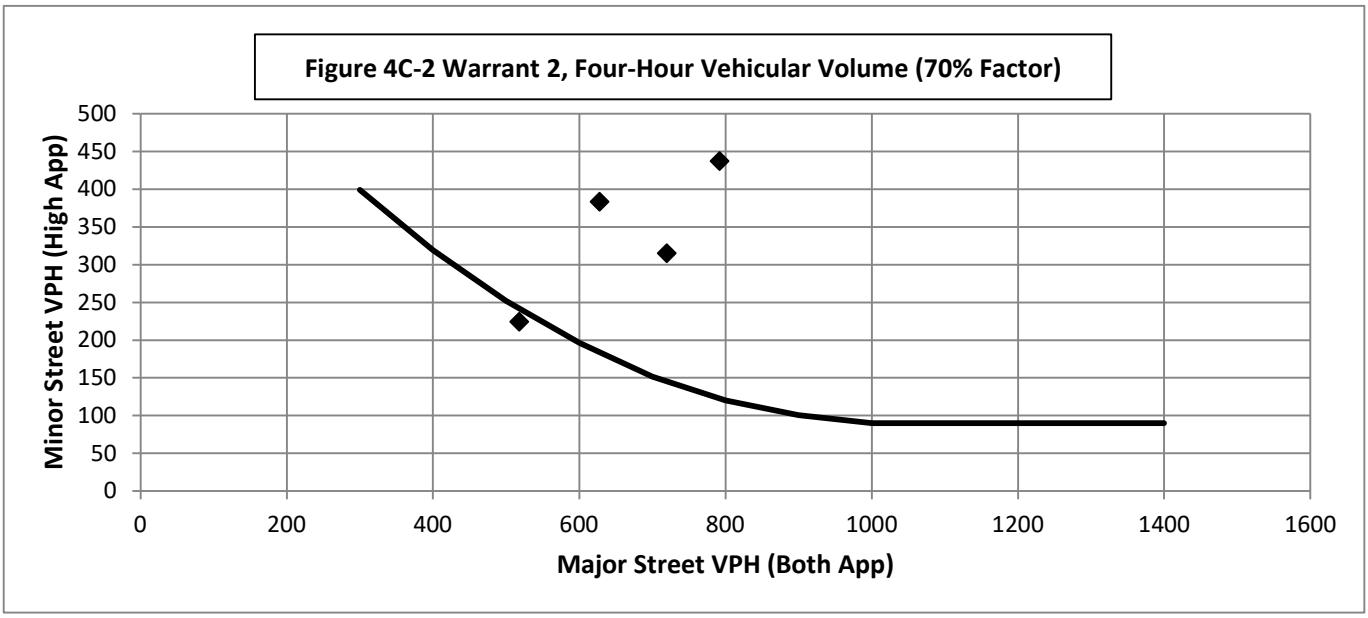
Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	525	93	618
2	7:00	8:00	640	98	738
3	8:00	9:00	457	151	608
4	9:00	10:00	394	149	543
5	10:00	11:00	354	141	495
6	11:00	12:00	410	168	578
7	12:00	13:00	413	191	604
8	13:00	14:00	464	181	645
9	14:00	15:00	518	224	742
10	15:00	16:00	720	315	1035
11	16:00	17:00	792	437	1229
12	17:00	18:00	628	383	1011
13	18:00	19:00	385	231	616
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	16:00	15:00	17:00	14:00
Major Road Vol.	792	720	628	518
Minor Road Vol.	437	315	383	224



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

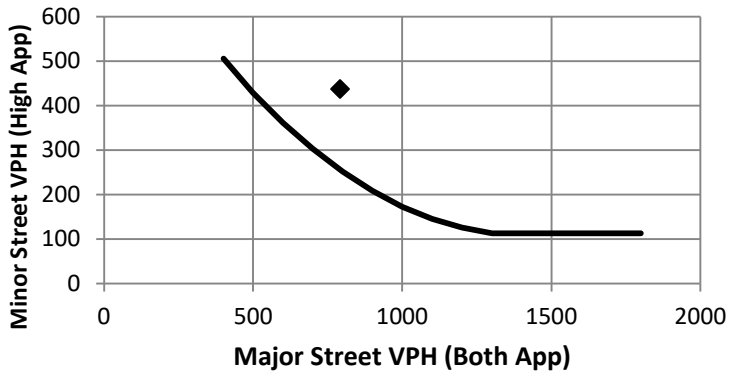
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	792	437

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

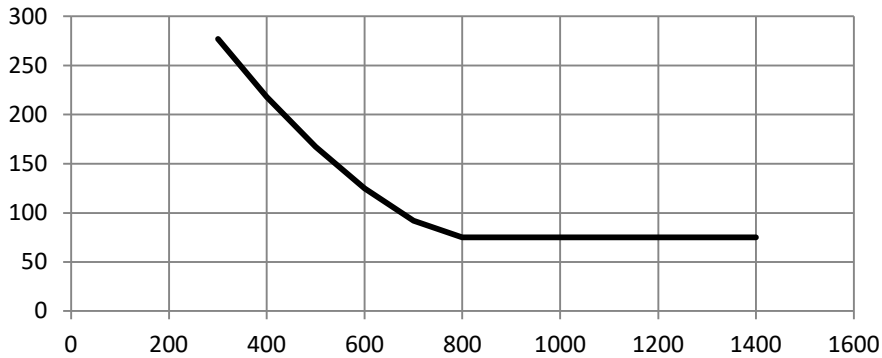
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

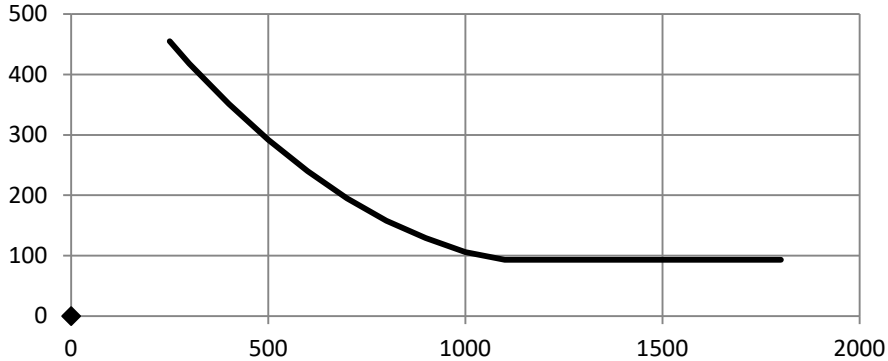


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		Yes	Yes
	Warrant 1, Condition B (80%)		No	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1229	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	16:00	792	437	146.395

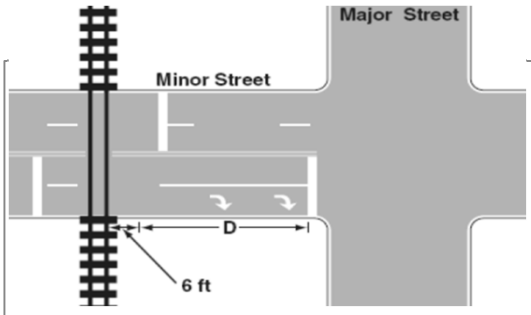
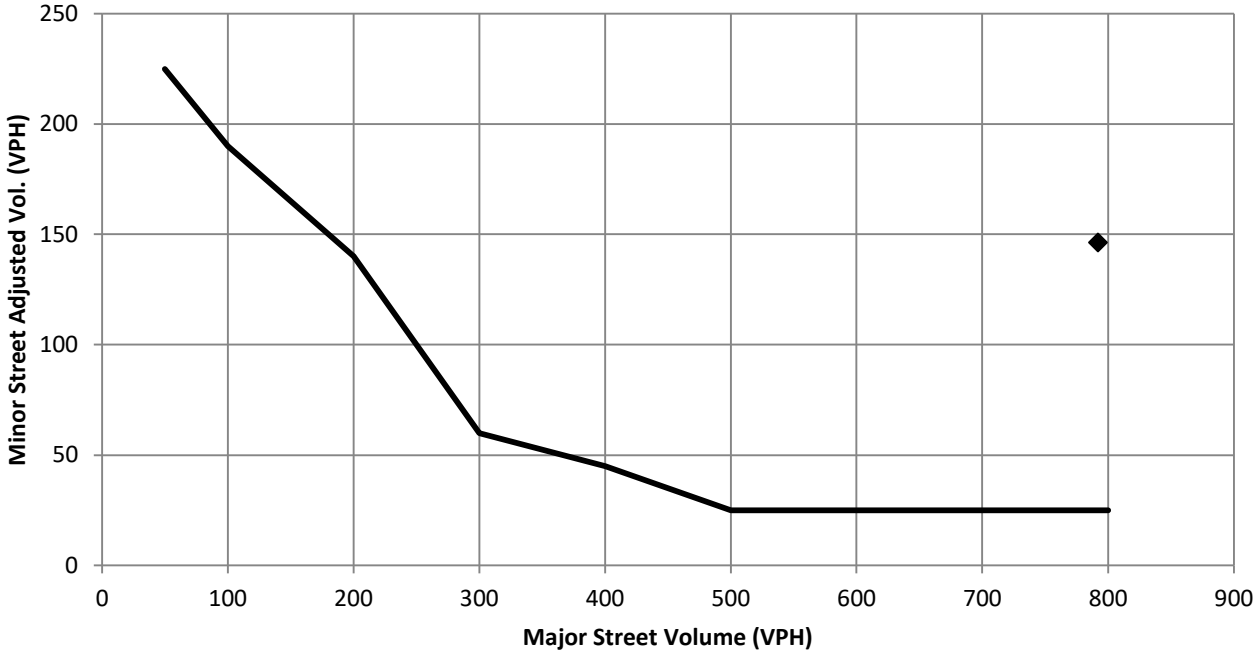


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	0	0	0	0	0	42	74	0	0	116	23	0	93	0	116	0	250	159	0	409	641
	7:00	0	0	0	0	0	63	84	0	0	147	19	1	97	0	117	0	251	242	0	493	757
	8:00	0	0	0	0	0	41	86	0	0	127	18	3	148	0	169	0	148	182	0	330	626
	9:00	0	0	0	0	0	54	76	0	0	130	12	3	146	0	161	0	119	145	0	264	555
MD	10:00	0	0	0	0	0	48	59	0	0	107	25	0	141	0	166	0	83	164	0	247	520
	11:00	0	0	0	0	0	47	88	0	0	135	27	1	167	0	195	0	120	155	0	275	605
	12:00	0	0	0	0	0	59	84	0	1	144	25	3	188	0	216	0	100	169	0	269	629
	13:00	0	0	0	0	0	56	87	0	0	143	27	0	181	0	208	0	132	188	1	321	672
PM	14:00	0	0	0	0	0	111	113	0	0	224	39	1	223	0	263	0	111	183	0	294	781
	15:00	0	0	0	0	0	186	153	0	0	339	42	0	315	0	357	0	141	240	0	381	1077
	16:00	0	0	0	0	0	176	161	0	0	337	46	0	437	0	483	0	146	309	0	455	1275
	17:00	0	0	0	0	0	116	124	0	0	240	46	0	383	0	429	0	122	266	0	388	1057
	18:00	0	0	0	0	0	49	69	0	0	118	25	0	231	0	256	0	84	182	1	267	641
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		0	0	0	0	0	1048	1258	0	1	2307	374	12	2750	0	3136	0	1807	2584	2	4393	9836

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach? No

% Right Turns Included (Default 0%)

From North (SB)	100%
From East (WB)	100%
From South (NB)	0%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
42	324	159	483	525
63	335	242	577	640
41	234	182	416	457
54	195	145	340	394
48	142	164	306	354
47	208	155	363	410
59	184	170	354	413
56	219	189	408	464
111	224	183	407	518
186	294	240	534	720
176	307	309	616	792
116	246	266	512	628
49	153	183	336	385
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1048	3065	2587	5652	6700

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	93	93	93
0	1	97	98	98
0	3	148	151	151
0	3	146	149	149
0	0	141	141	141
0	1	167	168	168
0	3	188	191	191
0	0	181	181	181
0	1	223	224	224
0	0	315	315	315
0	0	437	437	437
0	0	383	383	383
0	0	231	231	231
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	12	2750	2762	2762

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

IH-41/45 NB Ramps & STH 167

By: TSC
Date: 1/13/2021

Year 2018 Existing Traffic

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	0	0	0	0	38	65	0	0	16	0	74	0	0	220	137	0	550	
7-8am	0	0	0	0	57	73	0	0	13	1	74	0	0	223	212	0	653	
8-9am	0	0	0	0	37	75	0	0	15	3	121	0	0	131	151	0	533	
9-10am	0	0	0	0	49	66	0	0	10	3	124	0	0	106	119	0	477	
10-11am	0	0	0	0	43	50	0	0	23	0	119	0	0	72	138	0	445	
11am-12pm	0	0	0	0	42	76	0	0	24	1	144	0	0	104	129	0	520	
12-1pm	0	0	0	0	53	70	0	1	21	3	162	0	0	82	139	0	531	
1-2pm	0	0	0	0	49	74	0	0	24	0	157	0	0	116	160	1	580	
2-3pm	0	0	0	0	101	98	0	0	37	1	198	0	0	96	153	0	684	
3-4pm	0	0	0	0	165	125	0	0	38	0	289	0	0	120	208	0	945	
4-5pm	0	0	0	0	160	139	0	0	44	0	411	0	0	131	274	0	1159	
5-6pm	0	0	0	0	104	105	0	0	45	0	356	0	0	108	232	0	950	
6-7pm	0	0	0	0	45	59	0	0	24	0	206	0	0	74	152	1	560	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Year 2025 Background Traffic

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167					
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	Notes
6-7am	0	0	0	0	40	69	0	0	16	0	74	0	0	232	141	0	572	
7-8am	0	0	0	0	61	77	0	0	13	1	74	0	0	235	219	0	680	
8-9am	0	0	0	0	39	79	0	0	15	3	121	0	0	138	156	0	551	
9-10am	0	0	0	0	52	70	0	0	10	3	124	0	0	112	123	0	494	
10-11am	0	0	0	0	46	53	0	0	23	0	119	0	0	76	142	0	459	
11am-12pm	0	0	0	0	45	80	0	0	24	1	144	0	0	110	133	0	537	
12-1pm	0	0	0	0	56	74	0	1	21	3	162	0	0	87	143	0	547	
1-2pm	0	0	0	0	52	78	0	0	24	0	157	0	0	122	165	1	598	
2-3pm	0	0	0	0	107	103	0	0	37	1	198	0	0	101	158	0	705	
3-4pm	0	0	0	0	175	132	0	0	38	0	289	0	0	127	215	0	976	
4-5pm	0	0	0	0	170	147	0	0	44	0	411	0	0	138	283	0	1193	
5-6pm	0	0	0	0	111	111	0	0	45	0	356	0	0	114	239	0	976	
6-7pm	0	0	0	0	48	62	0	0	24	0	206	0	0	78	157	1	575	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM Growth Rates					0.8%	0.8%		0.0%	0.0%	0.0%	0.0%			0.8%	0.4%	0.0%		
PM Growth Rates					1.0%	0.8%		0.0%	0.0%	0.0%	0.0%			0.8%	0.5%	0.0%		

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

Kwik Trip (+)

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167									
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	4	0	0	0	0	25	0	0	4	24	0	57	55	52	4.7%	4.5%	Existing Kwik Trip daily traffic estimated
7-8am	0	0	0	0	0	5	0	0	0	0	30	0	0	5	30	0	70	66	66	5.7%	5.7%	at 3,100 vpd (see TIA Trip Gen)
8-9am	0	0	0	0	0	6	0	0	0	0	35	0	0	6	34	0	81	75	73	6.4%	6.3%	
9-10am	0	0	0	0	0	5	0	0	0	0	29	0	0	5	29	0	68	63	64	5.4%	5.5%	Distribution based on 2020 counts
10-11am	0	0	0	0	0	5	0	0	0	0	28	0	0	5	28	0	66	61	61	5.2%	5.2%	collected at Kwik Trip driveways:
11am-12pm	0	0	0	0	0	5	0	0	0	0	30	0	0	5	29	0	69	65	63	5.6%	5.4%	25% to/from west on 167 (770)
12-1pm	0	0	0	0	0	6	0	0	0	0	34	0	0	6	34	0	80	73	73	6.3%	6.3%	75% to/from east on 167 (2330)
1-2pm	0	0	0	0	0	5	0	0	0	0	31	0	0	5	30	0	71	68	66	5.8%	5.7%	
2-3pm	0	0	0	0	0	6	0	0	0	0	32	0	0	6	32	0	76	70	70	6.0%	6.0%	Distribution to/from ramp I/S same as
3-4pm	0	0	0	0	0	6	0	0	0	0	34	0	0	6	33	0	79	73	72	6.3%	6.2%	evaluated for KT assignment in TIA.
4-5pm	0	0	0	0	0	6	0	0	0	0	34	0	0	6	34	0	80	73	73	6.3%	6.3%	
5-6pm	0	0	0	0	0	6	0	0	0	0	35	0	0	6	35	0	82	77	76	6.6%	6.5%	Hourly Distributions: ITE LU#960
6-7pm	0	0	0	0	0	6	0	0	0	0	32	0	0	6	33	0	77	70	71	6.0%	6.1%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						8%					46%						IN %					
OUT %														8%	46%		OUT %					

AADT IN	AADT OUT	
1165	1165	
0%	0%	<- % Reduction, Sensitivity Test
1165	1165	

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

IH-41/45 NB Ramps & STH 167

By: TSC
Date: 1/13/2021

Exxon (-)

	IH-41/45 NB Ramps				STH 167				IH-41/45 NB Ramps				STH 167				Intersection				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	-1	0	0	0	0	-6	0	0	-1	-6	0	-14	0	0			Exxon traffic was approximately 23%
7-8am	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-7	0	-16	0	0			of Kwik Trip "existing" AM & PM traffic.
8-9am	0	0	0	0	0	-1	0	0	0	0	-8	0	0	-1	-8	0	-18	0	0			Therefore, subtract 23% of hourly
9-10am	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-7	0	-16	0	0			traffic from Kwik Trip (+) table.
10-11am	0	0	0	0	0	-1	0	0	0	0	-6	0	0	-1	-6	0	-14	0	0			
11am-12pm	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-7	0	-16	0	0			
12-1pm	0	0	0	0	0	-1	0	0	0	0	-8	0	0	-1	-8	0	-18	0	0			
1-2pm	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-7	0	-16	0	0			
2-3pm	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-7	0	-16	0	0			
3-4pm	0	0	0	0	0	-1	0	0	0	0	-8	0	0	-1	-8	0	-18	0	0			
4-5pm	0	0	0	0	0	-1	0	0	0	0	-8	0	0	-1	-8	0	-18	0	0			
5-6pm	0	0	0	0	0	-1	0	0	0	0	-8	0	0	-1	-8	0	-18	0	0			
6-7pm	0	0	0	0	0	-1	0	0	0	0	-7	0	0	-1	-8	0	-17	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

AADT IN	AADT OUT
0	0
0%	0%
0	0

<- % Reduction, Sensitivity Test

Gateway (+)

	IH-41/45 NB Ramps				STH 167				IH-41/45 NB Ramps				STH 167				Intersection				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	2	2	0	0	7	0	0	0	0	15	0	0	26	29	5	16.8%	2.6%	Briggs & Stratton
7-8am	0	0	0	0	2	3	0	0	6	0	0	0	0	12	0	0	23	24	6	13.8%	3.2%	40 employees = 345 daily trips
8-9am	0	0	0	0	2	2	0	0	3	0	0	0	0	5	0	0	12	10	5	5.7%	2.7%	(ITE LU#130)
9-10am	0	0	0	0	2	2	0	0	2	0	0	0	0	3	0	0	9	6	5	3.6%	2.9%	
10-11am	0	0	0	0	2	2	0	0	2	0	0	0	0	3	0	0	9	6	5	3.3%	2.8%	Hourly Distributions: ITE LU#140
11am-12pm	0	0	0	0	2	4	0	0	3	0	0	0	0	6	0	0	15	11	8	6.2%	4.7%	
12-1pm	0	0	0	0	3	5	0	0	4	0	0	0	0	8	0	0	20	16	11	8.9%	6.1%	Directional distribution from "East
1-2pm	0	0	0	0	4	5	0	0	3	0	0	0	0	6	0	0	18	12	12	6.8%	7.0%	Develoment Area" trip distribution in TIA.
2-3pm	0	0	0	0	4	5	0	0	2	0	0	0	0	5	0	0	16	9	12	5.1%	6.9%	
3-4pm	0	0	0	0	11	16	0	0	4	0	0	0	0	9	0	0	40	17	36	9.7%	20.7%	
4-5pm	0	0	0	0	6	9	0	0	2	0	0	0	0	3	0	0	20	6	20	3.6%	11.6%	
5-6pm	0	0	0	0	5	8	0	0	1	0	0	0	0	3	0	0	17	5	17	2.7%	9.5%	
6-7pm	0	0	0	0	1	2	0	0	1	0	0	0	0	1	0	0	5	2	4	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									25%					50%			IN %					
OUT %					30%	45%											OUT %					

AADT IN	AADT OUT
175	175
0%	0%
175	175

<- % Reduction, Sensitivity Test

	IH-41/45 NB Ramps				STH 167				IH-41/45 NB Ramps				STH 167				Intersection				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

AADT IN	AADT OUT
0	0
0%	0%
0	0

<- % Reduction, Sensitivity Test

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: STH 167 & IH-41/45 NB Ramps
County: Washington
Village: Richfield

Major Street: STH 167
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: IH-41/45 NB Ramps
Critical Approach Speed: 30 mph
Lanes: 1 lane

% Right Turns Included
From North (SB) 100%
From East (WB) 100%
From South (NB) 0%
From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? Yes
Manually set volume level?

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
2025 Build Traffic		6:00	AM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**Yes**
Condition A: Minimum Vehicular Volume	Yes
Condition B: Interruption of Continuous Traffic	Yes
Condition C: Combination: 80% of A and B	Yes
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**N/A**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**N/A**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:
Name: Tammi Czewski
Agency: TADI
Date: 1/12/2021

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	157.5	126
Number of Hours	12	13

Satisfied? Yes

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	79.5	63
Number of Hours	12	13

Satisfied? Yes

Condition C: Combination of A & B at 56%

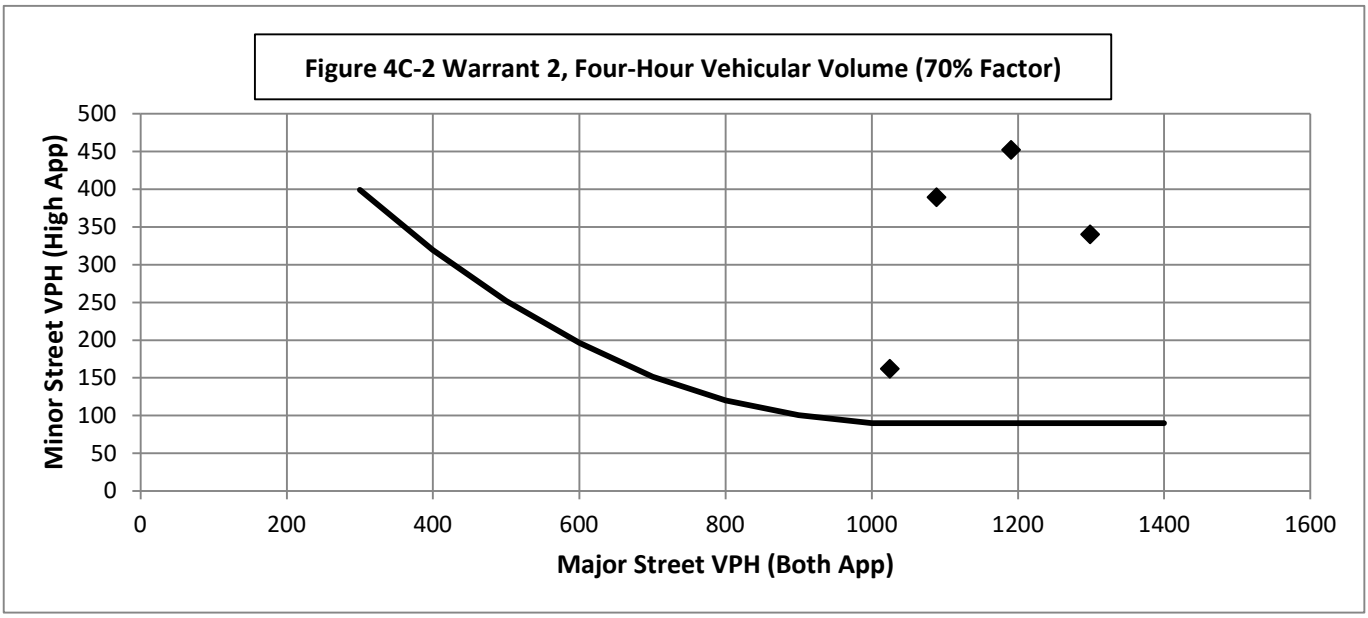
Satisfied? Yes

6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	811	140	951
2	7:00	8:00	1025	162	1187
3	8:00	9:00	755	189	944
4	9:00	10:00	704	182	886
5	10:00	11:00	682	176	858
6	11:00	12:00	766	194	960
7	12:00	13:00	882	225	1107
8	13:00	14:00	827	215	1042
9	14:00	15:00	909	253	1162
10	15:00	16:00	1299	340	1639
11	16:00	17:00	1191	452	1643
12	17:00	18:00	1089	389	1478
13	18:00	19:00	526	235	761
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	16:00	15:00	17:00	7:00
Major Road Vol.	1191	1299	1089	1025
Minor Road Vol.	452	340	389	162



Warrant 3: Peak Hour Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

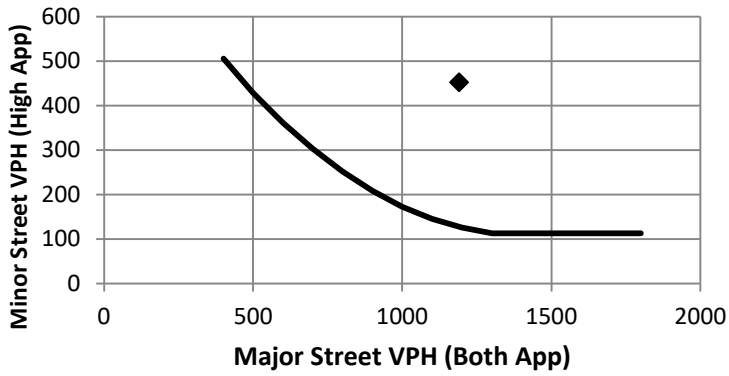
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	
Volume on Minor Approach	100	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	1191	452

Figure 4C-4 Warrant 3, Peak Hour (70% Factor)



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Criterion A: Four Hour

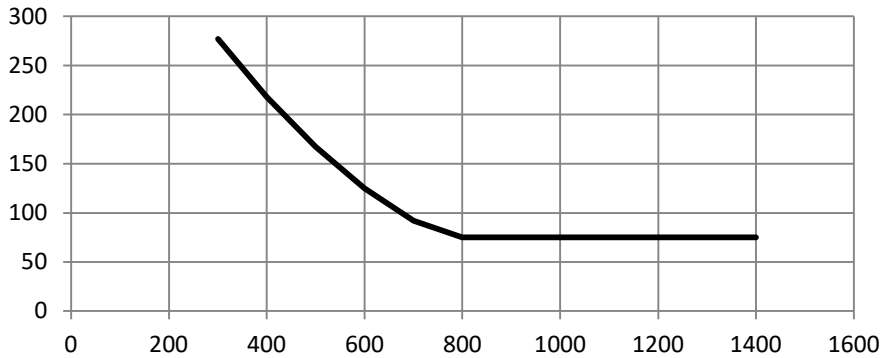
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-6 Warrant 4, Pedestrian Four-Hour Volume (70% Factor)

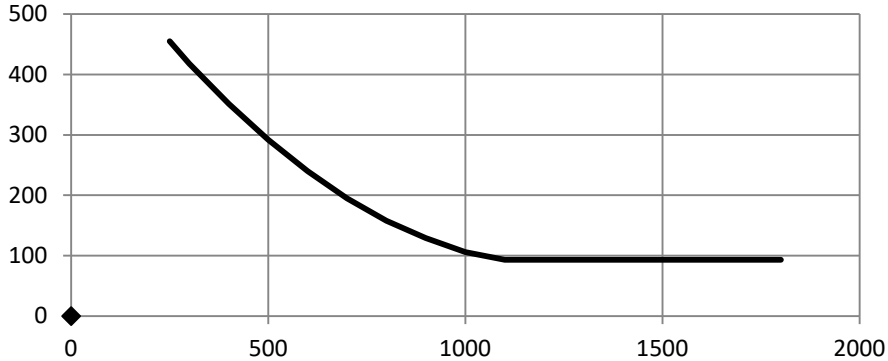


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-8 Warrant 4, Pedestrian Peak Hour (70% Factor)



Warrant 5: School Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria	Fulfilled?
1	Signal spacing > 1000 ft	
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	

Warrant 7: Crash Experience 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

	Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		Yes	Yes
	Warrant 1, Condition B (80%)		Yes	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

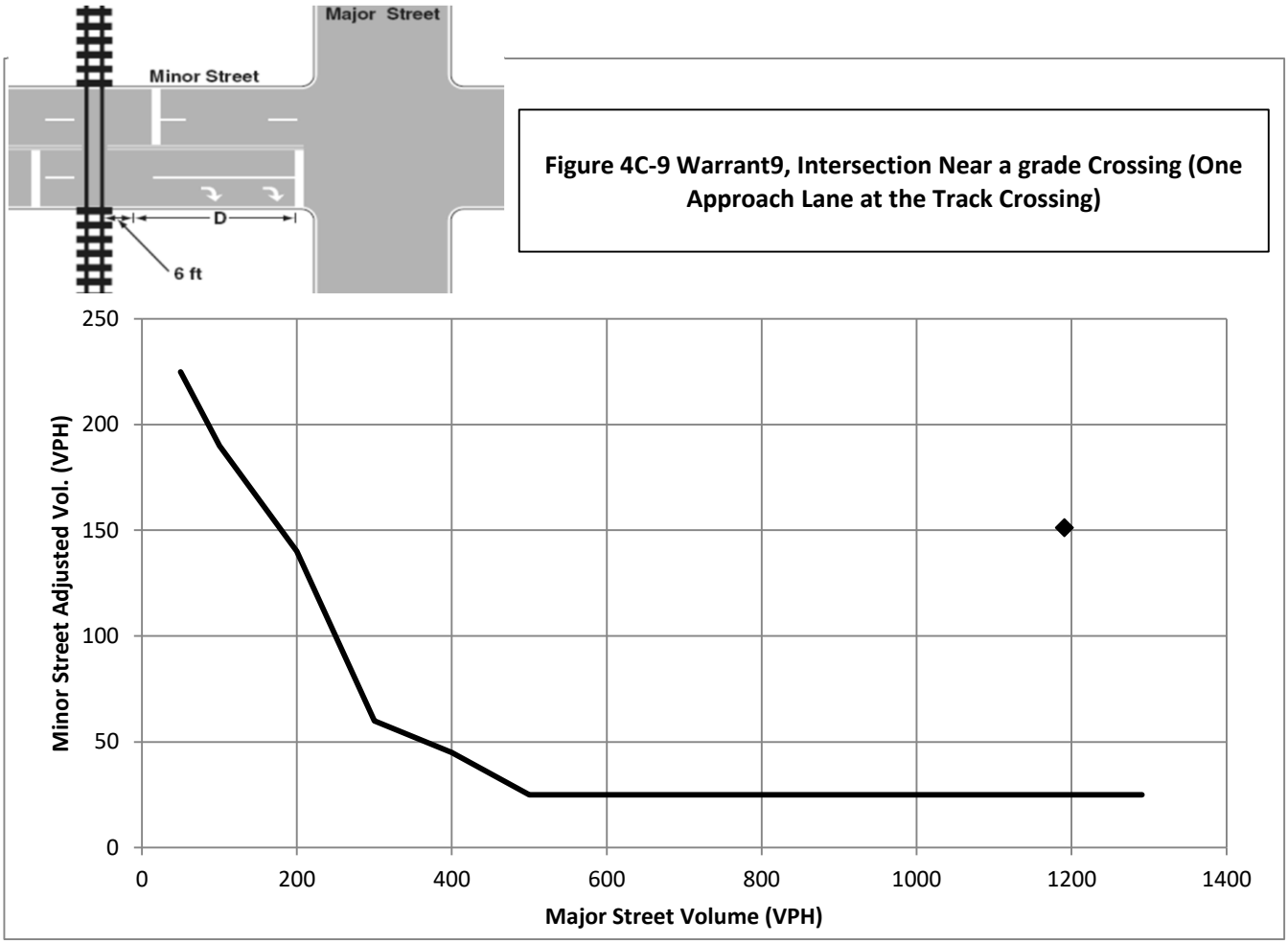
	Criteria				Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			1643	Yes	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.				No	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

	Characteristics of Major Routes - Select yes if all intersecting routes have characteristic	Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	16:00	1191	452	151.42



Conclusions/Comments:

Updated: 12/6/2017

Hourly Volume Data

One Hour Time Period Start Time		↓ From North (SB)					← From East (WB)					↑ From South (NB)					→ From West (EB)					Total Vehicle Volume
		Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM	6:00	0	0	0	0	0	57	114	0	0	171	120	0	140	0	260	0	471	169	0	640	1071
	7:00	0	0	0	0	0	87	146	0	0	233	143	0	162	0	305	0	532	260	0	792	1330
	8:00	0	0	0	0	0	75	159	0	0	234	91	0	189	0	280	0	316	205	0	521	1035
	9:00	0	0	0	0	0	107	171	0	0	278	68	0	182	0	250	0	250	176	0	426	954
MD	10:00	0	0	0	0	0	109	166	0	0	275	81	0	176	0	257	0	209	198	0	407	939
	11:00	0	0	0	0	0	120	209	0	0	329	79	0	194	0	273	0	245	192	0	437	1039
	12:00	0	0	0	0	0	154	238	0	0	392	96	0	225	0	321	0	272	218	0	490	1203
	13:00	0	0	0	0	0	124	201	0	0	325	89	0	215	0	304	0	279	223	0	502	1131
PM	14:00	0	0	0	0	0	194	249	0	0	443	93	0	253	0	346	0	241	225	0	466	1255
	15:00	0	0	0	0	0	340	381	0	0	721	96	0	340	0	436	0	279	299	0	578	1735
	16:00	0	0	0	0	0	286	327	0	0	613	75	0	452	0	527	0	222	356	0	578	1718
	17:00	0	0	0	0	0	255	334	0	0	589	60	0	389	0	449	0	169	331	0	500	1538
	18:00	0	0	0	0	0	80	130	0	0	210	32	0	235	0	267	0	109	207	0	316	793
	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	20:00																					0
	21:00																					0
Totals		0	0	0	0	0	1988	2825	0	0	4813	1123	0	3152	0	4275	0	3594	3059	0	6653	15741

Note: Copy volume data and paste into cells using paste special -> values

Note: U-Turns are counted as Left Turns in the Volume Totals

Please Select the Major Road: E/W

Major Road Left Turn as Minor Approach?

% Right Turns Included (Default 0%)

From North (SB)	100%
From East (WB)	100%
From South (NB)	0%
From West (EB)	100%

Major Road Volume Totals: East/West				
Right	Thru	Left	T+LT	Total
57	585	169	754	811
87	678	260	938	1025
75	475	205	680	755
107	421	176	597	704
109	375	198	573	682
120	454	192	646	766
154	510	218	728	882
124	480	223	703	827
194	490	225	715	909
340	660	299	959	1299
286	549	356	905	1191
255	503	331	834	1089
80	239	207	446	526
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1988	6419	3059	9478	11466

Minor Road Highest Volume: North/South				
Right	Thru	Left	T+LT	Total
0	0	140	140	140
0	0	162	162	162
0	0	189	189	189
0	0	182	182	182
0	0	176	176	176
0	0	194	194	194
0	0	225	225	225
0	0	215	215	215
0	0	253	253	253
0	0	340	340	340
0	0	452	452	452
0	0	389	389	389
0	0	235	235	235
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	3152	3152	3152

TRAFFIC SIGNAL WARRANT VOLUME CALCULATIONS:

IH-41/45 NB Ramps & STH 167

By: TSC
Date: 1/13/2021

Year 2025 Existing Traffic

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	0	0	0	0	42	74	0	0	23	0	93	0	0	250	159	0	641
7-8am	0	0	0	0	63	84	0	0	19	1	97	0	0	251	242	0	757
8-9am	0	0	0	0	41	86	0	0	18	3	148	0	0	148	182	0	626
9-10am	0	0	0	0	54	76	0	0	12	3	146	0	0	119	145	0	555
10-11am	0	0	0	0	48	59	0	0	25	0	141	0	0	83	164	0	520
11am-12pm	0	0	0	0	47	88	0	0	27	1	167	0	0	120	155	0	605
12-1pm	0	0	0	0	59	84	0	1	25	3	188	0	0	100	169	0	629
1-2pm	0	0	0	0	56	87	0	0	27	0	181	0	0	132	188	1	671
2-3pm	0	0	0	0	111	113	0	0	39	1	223	0	0	111	183	0	781
3-4pm	0	0	0	0	186	153	0	0	42	0	315	0	0	141	240	0	1077
4-5pm	0	0	0	0	176	161	0	0	46	0	437	0	0	146	309	0	1275
5-6pm	0	0	0	0	116	124	0	0	46	0	383	0	0	122	266	0	1057
6-7pm	0	0	0	0	49	69	0	0	25	0	231	0	0	84	182	1	640
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes

Year 2025 Background Traffic

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	0	0	0	0	42	74	0	0	23	0	93	0	0	250	159	0	641
7-8am	0	0	0	0	63	84	0	0	19	0	97	0	0	251	242	0	756
8-9am	0	0	0	0	41	86	0	0	18	0	148	0	0	148	182	0	623
9-10am	0	0	0	0	54	76	0	0	12	0	146	0	0	119	145	0	552
10-11am	0	0	0	0	48	59	0	0	25	0	141	0	0	83	164	0	520
11am-12pm	0	0	0	0	47	88	0	0	27	0	167	0	0	120	155	0	604
12-1pm	0	0	0	0	59	84	0	0	25	0	188	0	0	100	169	0	625
1-2pm	0	0	0	0	56	87	0	0	27	0	181	0	0	132	188	0	671
2-3pm	0	0	0	0	111	113	0	0	39	0	223	0	0	111	183	0	780
3-4pm	0	0	0	0	186	153	0	0	42	0	315	0	0	141	240	0	1077
4-5pm	0	0	0	0	176	161	0	0	46	0	437	0	0	146	309	0	1275
5-6pm	0	0	0	0	116	124	0	0	46	0	383	0	0	122	266	0	1057
6-7pm	0	0	0	0	49	69	0	0	25	0	231	0	0	84	182	0	640
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Growth Rates					1.0%	1.0%			1.0%		1.0%			1.0%	1.0%		
PM Growth Rates					1.0%	1.0%			1.0%		1.0%			1.0%	1.0%		

Notes
2025 Existing = 2025 Background in this sheet.
The 2025 Existing volumes on this sheet were the resulting 2025 Background traffic volumes from the 2025 Background warrant study for the STH 167/IH-41/45 Northbound Ramps intersection.

Growth Rates from WisDOT Forecasts. Average of AM & PM Growth Rates in Above Table.

2025 West Development (LU #154) - New Trips

	↓ IH-41/45 NB Ramps				← STH 167				↑ IH-41/45 NB Ramps				→ STH 167				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Intersection Totals
6-7am	0	0	0	0	0	2	0	0	0	0	12	0	0	0	2	0	16
7-8am	0	0	0	0	0	1	0	0	0	0	8	0	0	0	3	0	12
8-9am	0	0	0	0	0	1	0	0	0	0	6	0	0	1	3	0	11
9-10am	0	0	0	0	0	2	0	0	0	0	14	0	0	1	3	0	20
10-11am	0	0	0	0	0	2	0	0	0	0	11	0	0	1	3	0	17
11am-12pm	0	0	0	0	0	1	0	0	0	0	4	0	0	1	4	0	10
12-1pm	0	0	0	0	0	1	0	0	0	0	6	0	0	1	8	0	16
1-2pm	0	0	0	0	0	1	0	0	0	0	7	0	0	1	7	0	16
2-3pm	0	0	0	0	0	1	0	0	0	0	7	0	0	1	5	0	14
3-4pm	0	0	0	0	0	1	0	0	0	0	6	0	0	2	11	0	20
4-5pm	0	0	0	0	0	1	0	0	0	0	4	0	0	1	7	0	13
5-6pm	0	0	0	0	0	0	0	0	0	0	2	0	0	2	9	0	13
6-7pm	0	0	0	0	0	1	0	0	0	0	3	0	0	2	10	0	16
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IN %						5%					30%						IN %
OUT %														5%	30%		OUT %

AADT IN	AADT OUT	
380	380	
0%	0%	<- % Reduction, Sensitivity Test
380	380	

IN	OUT	% AADT IN	% AADT OUT	Notes
39	8	10.2%	2.1%	800 new trips
28	9	7.3%	2.3%	5% linked trips (40)
19	11	5.1%	2.8%	
45	10	11.8%	2.6%	Hourly Distributions: ITE LU#154
36	11	9.5%	2.9%	
14	14	3.8%	3.7%	Directional Distribution: "West Dist"
19	26	5.1%	6.9%	from TIA
22	22	5.9%	5.9%	
23	16	6.0%	4.3%	
20	38	5.3%	10.0%	
12	24	3.1%	6.3%	
8	30	2.2%	7.8%	
10	33	2.7%	8.8%	
0	0			

By: TSC
Date: 1/13/2021

2025 West Development (LU #130) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	0	6	0	0	0	0	35	0	0	1	4	0	46	117	13	10.6%	1.2%	2325 new trips
7-8am	0	0	0	0	0	10	0	0	0	0	57	0	0	2	9	0	78	191	30	17.3%	2.7%	5% linked trips (115)
8-9am	0	0	0	0	0	6	0	0	0	0	35	0	0	2	14	0	57	115	46	10.4%	4.2%	
9-10am	0	0	0	0	0	4	0	0	0	0	22	0	0	4	23	0	53	74	75	6.7%	6.8%	Hourly Distributions: ITE LU#110
10-11am	0	0	0	0	0	4	0	0	0	0	24	0	0	4	26	0	58	81	87	7.3%	7.9%	
11am-12pm	0	0	0	0	0	4	0	0	0	0	23	0	0	5	28	0	60	75	93	6.8%	8.4%	Directional Distribution: "West Dist"
12-1pm	0	0	0	0	0	5	0	0	0	0	31	0	0	6	35	0	77	104	117	9.4%	10.6%	from TIA
1-2pm	0	0	0	0	0	5	0	0	0	0	27	0	0	4	22	0	58	90	72	8.1%	6.5%	
2-3pm	0	0	0	0	0	4	0	0	0	0	23	0	0	5	31	0	63	78	103	7.1%	9.3%	
3-4pm	0	0	0	0	0	3	0	0	0	0	19	0	0	7	42	0	71	64	141	5.8%	12.8%	
4-5pm	0	0	0	0	0	2	0	0	0	0	11	0	0	6	34	0	53	38	112	3.4%	10.1%	
5-6pm	0	0	0	0	0	1	0	0	0	0	4	0	0	8	50	0	63	12	168	1.1%	15.2%	
6-7pm	0	0	0	0	0	0	0	0	0	0	1	0	0	1	9	0	11	4	29	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %						5%					30%						IN %					
OUT %														5%	30%		OUT %					

AADT IN	AADT OUT
1105	1105
0%	0%
1105	1105

<- % Reduction, Sensitivity Test

2025 West Development (LU #960 - Kwik Trip Growth to 2025) - Diverted Linked Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	-4	7	0	0	0	0	0	0	0	2	4	0	9	11	11	4.7%	4.5%	5530 daily trips at 100% in 2040
7-8am	0	0	0	0	-6	8	0	0	0	0	0	0	0	3	6	0	11	14	14	5.7%	5.7%	-3100 existing daily trips
8-9am	0	0	0	0	-6	9	0	0	0	0	0	0	0	3	6	0	12	15	15	6.4%	6.3%	-1825 trips in 2040 (75% of total growth)
9-10am	0	0	0	0	-5	8	0	0	0	0	0	0	0	3	5	0	11	13	13	5.4%	5.5%	=605 new KT trips in 2025 Build.
10-11am	0	0	0	0	-5	7	0	0	0	0	0	0	0	2	5	0	9	12	12	5.2%	5.2%	
11am-12pm	0	0	0	0	-5	8	0	0	0	0	0	0	0	3	5	0	11	13	13	5.6%	5.4%	80% (480) are diverted linked trips
12-1pm	0	0	0	0	-6	9	0	0	0	0	0	0	0	3	6	0	12	15	15	6.3%	6.3%	20% (125) are pas-by trips
1-2pm	0	0	0	0	-6	8	0	0	0	0	0	0	0	3	6	0	11	14	14	5.8%	5.7%	PB trips do not pass through NB
2-3pm	0	0	0	0	-6	8	0	0	0	0	0	0	0	3	6	0	11	14	14	6.0%	6.0%	ramp intersection.
3-4pm	0	0	0	0	-6	9	0	0	0	0	0	0	0	3	6	0	12	15	15	6.3%	6.2%	
4-5pm	0	0	0	0	-6	9	0	0	0	0	0	0	0	3	6	0	12	15	15	6.3%	6.3%	Hourly Distributions: ITE LU#960
5-6pm	0	0	0	0	-6	10	0	0	0	0	0	0	0	3	6	0	13	16	16	6.6%	6.5%	
6-7pm	0	0	0	0	-6	8	0	0	0	0	0	0	0	3	6	0	11	14	15	6.0%	6.1%	Directional Distribution: "West Dist"
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			for diverted linked trips from TIA
IN %					-40%	60%								20%	40%		IN %					
OUT %																	OUT %					

AADT IN	AADT OUT
240	240
0%	0%
240	240

<- % Reduction, Sensitivity Test

2025 East Development (LU #130) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	8	11	0	0	56	0	0	0	0	112	0	0	187	223	25	10.6%	1.2%	Area H (135)
7-8am	0	0	0	0	17	26	0	0	91	0	0	0	0	182	0	0	316	363	57	17.3%	2.7%	Area H (2515)
8-9am	0	0	0	0	26	40	0	0	55	0	0	0	0	109	0	0	230	218	88	10.4%	4.2%	Area I (1545)
9-10am	0	0	0	0	43	64	0	0	35	0	0	0	0	71	0	0	213	141	143	6.7%	6.8%	
10-11am	0	0	0	0	50	75	0	0	38	0	0	0	0	77	0	0	240	153	166	7.3%	7.9%	Hourly Distributions: ITE LU#110
11am-12pm	0	0	0	0	53	79	0	0	36	0	0	0	0	72	0	0	240	143	176	6.8%	8.4%	
12-1pm	0	0	0	0	67	100	0	0	49	0	0	0	0	99	0	0	315	197	223	9.4%	10.6%	Directional Distribution: "East Dist"
1-2pm	0	0	0	0	41	62	0	0	43	0	0	0	0	85	0	0	231	170	137	8.1%	6.5%	from TIA
2-3pm	0	0	0	0	59	88	0	0	37	0	0	0	0	75	0	0	259	149	195	7.1%	9.3%	
3-4pm	0	0	0	0	81	121	0	0	31	0	0	0	0	61	0	0	294	122	269	5.8%	12.8%	
4-5pm	0	0	0	0	64	95	0	0	18	0	0	0	0	36	0	0	213	71	212	3.4%	10.1%	
5-6pm	0	0	0	0	96	144	0	0	6	0	0	0	0	12	0	0	258	23	319	1.1%	15.2%	
6-7pm	0	0	0	0	17	25	0	0	2	0	0	0	0	4	0	0	48	8	55	0.4%	2.6%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									25%					50%			IN %					
OUT %					30%	45%											OUT %					

AADT IN	AADT OUT
2100	2100
0%	0%
2100	2100

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2025 East Development (LU #154) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	3	5	0	0	12	0	0	0	0	24	0	0	44	47	10	10.2%	2.1%	Area H (930)
7-8am	0	0	0	0	3	5	0	0	9	0	0	0	0	17	0	0	34	34	11	7.3%	2.3%	
8-9am	0	0	0	0	4	6	0	0	6	0	0	0	0	12	0	0	28	24	13	5.1%	2.8%	Hourly Distributions: ITE LU#154
9-10am	0	0	0	0	4	5	0	0	14	0	0	0	0	28	0	0	51	55	12	11.8%	2.6%	
10-11am	0	0	0	0	4	6	0	0	11	0	0	0	0	22	0	0	43	44	13	9.5%	2.9%	Directional Distribution: "East Dist"
11am-12pm	0	0	0	0	5	8	0	0	5	0	0	0	0	9	0	0	27	18	17	3.8%	3.7%	from TIA
12-1pm	0	0	0	0	10	14	0	0	6	0	0	0	0	12	0	0	42	24	32	5.1%	6.9%	
1-2pm	0	0	0	0	8	12	0	0	7	0	0	0	0	14	0	0	41	27	27	5.9%	5.9%	
2-3pm	0	0	0	0	6	9	0	0	7	0	0	0	0	14	0	0	36	28	20	6.0%	4.3%	
3-4pm	0	0	0	0	14	21	0	0	6	0	0	0	0	13	0	0	54	25	47	5.3%	10.0%	
4-5pm	0	0	0	0	9	13	0	0	4	0	0	0	0	7	0	0	33	14	29	3.1%	6.3%	
5-6pm	0	0	0	0	11	16	0	0	3	0	0	0	0	5	0	0	35	10	36	2.2%	7.8%	
6-7pm	0	0	0	0	12	18	0	0	3	0	0	0	0	7	0	0	40	13	41	2.7%	8.8%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									25%					50%			IN %					
OUT %					30%	45%											OUT %					

AADT IN	AADT OUT
465	465
0%	0%
465	465

<- % Reduction, Sensitivity Test

2025 East Development (LU #140) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	5	7	0	0	25	0	0	0	0	50	0	0	87	99	15	16.8%	2.6%	Area I (385)
7-8am	0	0	0	0	6	9	0	0	20	0	0	0	0	41	0	0	76	81	19	13.8%	3.2%	Area J (790)
8-9am	0	0	0	0	5	7	0	0	9	0	0	0	0	17	0	0	38	34	16	5.7%	2.7%	
9-10am	0	0	0	0	5	8	0	0	5	0	0	0	0	11	0	0	29	21	17	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	0	0	0	5	8	0	0	5	0	0	0	0	10	0	0	28	19	17	3.3%	2.8%	
11am-12pm	0	0	0	0	8	13	0	0	9	0	0	0	0	19	0	0	49	37	28	6.2%	4.7%	Directional Distribution: "East Dist"
12-1pm	0	0	0	0	11	16	0	0	13	0	0	0	0	27	0	0	67	53	36	8.9%	6.1%	from TIA
1-2pm	0	0	0	0	12	18	0	0	10	0	0	0	0	20	0	0	60	40	41	6.8%	7.0%	
2-3pm	0	0	0	0	12	18	0	0	8	0	0	0	0	15	0	0	53	30	41	5.1%	6.9%	
3-4pm	0	0	0	0	37	55	0	0	14	0	0	0	0	29	0	0	135	57	122	9.7%	20.7%	
4-5pm	0	0	0	0	20	31	0	0	5	0	0	0	0	11	0	0	67	21	68	3.6%	11.6%	
5-6pm	0	0	0	0	17	25	0	0	4	0	0	0	0	8	0	0	54	16	56	2.7%	9.5%	
6-7pm	0	0	0	0	4	6	0	0	2	0	0	0	0	4	0	0	16	7	14	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									25%					50%			IN %					
OUT %					30%	45%											OUT %					

AADT IN	AADT OUT
590	590
0%	0%
590	590

<- % Reduction, Sensitivity Test

2025 South Development (LU #140) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
6-7am	0	0	0	0	3	2	0	0	3	0	0	0	0	27	0	0	35	59	9	16.8%	2.6%	Area U (255)
7-8am	0	0	0	0	3	2	0	0	2	0	0	0	0	22	0	0	29	48	11	13.8%	3.2%	Area U (445)
8-9am	0	0	0	0	3	2	0	0	1	0	0	0	0	9	0	0	15	20	9	5.7%	2.7%	
9-10am	0	0	0	0	3	2	0	0	1	0	0	0	0	6	0	0	12	13	10	3.6%	2.9%	Hourly Distributions: ITE LU#140
10-11am	0	0	0	0	3	2	0	0	1	0	0	0	0	5	0	0	11	12	10	3.3%	2.8%	
11am-12pm	0	0	0	0	5	3	0	0	1	0	0	0	0	10	0	0	19	22	16	6.2%	4.7%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	6	4	0	0	2	0	0	0	0	14	0	0	26	31	21	8.9%	6.1%	from TIA
1-2pm	0	0	0	0	8	5	0	0	1	0	0	0	0	11	0	0	25	24	25	6.8%	7.0%	
2-3pm	0	0	0	0	7	5	0	0	1	0	0	0	0	8	0	0	21	18	24	5.1%	6.9%	
3-4pm	0	0	0	0	22	14	0	0	2	0	0	0	0	15	0	0	53	34	72	9.7%	20.7%	
4-5pm	0	0	0	0	12	8	0	0	1	0	0	0	0	6	0	0	27	13	41	3.6%	11.6%	
5-6pm	0	0	0	0	10	7	0	0	0	0	0	0	0	4	0	0	21	9	33	2.7%	9.5%	
6-7pm	0	0	0	0	2	2	0	0	0	0	0	0	0	2	0	0	6	4	8	1.2%	2.4%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									5%					45%			IN %					
OUT %					30%	20%											OUT %					

AADT IN	AADT OUT
350	350
0%	0%
350	350

<- % Reduction, Sensitivity Test

By: TSC
Date: 1/13/2021

2025 South Development (LU #710) - New Trips

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		230	230			
																		0%	0%			<- % Reduction, Sensitivity Test
																		230	230			
6-7am	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	0	6	11	1	4.6%	0.5%	Area U (435)
7-8am	0	0	0	0	1	1	0	0	2	0	0	0	0	14	0	0	18	30	4	13.1%	1.9%	Area U (25)
8-9am	0	0	0	0	2	2	0	0	2	0	0	0	0	15	0	0	21	33	8	14.4%	3.5%	
9-10am	0	0	0	0	3	2	0	0	1	0	0	0	0	7	0	0	13	15	10	6.4%	4.3%	Hourly Distributions: ITE LU#710
10-11am	0	0	0	0	4	3	0	0	1	0	0	0	0	5	0	0	13	12	14	5.4%	5.9%	
11am-12pm	0	0	0	0	7	5	0	0	1	0	0	0	0	6	0	0	19	14	24	6.2%	10.3%	Directional Distribution: "South Dist"
12-1pm	0	0	0	0	7	5	0	0	1	0	0	0	0	10	0	0	23	23	24	10.2%	10.4%	from TIA
1-2pm	0	0	0	0	5	3	0	0	1	0	0	0	0	9	0	0	18	21	15	9.0%	6.7%	
2-3pm	0	0	0	0	5	3	0	0	1	0	0	0	0	9	0	0	18	19	15	8.2%	6.5%	
3-4pm	0	0	0	0	6	4	0	0	1	0	0	0	0	8	0	0	19	17	20	7.4%	8.5%	
4-5pm	0	0	0	0	11	7	0	0	1	0	0	0	0	6	0	0	25	13	35	5.5%	15.2%	
5-6pm	0	0	0	0	11	7	0	0	1	0	0	0	0	5	0	0	24	10	36	4.2%	15.6%	
6-7pm	0	0	0	0	2	1	0	0	0	0	0	0	0	2	0	0	5	4	7	1.7%	2.9%	
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %									5%					45%			IN %					
OUT %					30%	20%											OUT %					

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		0	0			
																		0%	0%			<- % Reduction, Sensitivity Test
																		0	0			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					

Start Time	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	IH-41/45 NB Ramps Right	Thru	Left	U-Turn	STH 167 Right	Thru	Left	U-Turn	Intersection Totals	IN	OUT	% AADT IN	% AADT OUT	Notes
																		AADT IN	AADT OUT			
																		0	0			
																		0%	0%			<- % Reduction, Sensitivity Test
																		0	0			
6-7am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8-9am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9-10am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10-11am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11am-12pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12-1pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
1-2pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2-3pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
3-4pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4-5pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5-6pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
6-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7-8pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
IN %																	IN %					
OUT %																	OUT %					