Preliminary Environmental Assessment
For Presentation at a Public Hearing

Appendices for the Proposed Improvements to State Route 15 from County Road 312 to Vicinity of US 72

Volume I
Appendix A

MDOT Project No. SDP-0022-04(053)V21 / 101633-001000

Tippah County, Mississippi

Submitted to:
US Department of Transportation
Federal Highway Administration

Submitted by:
Mississippi Department of Transportation

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Appendix A

Traffic and Level of Service Analysis

Note: Analysis was prepared for SR 15 from CR 312 to Mississippi/Tennessee State Line

GRESHAM SMITH AND PARTNERS MS, P.C.

MEMORANDUM

TO: Sandy Layne-Sclafani

FROM: Tait Karlson

DATE: October 24, 2011

SUBJECT: TRAFFIC ANALYSIS FOR ENVIRONMENTAL ASSESSMENT
SR 15 BETWEEN CR 312 AND THE TENNESSEE STATE LINE
TIPPAH COUNTY, MISSISSIPPI
GS&P Project No. 28230.01

Per your request, we have completed a planning-level traffic analysis to support the NEPA Environmental Assessment referenced above. The existing roadway geometry includes several substandard vertical curves that do not meet the state's current design policy. Based on a review of crash data furnished by MDOT, these curves may be contributing to accidents and safety concerns (e.g., due to poor sight distance). In our judgment, the proposed improvement alternatives would adequately address this deficiency of the existing roadway. In terms of roadway capacity, the existing SR 15 facility should be sufficient to convey future traffic demand at acceptable levels of service. This memo further summarizes our methodology, findings, and conclusions.

Data Collection

The following information was provided by MDOT:

- As-built highway plans
- Prior studies and correspondence with local officials
- Design year for proposed improvements ***(2040)***
- Historic AADT volumes at various locations in the study area (1998-2008)
- 2011 tube & turning movement counts (incl. % trucks) at several locations
- Signal timings and history of improvements at the SR 15/U.S. 72 intersection
- Crash history for the study area, incl. the SR 15/U.S. 72 intersection (2007-10)
- Historic traffic growth in the study area ***(0.8% along SR 15, 2.5% along U.S. 72)***
- Growth rates for forecasting future traffic ***(1% along SR 15, 2.5% along U.S. 72)***
- Regional truck percentage trends for forecasting future traffic
- Regional peak hour factor trends for forecasting future traffic patterns

Future Traffic Growth

Future (2040) traffic volumes were forecasted for all study alternatives, including those where SR 15 will remain on its present alignment (Alternatives A, B-1 and B-2) and one alternative involving construction of a bypass (Alternative C):

- Alternative A (No Build)
- Alternative B (Widen SR 15 on Present Alignment) (two variations):
    - Alternative B-1 (At-Grade Intersection at SR 15/US 72)
    - Alternative B-2 (Grade-Separated Interchange at SR 15/US 72)
- Alternative C (Construct Western Bypass)

Daily and peak hour volumes were forecasted for the highway segments and major intersections in the study area. For Alternatives B-1 and B-2, turning movement volumes were derived for the SR 15/U.S. 72 intersection under at-grade (Alt. B-1) and grade-separated interchange (Alt. B-2) conditions. Alternative C (Western Bypass) provides a new interchange at the SR 15 bypass/U.S. 72 intersection, with the existing SR 15/U.S. 72 intersection remaining in its present location and configuration.

The following exhibits are attached:

- Map depicting existing traffic volumes
- Map depicting future traffic volumes for Alternatives A, B-1 and B-2
- Map depicting future traffic volumes for Alternative C

Methodology

Future traffic volumes were derived using annual growth rates approved by the MDOT Planning Division. These growth rates were estimated after reviewing historical growth trends as well as growth forecasts provided in the Mississippi Statewide Travel Demand Model (MSSTM). The MSSTM was updated in April 2011 and is assumed to incorporate all currently planned developments in the region that are expected to impact the study area. A growth rate of 1.0%, just above the historical rate, was used to grow the volumes along SR 15 from the study year (2011) to the design year (2040). Similarly, a rate of 2.5% was used along U.S. 72.

In addition to overall growth, it was also necessary to estimate the peak hour factor and the heavy truck component of future traffic streams. Regarding the peak hour factors, analysis of historic traffic counts did not illustrate any significant change to be expected at any of the project roadways or intersections. Therefore, the existing peak hour factors were used for the future year analyses. The existing truck percentages range from 14% to 27% in this rural area. Based on historic traffic counts and forecasts provided by the MDOT Planning Division, as the rate of industrial development is expected to keep pace with residential and commercial growth in the region, it is projected that heavy truck

traffic will increase at about the same rate as passenger vehicle traffic. Therefore, the current truck percentages were used for the future year analyses.

For Alternative C (Construct Western Bypass), the MSSTM (2040 network) was used to predict future traffic utilization of the bypass versus the existing SR 15 route. For highway segments north of U.S. 72, the model results showed that 14% of future traffic would remain on the existing SR 15 alignment, with 124% (including latent/induced demand) utilizing the proposed bypass. This means that an additional 38% of future traffic demand would be attracted to the improved road network (and away from other local roads) north of U.S. 72 if a bypass were constructed. Similarly, 45% of the future traffic is projected to remain on the existing SR 15 alignment south of U.S. 72, with 64% using the proposed bypass. Again, this means a 9% increase in traffic volumes south of U.S. 72 if the bypass were built. Based on these predicted splits and the increased network utilization, traffic volumes were estimated for Alternative C.

The MSSTM was also used to estimate how the heavy truck component would utilize the SR 15 bypass. Percentages were developed to compare Alternative C heavy truck volumes to the future No-Build Alternative. It was determined that, north of U.S. 72, approximately 10% of the No-Build Alternative truck volume would use the existing SR 15 alignment and 110% would use the proposed Walnut bypass. South of U.S. 72, it was estimated that 55% of heavy trucks would use the existing alignment while 64% would use the bypass route.

Assumptions

Beyond those noted above, the following additional assumptions were made:

- For Alternative A (No Build), the future turning movement volumes between U.S. 72 and the SR 15 segment south of U.S. 72 are expected to grow at the higher U.S. 72 rate (2.5%) rather than the lower SR 15 rate (1.0%). This is because several businesses (e.g., gas stations, restaurant, hotel) are located south of this intersection, along with government and school facilities for the Town of Walnut. These are the only amenities along U.S. 72 for several miles in either direction.
- For Alternatives B-1, B-2 and C, the traffic volumes at the intersection of U.S. 72 and SR 15 were adjusted to reflect the possible closure of minor U.S. 72 access connections at McCoy Street, Stinson Street, and James Street. The total traffic demand in this vicinity was not reduced, but was simply redirected through the SR 15/U.S. 72 intersection. This was a conservative assumption for the purpose of verifying there is sufficient capacity at this key intersection.

Capacity Analysis

Methodology

We performed capacity analyses to determine anticipated levels of service (LOS) for major roadway segments and intersections within the study area. Analyses were performed in accordance with procedures in the Highway Capacity Manual (2000), using McTrans HCS+ and Synchro software packages.

We evaluated the following:

- **Two-lane highway LOS**
  - existing SR 15 alignment ***(2011)***
  - existing SR 15 alignment (***Alts. A & C) (2040)***

- **Multi-lane highway LOS**
  - Existing U.S. 72 ***(all alternatives)(2011 & 2040)***
  - Improved SR 15 along existing alignment ***(Alts. B-1 & B-2) (2040)***
  - Improved SR 15 west bypass ***(Alt. C) (2040)***

- **Two-way stop-controlled (TWSC) intersection LOS**
  - SR 15 at existing U.S. 72 frontage road ***(Alt. A) (2011 & 2040)***
  - SR 15 at Munn Avenue ***(all alternatives) (2011 & 2040)***
  - SR 15 at Commerce Street ***(all alternatives) (2011 & 2040)***
  - SR 15 at U.S. 72 interchange ramps ***(Alt. B-2) (2040)***
  - Improved SR 15 west bypass at U.S. 72 interchange ramps ***(Alt. C)(2040)***
  - U.S. 72 at Stinson Street ***(Alt. A) (2011 & 2040)***
  - U.S. 72 at James Street ***(Alt. A) (2011 & 2040)***
  - U.S. 72 at Mill Road ***(Alt. A and Alt. C) (2011 & 2040)***

- **All-way stop-controlled (AWSC) intersection LOS**
  - SR 15 at U.S. 72 westbound interchange ramps ***(Alt. B-2) (2040)***

- **Signalized intersection LOS**
  - SR 15 at U.S. 72 ***(Alts. A & B-1) (2011 & 2040)***

Findings

Table 1 summarizes the HCM Level of Service (LOS) findings for highway segments within the study area for all alternatives.

Table 1. Level of Service Summary – Highway Segments

	Existing		Alt. A		Alt. B		Alt. C Existing Ali.		Alt. C Bypass	
SR 15	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
Just N. of CR 312	B	B	C	C	A	A	B	B	A	A
Just N. of CR 302	C	B	C	C	A	A	B	B	A	A
Just N. of CR 115	C	C	C	C	A	A	B	B	A	A
Just S. of CR 102	C	C	C	C	A	A			A	A
Just S. of TN S.L.	C	B	C	C	A	A			A	A
US 72	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**		
East of SR 15	A	A	A	A	A	A	A	A		
West of SR 15	A	A	A	A	A	A	A	A		

Tables 2A and 2B summarize the intersection LOS findings for each alternative.

Table 2A. Level of Service Summary – Intersections

	Existing			Alt. A			Alt. B-1 (SR 15/US 72 at-grade scenario)			Alt. C		
SR 15 at	AM	Noon	PM	AM	Noon	PM	AM	Noon	PM	AM	Noon	PM
U.S. 72	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]	C[1]
Frontage Rd.	A	A	A	A	A	A	A	A	A	A	A	A
Munn Ave.	A	A	A	A	A	A	A	A	A	A	A	A
Commerce Ave.	A	A	A	A	A	A	A	A	A	A	A	A
U.S. 72 at												
Stinson St.	A	A	A	A	A	A	A	A	A	-	-	-
James St.	A	A	A	A	A	A	A	A	A	-	-	-
Mill Rd.	A	A	A	A	A	A	A	A	A	A	A	A

All intersections are Two-Way Stop Controlled unless noted otherwise.

[1] Signalized intersection

Table 2B. Level of Service Summary – Intersections (cont'd.)

	Existing			Alt. A			Alt. B-2 (SR 15/US 72 interchange scenario)			Alt. C		
Ex. SR 15 at	AM	Noon	PM	AM	Noon	PM	AM	Noon	PM	AM	Noon	PM
U.S. 72 WB ramps	-	-	-	-	-	-	A[2]	A[2]	B[2]	-	-	-
U.S. 72 EB ramps	-	-	-	-	-	-	A/B[3]	A/B[3]	A/C[3]	-	-	-
Bypass SR 15 at												
U.S. 72 WB ramps	-	-	-	-	-	-	-	-	-	A/B[3]	A/B[3]	A/C[3]
U.S. 72 EB ramps	-	-	-	-	-	-	-	-	-	A/B[3]	A/B[3]	A/C[3]

All intersections are Two-Way Stop Controlled unless noted otherwise.

[1] Signalized intersection

[2] All-way Stop Controlled

[3] Two-Way Stop Controlled LOS for major street/side street approaches

For all alternatives, the LOS for every movement at all stop-controlled intersections is C or better, with one exception. For Alternative B-2 (SR 15 / US 72 interchange), the LOS is D for the eastbound off-ramp left-turn during the PM peak. However, the 95% queue is only expected to be 40 feet. Therefore, this is not seen as a major concern.

For Alternatives B-1 and C, an at-grade, signalized intersection at U.S. 72/SR 15 is expected to operate at an overall LOS C. However, as currently designed (with split phasing of SR 15 approaches), this intersection would operate at an overall LOS D in the Alternative A (No Build) scenario. This intersection would be able to operate at an LOS C (as shown in the table above) if the northbound/southbound approaches no longer run with split phasing. It would be possible to implement this by changing some wiring and signal heads. For further details please see the attached reports:

- **HCS+ Reports**
  - Two-lane Highway LOS (Alternative A)
  - Multi-lane Highway LOS (all alternatives)
  - Stop-controlled Intersection LOS at Proposed Interchange Ramps (Alternative B-2 and Alternative C)

- **Synchro Reports**
  - Stop-controlled Intersection LOS (all alternatives)
  - Signalized Intersection LOS (SR 15 at U.S. 72; all alternatives)

Crash Analysis

There are several crest and sag vertical curves along SR 15 (e.g., vicinity of CR 312 and CR 306 intersections) that have been identified by previous studies (and this study) as not meeting current design standards for a high-speed state highway. Substandard vertical curves generally cause sight distance problems that may contribute to crashes. MDOT Traffic Engineering Division provided crash data for the studied highway segments for the preceding four years (2007-10). There have been at least seven significant crashes during this period that were located near a deficient vertical curve. These crashes included three head-on collisions, three rear-end collisions, and one angle crash, and involved two fatalities and three life-threatening injuries. However, the overall crash rates and severity indices were found to be similar to (i.e., not significantly higher than) those for similar rural highway facilities.

The crash history of the SR 15/U.S. 72 intersection was also investigated. Accounts of several severe traffic crashes at this location were recorded during a public meeting conducted by MDOT in Walnut in 2004. Since that time, MDOT has implemented safety improvements to mitigate the apparent hazards. Project No. HSIP-0007-01(073) was completed in June 2008 and involved modifications to the signal phasing and realignment of left turn bays. Analysis of the preceding four years' crash data has shown what would generally be considered a low crash rate and severity index at this location, which suggests the 2008 safety improvements were successful.

Conclusions

Based on the analyses documented herein, the present and future deficiencies of this section of SR 15 would be adequately addressed by any of the build alternatives. Our conclusions are further summarized below:

- Alternative A (No Build) provides sufficient capacity to convey projected traffic volumes at an acceptable level of service (LOS). While the existing two-lane SR 15 is expected to operate at LOS C or better, there are geometric deficiencies that could impact safety and thereby degrade the overall quality of service. With some phasing/timing modifications, the signalized SR 15/U.S. 72 intersection is anticipated to operate at an overall LOS C during the future PM peak hour.
- For all build alternatives, all project roadway segments will operate at an acceptable LOS during 2040 peak hours.
- For all build alternatives, all major unsignalized intersections will operate at an acceptable LOS during 2040 peak hours.
- For Alternative B-1, the currently signalized intersection of U.S. 72 and SR 15 is expected to operate at an overall LOS C. Should an interchange be constructed instead (Alt. B-2), the ramp intersections will operate at an acceptable LOS during 2040 peak hours. The eastbound ramp intersection may operate safely

and efficiently under two-way stop control (TWSC), but the westbound ramp intersection is recommended for all-way stop control (AWSC).

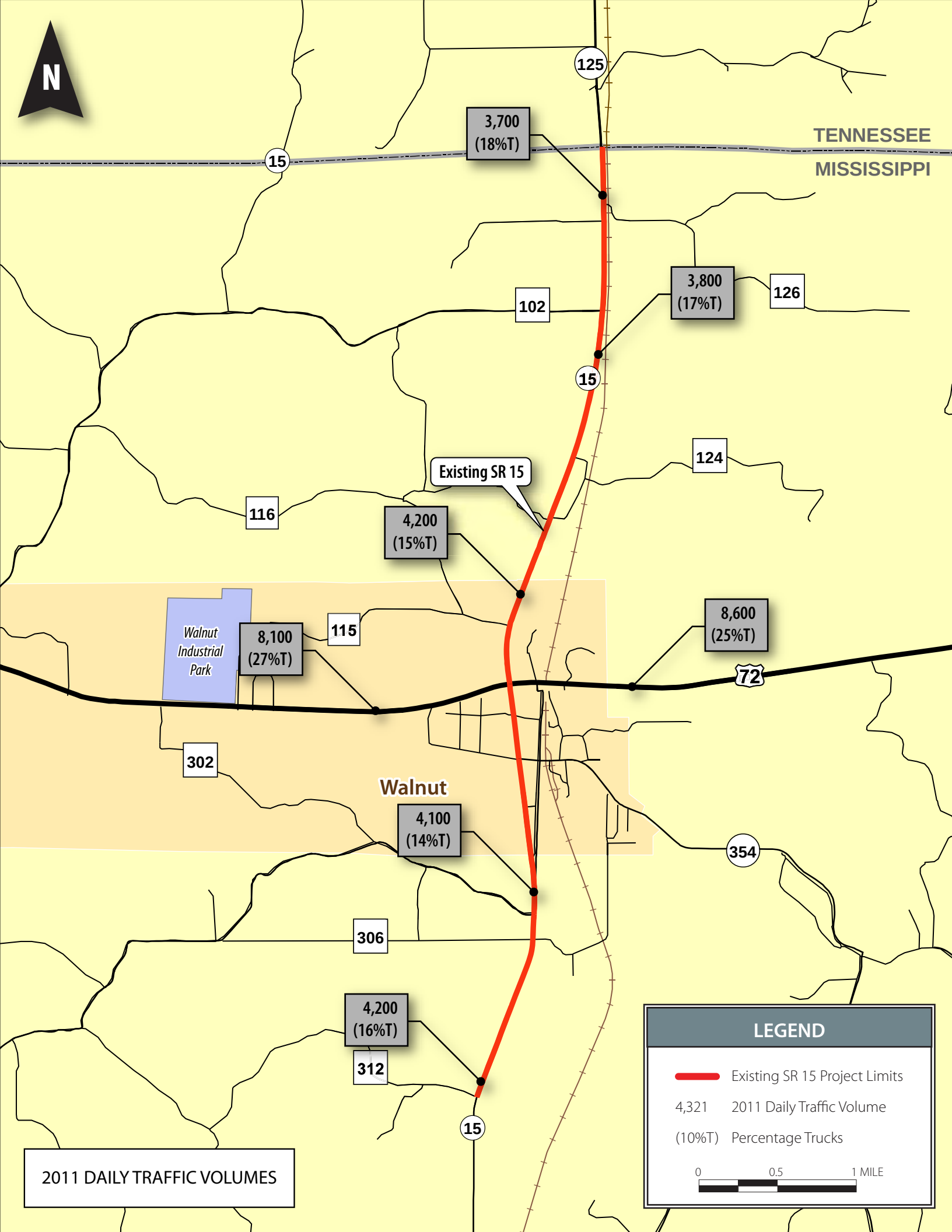
- For Alternative C, the currently signalized intersection of U.S. 72 and SR 15 is expected to operate at an acceptable LOS during 2040 peak hours. The West Walnut SR 15 Bypass/U.S. 72 interchange ramps are expected to operate at an acceptable LOS under TWSC conditions during 2040 peak hours.

Should you require additional information, please do not hesitate to contact me.

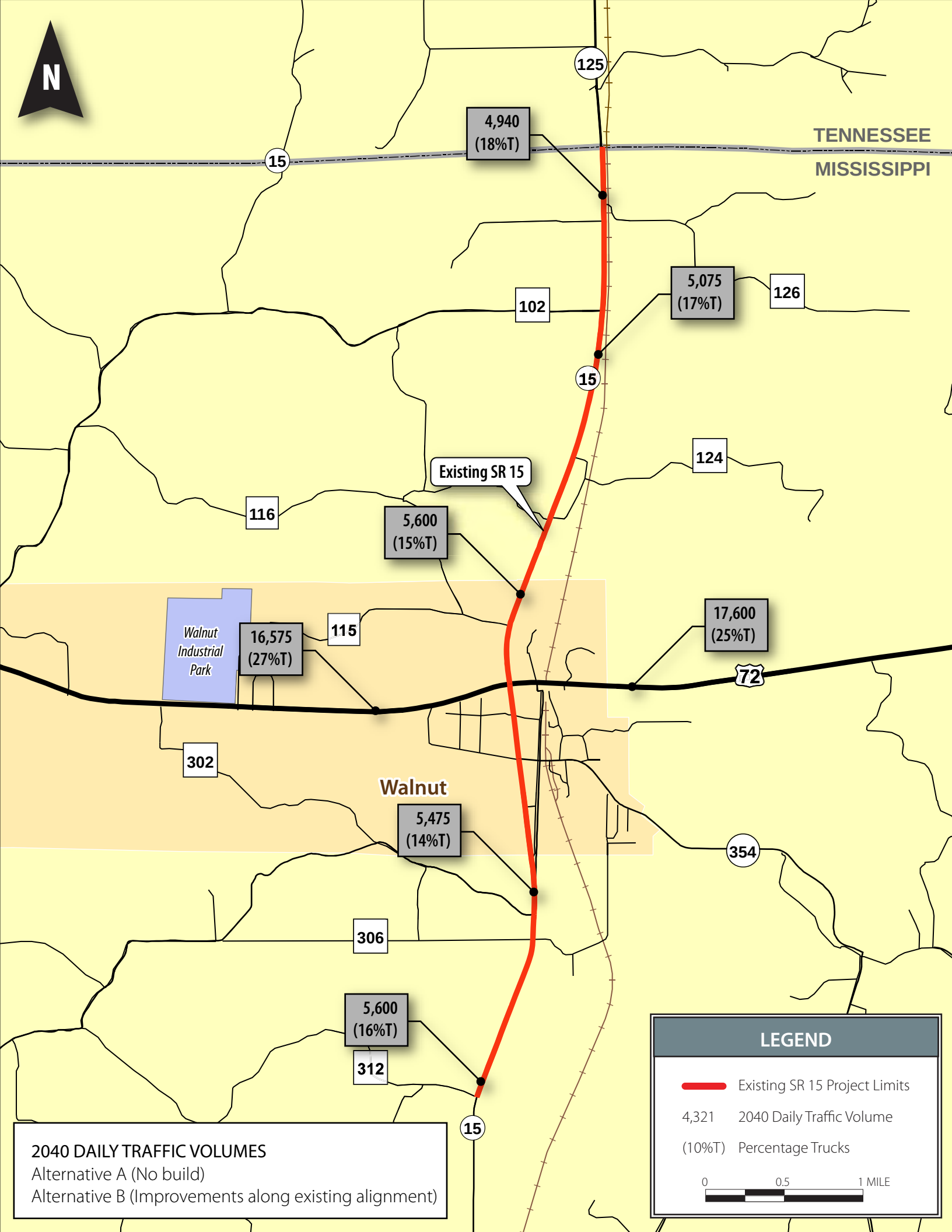
tkk

Attachments – Traffic volume and capacity analysis exhibits, as stated above

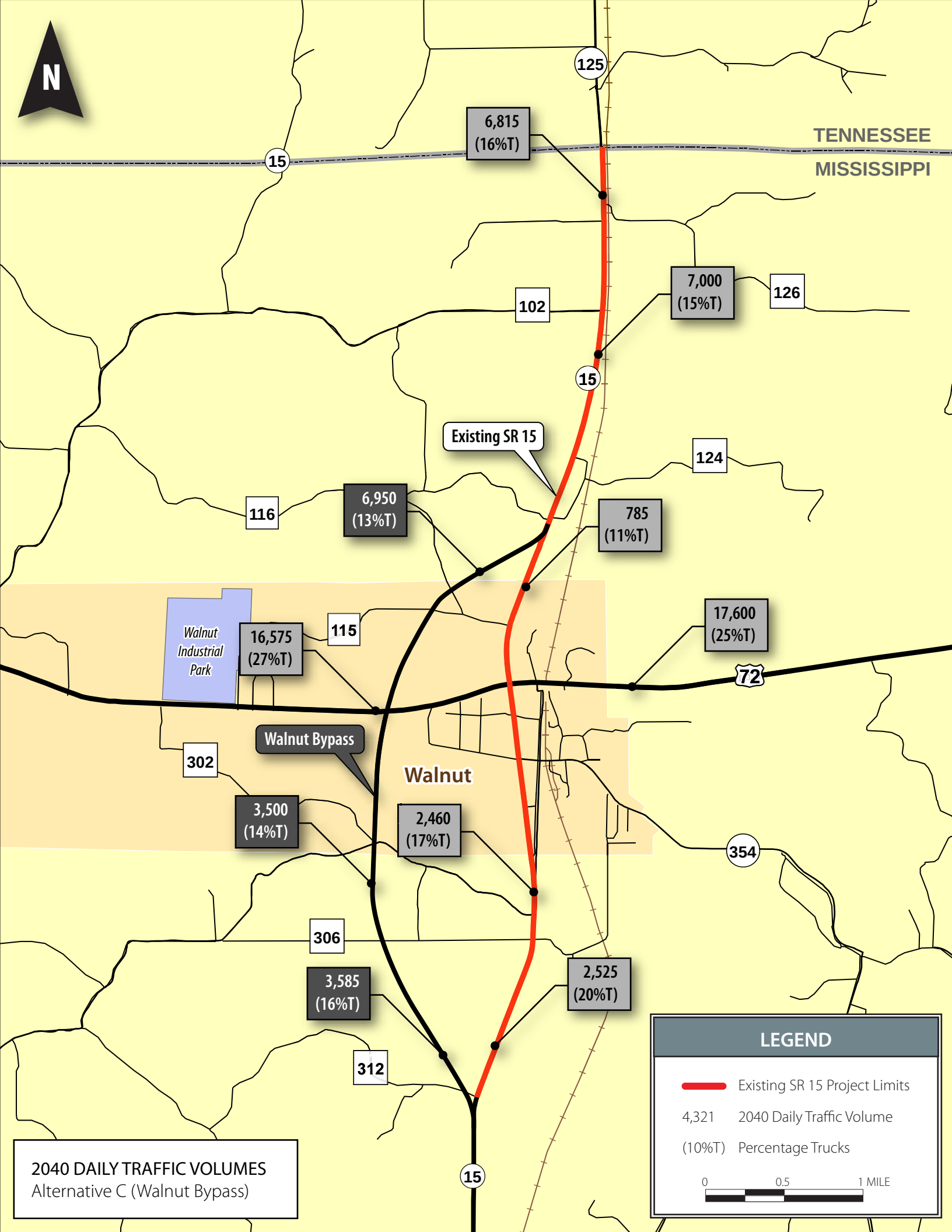
Copy Stephen Mosher – GS&P



2011 DAILY TRAFFIC VOLUMES



2040 DAILY TRAFFIC VOLUMES
Alternative A (No build)
Alternative B (Improvements along existing alignment)



2040 DAILY TRAFFIC VOLUMES
Alternative C (Walnut Bypass)

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1600
Highway	S.R. 15 Site 1 NB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.80	
Shoulder width	6.0	ft	% Trucks and buses	11	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 176 veh/h
Opposing direction volume, Vo 171 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.929		0.929	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	237	pc/h	230	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	59	mi/h
Observed volume,(note-3) Vf	89	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	59.7	mi/h
Adjustment for no-passing zones, fnp	2.3	mi/h
Average travel speed, ATSd	53.8	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.989	0.989
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	222 pc/h	216 pc/h

Base percent time-spent-following,(note-4) BPTSFd	24.0	%
Adjustment for no-passing zones, fnp	46.7	
Percent time-spent-following, PTSFd	47.7	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.14	
Peak 15-min vehicle-miles of travel, VMT15	121	veh-mi
Peak-hour vehicle-miles of travel, VMT60	387	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.8	mi/h
Percent time-spent-following, PTSFd (from above)	47.7	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.5	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.46	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-10.26	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	29.4	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	2.2	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	S.R. 15 Site 1 SB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	9	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 196 veh/h
Opposing direction volume, Vo 146 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.941		0.941	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	245	pc/h	183	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	59	mi/h
Observed volume,(note-3) Vf	87	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	59.7	mi/h
Adjustment for no-passing zones, fnp	2.2	mi/h
Average travel speed, ATSd	54.2	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.991	0.991
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	233 pc/h	173 pc/h

Base percent time-spent-following,(note-4) BPTSFd	24.5	%
Adjustment for no-passing zones, fnp	42.6	
Percent time-spent-following, PTSFd	49.0	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.14	
Peak 15-min vehicle-miles of travel, VMT15	127	veh-mi
Peak-hour vehicle-miles of travel, VMT60	431	veh-mi
Peak 15-min total travel time, TT15	2.3	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	54.2	mi/h
Percent time-spent-following, PTSFd (from above)	49.0	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.19	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.99	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	30.3	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	2.3	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	700
Highway	S.R. 15 Site 2 NB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.93	
Shoulder width	6.0	ft	% Trucks and buses	13	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 185 veh/h
Opposing direction volume, Vo 108 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.917		0.917	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	217	pc/h	127	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	53	mi/h
Observed volume,(note-3) Vf	95	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h

Free-flow speed, FFSd	53.8	mi/h
Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATSd	50.1	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.987	0.987
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	202 pc/h	118 pc/h

Base percent time-spent-following,(note-4) BPTSFd	21.7	%
Adjustment for no-passing zones, fnp	37.2	
Percent time-spent-following, PTSFd	45.2	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.13	
Peak 15-min vehicle-miles of travel, VMT15	109	veh-mi
Peak-hour vehicle-miles of travel, VMT60	407	veh-mi
Peak 15-min total travel time, TT15	2.2	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.1	mi/h
Percent time-spent-following, PTSFd (from above)	45.2	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	51.6	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.95	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-10.75	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	27.8	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	2.1	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	S.R. 15 Site 2 SB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	7	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 196 veh/h
Opposing direction volume, Vo 157 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.953		0.953	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	242	pc/h	194	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	54	mi/h
Observed volume,(note-3) Vf	79	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h

Free-flow speed, FFSd 54.6 mi/h

Adjustment for no-passing zones, fnp 1.9 mi/h
Average travel speed, ATSd 49.4 mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	232 pc/h	186 pc/h

Base percent time-spent-following,(note-4) BPTSFd	24.5	%
Adjustment for no-passing zones, fnp	43.8	
Percent time-spent-following, PTSFd	48.8	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.14	
Peak 15-min vehicle-miles of travel, VMT15	127	veh-mi
Peak-hour vehicle-miles of travel, VMT60	431	veh-mi
Peak 15-min total travel time, TT15	2.6	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	49.4	mi/h
Percent time-spent-following, PTSFd (from above)	48.8	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	50.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.22	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-10.02	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	30.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	2.5	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 3 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	7	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 200 veh/h
Opposing direction volume, Vo 178 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.953		0.953	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	250	pc/h	222	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	62	mi/h
Observed volume,(note-3) Vf	91	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	62.7	mi/h
Adjustment for no-passing zones, fnp	3.2	mi/h
Average travel speed, ATSd	55.8	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	240 pc/h	213 pc/h

Base percent time-spent-following,(note-4) BPTSFd	25.6	%
Adjustment for no-passing zones, fnp	53.4	
Percent time-spent-following, PTSFd	53.9	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	161	veh-mi
Peak-hour vehicle-miles of travel, VMT60	540	veh-mi
Peak 15-min total travel time, TT15	2.9	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	55.8	mi/h
Percent time-spent-following, PTSFd (from above)	53.9	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	57.2	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.02	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.32	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	33.8	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	2.8	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 3 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	14	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 196 veh/h
Opposing direction volume, Vo 149 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.911		0.911	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	272	pc/h	207	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	61	mi/h
Observed volume,(note-3) Vf	86	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	61.7	mi/h
Adjustment for no-passing zones, fnp	3.5	mi/h
Average travel speed, ATSd	54.5	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.986	0.986
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	252 pc/h	191 pc/h

Base percent time-spent-following,(note-4) BPTSFd	26.2	%
Adjustment for no-passing zones, fnp	53.3	
Percent time-spent-following, PTSFd	56.5	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	167	veh-mi
Peak-hour vehicle-miles of travel, VMT60	529	veh-mi
Peak 15-min total travel time, TT15	3.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	54.5	mi/h
Percent time-spent-following, PTSFd (from above)	56.5	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	11.73	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.03	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	35.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 4 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	10	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 178 veh/h
Opposing direction volume, Vo 172 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.935		0.935	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	227	pc/h	219	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	59	mi/h
Observed volume,(note-3) Vf	83	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h

Free-flow speed, FFSd 59.7 mi/h

Adjustment for no-passing zones, fnp 3.1 mi/h
Average travel speed, ATSd 53.2 mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.990	0.990
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	214 pc/h	207 pc/h

Base percent time-spent-following,(note-4) BPTSFd	23.0	%
Adjustment for no-passing zones, fnp	56.0	
Percent time-spent-following, PTSFd	51.5	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.13	
Peak 15-min vehicle-miles of travel, VMT15	143	veh-mi
Peak-hour vehicle-miles of travel, VMT60	481	veh-mi
Peak 15-min total travel time, TT15	2.7	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.2	mi/h
Percent time-spent-following, PTSFd (from above)	51.5	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	54.5	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.66	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.96	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	32.2	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	2.6	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 4 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	16	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 185 veh/h
Opposing direction volume, Vo 133 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.899		0.899	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	260	pc/h	187	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	57	mi/h
Observed volume,(note-3) Vf	81	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	57.7	mi/h
Adjustment for no-passing zones, fnp	3.2	mi/h
Average travel speed, ATSd	51.1	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.984	0.984
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	238 pc/h	171 pc/h

Base percent time-spent-following,(note-4) BPTSFd	25.0	%
Adjustment for no-passing zones, fnp	52.4	
Percent time-spent-following, PTSFd	55.5	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	158	veh-mi
Peak-hour vehicle-miles of travel, VMT60	500	veh-mi
Peak 15-min total travel time, TT15	3.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	51.1	mi/h
Percent time-spent-following, PTSFd (from above)	55.5	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	52.3	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.07	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.37	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	34.8	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 5 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	13	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 157 veh/h
Opposing direction volume, Vo 177 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.917		0.917	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	204	pc/h	230	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	57	mi/h
Observed volume,(note-3) Vf	80	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	57.7	mi/h
Adjustment for no-passing zones, fnp	2.9	mi/h
Average travel speed, ATSd	51.4	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.987	0.987
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	189 pc/h	213 pc/h

Base percent time-spent-following,(note-4) BPTSFd	20.9	%
Adjustment for no-passing zones, fnp	47.8	
Percent time-spent-following, PTSFd	43.4	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.12	
Peak 15-min vehicle-miles of travel, VMT15	126	veh-mi
Peak-hour vehicle-miles of travel, VMT60	424	veh-mi
Peak 15-min total travel time, TT15	2.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	51.4	mi/h
Percent time-spent-following, PTSFd (from above)	43.4	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	52.7	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-10.30	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	27.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	2.4	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 5 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	14	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 182 veh/h
Opposing direction volume, Vo 132 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.911		0.911	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	253	pc/h	183	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	56	mi/h
Observed volume,(note-3) Vf	79	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h

Free-flow speed, FFSd 56.7 mi/h

Adjustment for no-passing zones, fnp 3.1 mi/h
Average travel speed, ATSd 50.2 mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.986	0.986
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	234 pc/h	169 pc/h

Base percent time-spent-following,(note-4) BPTSFd	24.6	%
Adjustment for no-passing zones, fnp	52.5	
Percent time-spent-following, PTSFd	55.1	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	156	veh-mi
Peak-hour vehicle-miles of travel, VMT60	491	veh-mi
Peak 15-min total travel time, TT15	3.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.2	mi/h
Percent time-spent-following, PTSFd (from above)	55.1	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	51.5	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	12.17	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.47	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	34.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1600
Highway:	US 72
From/To:	.5 mi east of SR 15
Jurisdiction:	MDOT
Analysis Year:	2011
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	58.6	mph	57.6	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	58.6	mph	57.6	mph

VOLUME

Direction	1		2	
Volume, V	358	vph	324	vph
Peak-hour factor, PHF	0.81		0.84	
Peak 15-minute volume, v15	110		96	
Trucks and buses	19	%	19	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.913		0.913	
Flow rate, vp	241	pcphpl	211	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	241	pcphpl	211	pcphpl
Free-flow speed, FFS	58.6	mph	57.6	mph
Avg. passenger-car travel speed, S	58.6	mph	57.6	mph
Level of service, LOS	A		A	
Density, D	4.1	pc/mi/ln	3.7	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1400
Highway:	US 72
From/To:	.5 mi west of CR 15
Jurisdiction:	MDOT
Analysis Year:	2011
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	0		0	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.0	mph	0.0	mph
Free-flow speed	60.0	mph	60.0	mph

VOLUME

Direction	1		2	
Volume, V	329	vph	274	vph
Peak-hour factor, PHF	0.94		0.98	
Peak 15-minute volume, v15	88		70	
Trucks and buses	20	%	25	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.909		0.889	
Flow rate, vp	192	pcphpl	157	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	192	pcphpl	157	pcphpl
Free-flow speed, FFS	60.0	mph	60.0	mph
Avg. passenger-car travel speed, S	60.0	mph	60.0	mph
Level of service, LOS	A		A	
Density, D	3.2	pc/mi/ln	2.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1600
Highway	S.R. 15 Site 1 NB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.80	
Shoulder width	6.0	ft	% Trucks and buses	11	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 230 veh/h
Opposing direction volume, Vo 223 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.978		0.929	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	294	pc/h	300	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.9	mi/h
Average travel speed, ATSd	50.3	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.989	0.989
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	291 pc/h	282 pc/h

Base percent time-spent-following,(note-4) BPTSFd	31.9	%
Adjustment for no-passing zones, fnp	43.6	
Percent time-spent-following, PTSFd	54.0	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	158	veh-mi
Peak-hour vehicle-miles of travel, VMT60	506	veh-mi
Peak 15-min total travel time, TT15	3.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.3	mi/h
Percent time-spent-following, PTSFd (from above)	54.0	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	51.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.77	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-8.57	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	33.7	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	S.R. 15 Site 1 SB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	9	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 256 veh/h
Opposing direction volume, Vo 190 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.982		0.941	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	307	pc/h	238	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	2.0	mi/h
Average travel speed, ATSd	50.5	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.991	0.991
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	304 pc/h	226 pc/h

Base percent time-spent-following,(note-4) BPTSFd	31.4	%
Adjustment for no-passing zones, fnp	41.7	
Percent time-spent-following, PTSFd	55.4	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	166	veh-mi
Peak-hour vehicle-miles of travel, VMT60	563	veh-mi
Peak 15-min total travel time, TT15	3.3	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.5	mi/h
Percent time-spent-following, PTSFd (from above)	55.4	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	52.4	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.45	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-8.25	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	36.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.2	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	700
Highway	S.R. 15 Site 2 NB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.93	
Shoulder width	6.0	ft	% Trucks and buses	13	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 241 veh/h
Opposing direction volume, Vo 141 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.917		0.917	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	283	pc/h	165	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.7	mi/h
Average travel speed, ATSd	51.6	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.987	0.987
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	263 pc/h	154 pc/h

Base percent time-spent-following,(note-4) BPTSFd	27.2	%
Adjustment for no-passing zones, fnp	38.6	
Percent time-spent-following, PTSFd	51.5	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	143	veh-mi
Peak-hour vehicle-miles of travel, VMT60	530	veh-mi
Peak 15-min total travel time, TT15	2.8	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	51.6	mi/h
Percent time-spent-following, PTSFd (from above)	51.5	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	53.1	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	11.46	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.26	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	32.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	2.7	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	S.R. 15 Site 2 SB
From/To	.5mi S of CR312 to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	7	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.2	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 256 veh/h
Opposing direction volume, Vo 205 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.986		0.953	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	305	pc/h	253	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	2.0	mi/h
Average travel speed, ATSd	50.4	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	303 pc/h	243 pc/h

Base percent time-spent-following,(note-4) BPTSFd	31.9	%
Adjustment for no-passing zones, fnp	42.3	
Percent time-spent-following, PTSFd	55.4	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	166	veh-mi
Peak-hour vehicle-miles of travel, VMT60	563	veh-mi
Peak 15-min total travel time, TT15	3.3	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.2	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.4	mi/h
Percent time-spent-following, PTSFd (from above)	55.4	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	0.50	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	52.4	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.48	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-8.28	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	36.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	3.2	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 3 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	7	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 261 veh/h
Opposing direction volume, Vo 232 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.986		0.953	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	315	pc/h	290	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	5.0	mi/h
Free-flow speed, FFSd	55.0	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	47.8	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.993	0.993
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	313 pc/h	278 pc/h

Base percent time-spent-following,(note-4) BPTSFd	33.6	%
Adjustment for no-passing zones, fnp	49.3	
Percent time-spent-following, PTSFd	59.8	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	210	veh-mi
Peak-hour vehicle-miles of travel, VMT60	705	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	47.8	mi/h
Percent time-spent-following, PTSFd (from above)	59.8	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	49.3	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.23	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-7.53	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	39.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	C	
Peak 15-min total travel time, TT15	4.3	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 3 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	14	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 256 veh/h
Opposing direction volume, Vo 194 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.973		0.911	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	333	pc/h	270	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	5.0	mi/h
Free-flow speed, FFSd	55.0	mi/h
Adjustment for no-passing zones, fnp	2.8	mi/h
Average travel speed, ATSd	47.5	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.986	0.986
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	329 pc/h	249 pc/h

Base percent time-spent-following,(note-4) BPTSFd	34.2	%
Adjustment for no-passing zones, fnp	50.5	
Percent time-spent-following, PTSFd	62.9	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.20	
Peak 15-min vehicle-miles of travel, VMT15	219	veh-mi
Peak-hour vehicle-miles of travel, VMT60	691	veh-mi
Peak 15-min total travel time, TT15	4.6	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	47.5	mi/h
Percent time-spent-following, PTSFd (from above)	62.9	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	48.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	9.84	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-7.14	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	41.7	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	C	
Peak 15-min total travel time, TT15	4.5	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 4 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	10	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 232 veh/h
Opposing direction volume, Vo 224 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.935		0.935	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	296	pc/h	285	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	5.0	mi/h
Free-flow speed, FFSd	55.0	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	48.0	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.990	0.990
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	279 pc/h	269 pc/h

Base percent time-spent-following,(note-4) BPTSFd	30.5	%
Adjustment for no-passing zones, fnp	51.5	
Percent time-spent-following, PTSFd	56.8	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	186	veh-mi
Peak-hour vehicle-miles of travel, VMT60	626	veh-mi
Peak 15-min total travel time, TT15	3.9	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	48.0	mi/h
Percent time-spent-following, PTSFd (from above)	56.8	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	49.2	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	11.06	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-8.36	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	35.8	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	C	
Peak 15-min total travel time, TT15	3.8	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 4 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	17	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 241 veh/h
Opposing direction volume, Vo 173 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.967		0.894	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	315	pc/h	245	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	57	mi/h
Observed volume,(note-3) Vf	81	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	-	mi/h
Adj. for lane and shoulder width,(note-3) fLS	-	mi/h
Adj. for access points,(note-3) fA	-	mi/h
Free-flow speed, FFSd	57.6	mi/h
Adjustment for no-passing zones, fnp	3.1	mi/h
Average travel speed, ATSd	50.2	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.983	0.983
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	310 pc/h	223 pc/h

Base percent time-spent-following,(note-4) BPTSFd	31.8	%
Adjustment for no-passing zones, fnp	50.5	
Percent time-spent-following, PTSFd	61.2	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	206	veh-mi
Peak-hour vehicle-miles of travel, VMT60	651	veh-mi
Peak 15-min total travel time, TT15	4.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	50.2	mi/h
Percent time-spent-following, PTSFd (from above)	61.2	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	51.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.31	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-7.61	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	40.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	B	
Peak 15-min total travel time, TT15	4.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	S.R. 15 Site 5 NB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2011
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	13	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	47	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 205 veh/h
Opposing direction volume, Vo 231 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.917		0.917	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	266	pc/h	300	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	5.0	mi/h
Free-flow speed, FFSd	55.0	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	48.2	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.987	0.987
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	247 pc/h	279 pc/h

Base percent time-spent-following,(note-4) BPTSFd	27.9	%
Adjustment for no-passing zones, fnp	47.0	
Percent time-spent-following, PTSFd	50.0	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.16	
Peak 15-min vehicle-miles of travel, VMT15	165	veh-mi
Peak-hour vehicle-miles of travel, VMT60	554	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	48.2	mi/h
Percent time-spent-following, PTSFd (from above)	50.0	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	49.4	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	11.85	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-9.15	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	31.4	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	C	
Peak 15-min total travel time, TT15	3.3	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	S.R. 15 Site 5 SB
From/To	CR 115 to TN State line
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	14	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	2.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	54	%
Up/down		%	Access points/mi	20	/mi

Analysis direction volume, Vd 237 veh/h
Opposing direction volume, Vo 172 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.2		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.973		0.911	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	308	pc/h	239	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	5.0	mi/h
Free-flow speed, FFSd	55.0	mi/h
Adjustment for no-passing zones, fnp	3.0	mi/h
Average travel speed, ATSd	47.8	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.986	0.986
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	304 pc/h	221 pc/h

Base percent time-spent-following,(note-4) BPTSFd	31.3	%
Adjustment for no-passing zones, fnp	51.1	
Percent time-spent-following, PTSFd	60.9	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.18	
Peak 15-min vehicle-miles of travel, VMT15	202	veh-mi
Peak-hour vehicle-miles of travel, VMT60	640	veh-mi
Peak 15-min total travel time, TT15	4.2	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	2.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	47.8	mi/h
Percent time-spent-following, PTSFd (from above)	60.9	
Level of service,(note-1) LOSd (from above)	C	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane,(note-2) ATSpl	49.2	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	10.45	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-7.75	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane,(note-3) PTSFpl	40.2	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	C	
Peak 15-min total travel time, TT15	4.1	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1600
Highway:	US 72
From/To:	.5 mi east of SR 15
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	4		4	
Median type				
Free-flow speed:	Measured		Measured	
FFS or BFFS	58.6	mph	57.6	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	1.0	mph	1.0	mph
Free-flow speed	58.6	mph	57.6	mph

VOLUME

Direction	1		2	
Volume, V	733	vph	663	vph
Peak-hour factor, PHF	0.81		0.84	
Peak 15-minute volume, v15	226		197	
Trucks and buses	19	%	19	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.913		0.913	
Flow rate, vp	495	pcphpl	432	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	495	pcphpl	432	pcphpl
Free-flow speed, FFS	58.6	mph	57.6	mph
Avg. passenger-car travel speed, S	58.6	mph	57.6	mph
Level of service, LOS	A		A	
Density, D	8.4	pc/mi/ln	7.5	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1400
Highway:	US 72
From/To:	.5 mi west of CR 15
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	4		4	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	1.0	mph	1.0	mph
Free-flow speed	59.0	mph	59.0	mph

VOLUME

Direction	1		2	
Volume, V	673	vph	561	vph
Peak-hour factor, PHF	0.94		0.98	
Peak 15-minute volume, v15	179		143	
Trucks and buses	20	%	25	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.909		0.889	
Flow rate, vp	393	pcphpl	322	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	393	pcphpl	322	pcphpl
Free-flow speed, FFS	59.0	mph	59.0	mph
Avg. passenger-car travel speed, S	59.0	mph	59.0	mph
Level of service, LOS	A		A	
Density, D	6.7	pc/mi/ln	5.5	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	Impr. S.R. 15 Site 1
From/To:	0.5 mi S of CR312 to Mitchell
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	13		13	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	3.3	mph	3.3	mph
Free-flow speed	56.8	mph	56.8	mph

VOLUME

Direction	1		2	
Volume, V	230	vph	251	vph
Peak-hour factor, PHF	0.78		0.85	
Peak 15-minute volume, v15	74		74	
Trucks and buses	10	%	14	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.952		0.935	
Flow rate, vp	154	pcphpl	157	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	154	pcphpl	157	pcphpl
Free-flow speed, FFS	56.8	mph	56.8	mph
Avg. passenger-car travel speed, S	56.8	mph	56.8	mph
Level of service, LOS	A		A	
Density, D	2.7	pc/mi/ln	2.8	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1700
Highway:	Impr. S.R. 15 Site 2
From/To:	0.5 mi S of CR312 to Mitchell
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	13		13	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	3.3	mph	3.3	mph
Free-flow speed	56.8	mph	56.8	mph

VOLUME

Direction	1		2	
Volume, V	210	vph	262	vph
Peak-hour factor, PHF	0.76		0.85	
Peak 15-minute volume, v15	69		77	
Trucks and buses	11	%	7	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.948		0.966	
Flow rate, vp	145	pcphpl	159	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	145	pcphpl	159	pcphpl
Free-flow speed, FFS	56.8	mph	56.8	mph
Avg. passenger-car travel speed, S	56.8	mph	56.8	mph
Level of service, LOS	A		A	
Density, D	2.6	pc/mi/ln	2.8	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	Impr. S.R. 15 Site 3
From/To:	CR 115 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	266	vph	238	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	79		68	
Trucks and buses	7	%	15	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.966		0.930	
Flow rate, vp	163	pcphpl	145	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	163	pcphpl	145	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	3.0	pc/mi/ln	2.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	Impr. S.R. 15 Site 4
From/To:	CR 115 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	237	vph	230	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	71		65	
Trucks and buses	10	%	13	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.952		0.939	
Flow rate, vp	148	pcphpl	139	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	148	pcphpl	139	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	2.7	pc/mi/ln	2.5	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	Impr. S.R. 15 Site 5
From/To:	CR 115 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	210	vph	236	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	63		67	
Trucks and buses	13	%	14	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.939		0.935	
Flow rate, vp	133	pcphpl	143	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	133	pcphpl	143	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	2.4	pc/mi/ln	2.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/12/2011
Analysis Time Period: 0715 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	0	0	106	0	24	149	106	0	0	160	68
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	T		TR	
PHF			0.88	0.88	0.85		0.78	
Flow Rate			120	27	124		292	
% Heavy Veh			7	11	7		16	
No. Lanes		2			1			1
Opposing-Lanes		0			1			1
Conflicting-lanes		1			2			2
Geometry group		1			2			2

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane			120	27	124		292	
Left-Turn			120	0	0		0	
Right-Turn			0	27	0		87	
Prop. Left-Turns			1.0	0.0	0.0		0.0	
Prop. Right-Turns			0.0	1.0	0.0		0.3	
Prop. Heavy Vehicle			0.1	0.1	0.1		0.2	
Geometry Group		1			2			2
Adjustments Exhibit 17-33:								
hLT-adj		0.2			0.2			0.2

hRT-adj			-0.6		-0.6		-0.6	
hHV-adj			1.7		1.7		1.7	
hadj, computed			0.3	-0.4	0.1		0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate			120	27	124		292	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial			0.11	0.02	0.11		0.26	
hd, final value			5.20	4.47	4.74		4.53	
x, final value			0.17	0.03	0.16		0.37	
Move-up time, m			2.0		2.0		2.0	
Service Time			3.2	2.5	2.7		2.5	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate			120	27	124		292	
Service Time			3.2	2.5	2.7		2.5	
Utilization, x			0.17	0.03	0.16		0.37	
Dep. headway, hd			5.20	4.47	4.74		4.53	
Capacity			370	277	374		542	
Delay			9.29	7.62	8.66		10.13	
LOS			A	A	A		B	
Approach:								
Delay			8.98		8.66		10.13	
LOS			A		A		B	

Intersection Delay 9.51 Intersection LOS A

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/12/2011
Analysis Time Period: 1200 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	0	0	147	0	41	123	96	0	0	128	31
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	T		TR	
PHF			0.81	0.81	0.71		0.83	
Flow Rate			181	50	135		191	
% Heavy Veh			20	23	19		14	
No. Lanes			2		1		1	
Opposing-Lanes			0		1		1	
Conflicting-lanes			1		2		2	
Geometry group			1		2		2	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane			181	50	135		191	
Left-Turn			181	0	0		0	
Right-Turn			0	50	0		37	
Prop. Left-Turns			1.0	0.0	0.0		0.0	
Prop. Right-Turns			0.0	1.0	0.0		0.2	
Prop. Heavy Vehicle			0.2	0.2	0.2		0.1	
Geometry Group			1		2		2	
Adjustments Exhibit 17-33:								
hLT-adj			0.2		0.2		0.2	

hRT-adj			-0.6		-0.6		-0.6	
hHV-adj			1.7		1.7		1.7	
hadj, computed			0.5	-0.2	0.3		0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate			181	50	135		191	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial			0.16	0.04	0.12		0.17	
hd, final value			5.27	4.51	5.07		4.80	
x, final value			0.26	0.06	0.19		0.25	
Move-up time, m				2.0		2.0		2.0
Service Time			3.3	2.5	3.1		2.8	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate			181	50	135		191	
Service Time			3.3	2.5	3.1		2.8	
Utilization, x			0.26	0.06	0.19		0.25	
Dep. headway, hd			5.27	4.51	5.07		4.80	
Capacity			431	300	385		441	
Delay			10.15	7.81	9.25		9.43	
LOS			B	A	A		A	
Approach:								
Delay				9.64		9.25		9.43
LOS				A		A		A

Intersection Delay 9.48 Intersection LOS A

Phone: Fax:
E-Mail:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/12/2011
Analysis Time Period: 1615 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	0	0	153	0	31	143	179	0	0	187	36
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			L	R	T		TR	
PHF			0.86	0.86	0.70		0.61	
Flow Rate			177	36	255		365	
% Heavy Veh			6	9	15		0	
No. Lanes			2		1		1	
Opposing-Lanes			0		1		1	
Conflicting-lanes			1		2		2	
Geometry group			1		2		2	

Duration, T 0.25 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane			177	36	255		365	
Left-Turn			177	0	0		0	
Right-Turn			0	36	0		59	
Prop. Left-Turns			1.0	0.0	0.0		0.0	
Prop. Right-Turns			0.0	1.0	0.0		0.2	
Prop. Heavy Vehicle			0.1	0.1	0.1		0.0	
Geometry Group			1		2		2	
Adjustments Exhibit 17-33:								
hLT-adj			0.2		0.2		0.2	

hRT-adj			-0.6		-0.6		-0.6	
hHV-adj			1.7		1.7		1.7	
hadj, computed			0.3	-0.4	0.3		-0.1	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate			177	36	255		365	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial			0.16	0.03	0.23		0.32	
hd, final value			5.73	4.98	5.24		4.77	
x, final value			0.28	0.05	0.37		0.48	
Move-up time, m				2.0		2.0		2.0
Service Time			3.7	3.0	3.2		2.8	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate			177	36	255		365	
Service Time			3.7	3.0	3.2		2.8	
Utilization, x			0.28	0.05	0.37		0.48	
Dep. headway, hd			5.73	4.98	5.24		4.77	
Capacity			427	286	505		615	
Delay			10.97	8.24	11.29		12.16	
LOS			B	A	B		B	
Approach:								
Delay				10.51		11.29		12.16
LOS				B		B		B

Intersection Delay 11.47 Intersection LOS B

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TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		226	151	41	225	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Hourly Flow Rate, HFR		265	177	52	288	
Percent Heavy Vehicles		--	--	16	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				29		194
Peak Hour Factor, PHF				0.90		0.90
Hourly Flow Rate, HFR				32		215
Percent Heavy Vehicles				9		9
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes				1	1	
Configuration				L	R	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		52				32		215
C(m) (vph)		1048				353		735
v/c		0.05				0.09		0.29
95% queue length		0.16				0.30		1.22
Control Delay		8.6				16.2		11.9
LOS		A				C		B
Approach Delay							12.5	
Approach LOS							B	

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TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		226	151	41	225	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Peak-15 Minute Volume		66	44	13	72	
Hourly Flow Rate, HFR		265	177	52	288	
Percent Heavy Vehicles		--	--	16	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				29		194
Peak Hour Factor, PHF				0.90		0.90
Peak-15 Minute Volume				8		54
Hourly Flow Rate, HFR				32		215
Percent Heavy Vehicles				9		9
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?						No
Lanes				1	1	
Configuration				L	R	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

		Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2	Left-Turn							
	Through							
S5	Left-Turn							
	Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		288
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1				7.1		6.2
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			16				9		9
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00				0.70		0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.3				6.5		6.3
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		16				9		9
t(f)		2.3				3.6		3.4

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		442				746		288
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		288
Potential Capacity		735
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		735
Probability of Queue free St.	1.00	0.71
Step 2: LT from Major St.	4	1
Conflicting Flows	442	
Potential Capacity	1048	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1048	
Probability of Queue free St.	0.95	1.00
Maj L-Shared Prob Q free St.	0.94	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		746
Potential Capacity		371
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.94	
Maj. L, Min T Adj. Imp Factor.	0.95	
Cap. Adj. factor due to Impeding mvmnt	0.68	0.95
Movement Capacity		353

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		746
Potential Capacity		371
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.94	
Maj. L, Min T Adj. Imp Factor.	0.95	
Cap. Adj. factor due to Impeding mvmnt	0.68	0.95
Movement Capacity		353
Results for Two-stage process:		
a		
y		
C t		353

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				32		215
Movement Capacity (vph)				353		735
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				353		735
Volume				32		215
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		52				32		215
C(m) (vph)		1048				353		735
v/c		0.05				0.09		0.29
95% queue length		0.16				0.30		1.22
Control Delay		8.6				16.2		11.9
LOS		A				C		B
Approach Delay							12.5	
Approach LOS							B	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.95
v(il), Volume for stream 2 or 5		288
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.94
d(M,LT), Delay for stream 1 or 4		8.6
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.5

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		186	137	37	238	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Hourly Flow Rate, HFR		261	192	44	286	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				33		217
Peak Hour Factor, PHF				0.73		0.73
Hourly Flow Rate, HFR				45		297
Percent Heavy Vehicles				12		5
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes				1	1	
Configuration				L	R	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		44				45		297
C(m) (vph)		1047				359		746
v/c		0.04				0.13		0.40
95% queue length		0.13				0.43		1.92
Control Delay		8.6				16.5		13.0
LOS		A				C		B
Approach Delay							13.4	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		186	137	37	238	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Peak-15 Minute Volume		65	48	11	72	
Hourly Flow Rate, HFR		261	192	44	286	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				33		217
Peak Hour Factor, PHF				0.73		0.73
Peak-15 Minute Volume				11		74
Hourly Flow Rate, HFR				45		297
Percent Heavy Vehicles				12		5
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?						No
Lanes				1	1	
Configuration				L	R	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		286
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1				7.1		6.2
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			14				12		5
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00				0.70		0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.2				6.5		6.3
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		14				12		5
t(f)		2.3				3.6		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		453				731		286
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		286
Potential Capacity		746
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		746
Probability of Queue free St.	1.00	0.60
Step 2: LT from Major St.	4	1
Conflicting Flows	453	
Potential Capacity	1047	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1047	
Probability of Queue free St.	0.96	1.00
Maj L-Shared Prob Q free St.	0.95	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		731
Potential Capacity		375
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.95	
Maj. L, Min T Adj. Imp Factor.	0.96	
Cap. Adj. factor due to Impeding mvmnt	0.58	0.96
Movement Capacity		359

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		731
Potential Capacity		375
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.95	
Maj. L, Min T Adj. Imp Factor.	0.96	
Cap. Adj. factor due to Impeding mvmnt	0.58	0.96
Movement Capacity		359
Results for Two-stage process:		
a		
y		
C t		359

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				45		297
Movement Capacity (vph)				359		746
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				359		746
Volume				45		297
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		44				45		297
C(m) (vph)		1047				359		746
v/c		0.04				0.13		0.40
95% queue length		0.13				0.43		1.92
Control Delay		8.6				16.5		13.0
LOS		A				C		B
Approach Delay							13.4	
Approach LOS							B	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.96
v(il), Volume for stream 2 or 5		286
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.95
d(M,LT), Delay for stream 1 or 4		8.6
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.4

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		263	182	47	293	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Hourly Flow Rate, HFR		375	260	77	480	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				59		221
Peak Hour Factor, PHF				0.80		0.80
Hourly Flow Rate, HFR				73		276
Percent Heavy Vehicles				0		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes				1	1	
Configuration				L	R	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		77				73		276
C(m) (vph)		958				207		586
v/c		0.08				0.35		0.47
95% queue length		0.26				1.50		2.51
Control Delay		9.1				31.6		16.5
LOS		A				D		C
Approach Delay							19.6	
Approach LOS							C	

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt B
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		263	182	47	293	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Peak-15 Minute Volume		94	65	19	120	
Hourly Flow Rate, HFR		375	260	77	480	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				59		221
Peak Hour Factor, PHF				0.80		0.80
Peak-15 Minute Volume				18		69
Hourly Flow Rate, HFR				73		276
Percent Heavy Vehicles				0		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?						No
Lanes				1	1	
Configuration				L	R	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		480
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)		4.1				7.1		6.2
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		0				0		2
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)		0.00				0.70		0.00
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage		4.1				6.4		6.2
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0				0		2
t(f)		2.2				3.5		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		635				1139		480
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		480
Potential Capacity		586
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		586
Probability of Queue free St.	1.00	0.53
Step 2: LT from Major St.	4	1
Conflicting Flows	635	
Potential Capacity	958	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	958	
Probability of Queue free St.	0.92	1.00
Maj L-Shared Prob Q free St.	0.89	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.89	0.89
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		1139
Potential Capacity		225
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.89	
Maj. L, Min T Adj. Imp Factor.	0.91	
Cap. Adj. factor due to Impeding mvmnt	0.48	0.92
Movement Capacity		207

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.89	0.89
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		1139
Potential Capacity		225
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.89	
Maj. L, Min T Adj. Imp Factor.	0.91	
Cap. Adj. factor due to Impeding mvmnt	0.48	0.92
Movement Capacity		207

Results for Two-stage process:		
a		
y		
C t		207

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				73		276
Movement Capacity (vph)				207		586
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				207		586
Volume				73		276
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT				L		R
v (vph)		77				73		276
C(m) (vph)		958				207		586
v/c		0.08				0.35		0.47
95% queue length		0.26				1.50		2.51
Control Delay		9.1				31.6		16.5
LOS		A				D		C
Approach Delay							19.6	
Approach LOS							C	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.92
v(il), Volume for stream 2 or 5		480
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.89
d(M,LT), Delay for stream 1 or 4		9.1
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		1.0

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	149	106			160	68
Peak-Hour Factor, PHF	0.85	0.85			0.78	0.78
Hourly Flow Rate, HFR	175	124			205	87
Percent Heavy Vehicles	7	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	106		24			
Peak Hour Factor, PHF	0.88		0.88			
Hourly Flow Rate, HFR	120		27			
Percent Heavy Vehicles	7		11			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	175			147				
C(m) (vph)	1242			376				
v/c	0.14			0.39				
95% queue length	0.49			1.81				
Control Delay	8.4			20.6				
LOS	A			C				
Approach Delay				20.6				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	149	106			160	68
Peak-Hour Factor, PHF	0.85	0.85			0.78	0.78
Peak-15 Minute Volume	44	31			51	22
Hourly Flow Rate, HFR	175	124			205	87
Percent Heavy Vehicles	7	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	106		24			
Peak Hour Factor, PHF	0.88		0.88			
Peak-15 Minute Volume	30		7			
Hourly Flow Rate, HFR	120		27			
Percent Heavy Vehicles	7		11			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0		0			
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	124	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	7		7		11			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.2		6.5		6.3			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	7		7		11			
t(f)	2.3		3.6		3.4			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	292		722		124			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	124	
Potential Capacity	903	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	903	
Probability of Queue free St.	0.97	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows		292
Potential Capacity		1242
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1242
Probability of Queue free St.	1.00	0.86
Maj L-Shared Prob Q free St.		0.85
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.85	0.85
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	722	
Potential Capacity	386	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.85
Maj. L, Min T Adj. Imp Factor.		0.88
Cap. Adj. factor due to Impeding mvmnt	0.86	0.86
Movement Capacity	332	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.85	0.85
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows	722	
Potential Capacity	386	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.85
Maj. L, Min T Adj. Imp Factor.		0.88
Cap. Adj. factor due to Impeding mvmnt	0.86	0.86
Movement Capacity	332	
Results for Two-stage process:		
a		
y		
C t	332	

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	120		27			
Movement Capacity (vph)	332		903			
Shared Lane Capacity (vph)		376				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	332		903			
Volume	120		27			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		376				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	175			147				
C(m) (vph)	1242			376				
v/c	0.14			0.39				
95% queue length	0.49			1.81				
Control Delay	8.4			20.6				
LOS	A			C				
Approach Delay				20.6				
Approach LOS				C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.86	1.00
v(il), Volume for stream 2 or 5	124	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.85	
d(M,LT), Delay for stream 1 or 4	8.4	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	1.3	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID:
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	123	96			128	31
Peak-Hour Factor, PHF	0.71	0.71			0.83	0.83
Hourly Flow Rate, HFR	173	135			154	37
Percent Heavy Vehicles	19	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	147		41			
Peak Hour Factor, PHF	0.81		0.81			
Hourly Flow Rate, HFR	181		50			
Percent Heavy Vehicles	20		23			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT		L		R			
v (vph)	173		181		50			
C(m) (vph)	1287		351		861			
v/c	0.13		0.52		0.06			
95% queue length	0.46		2.82		0.18			
Control Delay	8.2		25.7		9.4			
LOS	A		D		A			
Approach Delay				22.2				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
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TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID:
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	123	96			128	31
Peak-Hour Factor, PHF	0.71	0.71			0.83	0.83
Peak-15 Minute Volume	43	34			39	9
Hourly Flow Rate, HFR	173	135			154	37
Percent Heavy Vehicles	19	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	147		41			
Peak Hour Factor, PHF	0.81		0.81			
Peak-15 Minute Volume	45		13			
Hourly Flow Rate, HFR	181		50			
Percent Heavy Vehicles	20		23			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?			No			
Lanes	1		1			
Configuration	L		R			

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	135	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	19		20		23			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.3		6.6		6.4			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	19		20		23			
t(f)	2.4		3.7		3.5			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	191		653		135			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	135	
Potential Capacity	861	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	861	
Probability of Queue free St.	0.94	1.00

Step 2: LT from Major St.	4	1
Conflicting Flows		191
Potential Capacity		1287
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1287
Probability of Queue free St.	1.00	0.87
Maj L-Shared Prob Q free St.		0.85

Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.85	0.85
Movement Capacity		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10
Conflicting Flows	653	
Potential Capacity	405	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.85
Maj. L, Min T Adj. Imp Factor.		0.89
Cap. Adj. factor due to Impeding mvmnt	0.87	0.84
Movement Capacity	351	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.85	0.85
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	653	
Potential Capacity	405	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.85
Maj. L, Min T Adj. Imp Factor.		0.89
Cap. Adj. factor due to Impeding mvmnt	0.87	0.84
Movement Capacity	351	

Results for Two-stage process:	
a	
y	
C t	351

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	181		50			
Movement Capacity (vph)	351		861			
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	351		861			
Volume	181		50			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT		L		R			
v (vph)	173		181		50			
C(m) (vph)	1287		351		861			
v/c	0.13		0.52		0.06			
95% queue length	0.46		2.82		0.18			
Control Delay	8.2		25.7		9.4			
LOS	A		D		A			
Approach Delay				22.2				
Approach LOS				C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.87	1.00
v(il), Volume for stream 2 or 5	135	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.85	
d(M,LT), Delay for stream 1 or 4	8.2	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	1.2	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	143	179			187	36
Peak-Hour Factor, PHF	0.70	0.70			0.61	0.61
Hourly Flow Rate, HFR	204	255			306	59
Percent Heavy Vehicles	15	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	153		31			
Peak Hour Factor, PHF	0.86		0.86			
Hourly Flow Rate, HFR	177		36			
Percent Heavy Vehicles	6		9			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			/
Lanes	1		1			
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT		L		R			
v (vph)	204		177		36			
C(m) (vph)	1125		217		767			
v/c	0.18		0.82		0.05			
95% queue length	0.66		6.02		0.15			
Control Delay	8.9		68.5		9.9			
LOS	A		F		A			
Approach Delay				58.6				
Approach LOS				F				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt B
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	143	179			187	36
Peak-Hour Factor, PHF	0.70	0.70			0.61	0.61
Peak-15 Minute Volume	51	64			77	15
Hourly Flow Rate, HFR	204	255			306	59
Percent Heavy Vehicles	15	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	153		31			
Peak Hour Factor, PHF	0.86		0.86			
Peak-15 Minute Volume	44		9			
Hourly Flow Rate, HFR	177		36			
Percent Heavy Vehicles	6		9			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?			No			
Lanes	1		1			
Configuration	L		R			

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	255	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	15		6		9			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.3		6.5		6.3			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	15		6		9			
t(f)	2.3		3.6		3.4			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)	
Arrival Type	
Effective Green, g (sec)	
Cycle Length, C (sec)	
Rp (from Exhibit 16-11)	
Proportion vehicles arriving on green P	
g(q1)	
g(q2)	
g(q)	

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	365		999		255			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	255	
Potential Capacity	767	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	767	
Probability of Queue free St.	0.95	1.00
Step 2: LT from Major St.	**4**	**1**
Conflicting Flows		365
Potential Capacity		1125
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1125
Probability of Queue free St.	1.00	0.82
Maj L-Shared Prob Q free St.		0.79
Step 3: TH from Minor St.	**8**	**11**
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.79	0.79
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	**7**	**10**
Conflicting Flows	999	
Potential Capacity	265	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.79
Maj. L, Min T Adj. Imp Factor.		0.84
Cap. Adj. factor due to Impeding mvmnt	0.82	0.80
Movement Capacity	217	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.79	0.79
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	999	
Potential Capacity	265	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.79
Maj. L, Min T Adj. Imp Factor.		0.84
Cap. Adj. factor due to Impeding mvmnt	0.82	0.80
Movement Capacity	217	

Results for Two-stage process:	
a	
y	
C t	217

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	177		36			
Movement Capacity (vph)	217		767			
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	217		767			
Volume	177		36			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT		L		R			
v (vph)	204		177		36			
C(m) (vph)	1125		217		767			
v/c	0.18		0.82		0.05			
95% queue length	0.66		6.02		0.15			
Control Delay	8.9		68.5		9.9			
LOS	A		F		A			
Approach Delay				58.6				
Approach LOS				F				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.82	1.00
v(il), Volume for stream 2 or 5	255	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.79	
d(M,LT), Delay for stream 1 or 4	8.9	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	1.9	

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	5/06/2011
Analysis Time Period	1600
Highway	X ali S.R. 15 Site 1 NB
From/To	Int S SR15/byps to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.80	
Shoulder width	6.0	ft	% Trucks and buses	12	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 106 veh/h
Opposing direction volume, Vo 103 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.923		0.923	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	144	pc/h	140	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.4	mi/h
Average travel speed, ATSd	53.1	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.988	0.988
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	134 pc/h	130 pc/h

Base percent time-spent-following,(note-4) BPTSFd	15.2	%
Adjustment for no-passing zones, fnp	39.9	
Percent time-spent-following, PTSFd	35.4	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.08	
Peak 15-min vehicle-miles of travel, VMT15	53	veh-mi
Peak-hour vehicle-miles of travel, VMT60	170	veh-mi
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.6	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.1	mi/h
Percent time-spent-following, PTSFd (from above)	35.4	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.10	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.4	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-11.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	21.5	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	X ali S.R. 15 Site 1 SB
From/To	Int S SR15/byps to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	17	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	27	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 118 veh/h
Opposing direction volume, Vo 88 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.894		0.894	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	155	pc/h	116	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSd	53.6	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.983	0.983
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	141 pc/h	105 pc/h

Base percent time-spent-following,(note-4) BPTSFd	15.9	%
Adjustment for no-passing zones, fnp	35.8	
Percent time-spent-following, PTSFd	36.4	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.09	
Peak 15-min vehicle-miles of travel, VMT15	56	veh-mi
Peak-hour vehicle-miles of travel, VMT60	189	veh-mi
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.6	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.6	mi/h
Percent time-spent-following, PTSFd (from above)	36.4	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.10	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-11.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	22.0	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	700
Highway	X ali S.R. 15 Site 2 NB
From/To	Int S SR15/byps to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.93	
Shoulder width	6.0	ft	% Trucks and buses	13	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 111 veh/h
Opposing direction volume, Vo 65 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.917		0.917	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	130	pc/h	76	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSd	54.2	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.987	0.987
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	121 pc/h	71 pc/h

Base percent time-spent-following,(note-4) BPTSFd	13.8	%
Adjustment for no-passing zones, fnp	35.0	
Percent time-spent-following, PTSFd	35.9	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.08	
Peak 15-min vehicle-miles of travel, VMT15	48	veh-mi
Peak-hour vehicle-miles of travel, VMT60	178	veh-mi
Peak 15-min total travel time, TT15	0.9	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.6	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	54.2	mi/h
Percent time-spent-following, PTSFd (from above)	35.9	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.10	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	56.5	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-11.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	21.7	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	0.8	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1700
Highway	X ali S.R. 15 Site 2 SB
From/To	Int S SR15/byps to Mitchell Av
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.85	
Shoulder width	6.0	ft	% Trucks and buses	9	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.6	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	30	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 118 veh/h
Opposing direction volume, Vo 95 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.941		0.941	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	148	pc/h	119	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSd	53.5	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.991	0.991
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	140 pc/h	113 pc/h

Base percent time-spent-following,(note-4) BPTSFd	15.8	%
Adjustment for no-passing zones, fnp	38.2	
Percent time-spent-following, PTSFd	36.9	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.09	
Peak 15-min vehicle-miles of travel, VMT15	56	veh-mi
Peak-hour vehicle-miles of travel, VMT60	189	veh-mi
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.6	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.5	mi/h
Percent time-spent-following, PTSFd (from above)	36.9	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.10	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	55.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-11.40	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	22.3	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1500
Highway	X ali S.R. 15 Site 3 NB
From/To	US72 to Int N SR15/byps
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.84	
Shoulder width	6.0	ft	% Trucks and buses	5	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	70	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 37 veh/h
Opposing direction volume, Vo 33 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.966		0.966	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	46	pc/h	41	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	53.6	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.995	0.995
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	44 pc/h	39 pc/h

Base percent time-spent-following,(note-4) BPTSFd	5.4	%
Adjustment for no-passing zones, fnp	50.7	
Percent time-spent-following, PTSFd	32.3	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.03	
Peak 15-min vehicle-miles of travel, VMT15	8	veh-mi
Peak-hour vehicle-miles of travel, VMT60	26	veh-mi
Peak 15-min total travel time, TT15	0.1	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.6	mi/h
Percent time-spent-following, PTSFd (from above)	32.3	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	57.0	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-12.30	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	19.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	0.1	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	TKK
Agency/Co.	Gresham, Smith & Partners
Date Performed	3/21/2011
Analysis Time Period	1400
Highway	X ali S.R. 15 Site 3 SB
From/To	US72 to Int N SR15/byps
Jurisdiction	MDOT
Analysis Year	2040
Description	S.R. 15 Purpose and Need

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.79	
Shoulder width	6.0	ft	% Trucks and buses	11	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.7	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	0	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	13	/mi

Analysis direction volume, Vd 37 veh/h
Opposing direction volume, Vo 28 veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.7		1.7	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor,(note-5) fHV	0.929		0.929	
Grade adj. factor,(note-1) fG	1.00		1.00	
Directional flow rate,(note-2) vi	50	pc/h	38	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed volume,(note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	60.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access points,(note-3) fA	3.3	mi/h
Free-flow speed, FFSd	56.8	mi/h
Adjustment for no-passing zones, fnp	2.8	mi/h
Average travel speed, ATSd	53.3	mi/h

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.1	1.1
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.989	0.989
Grade adjustment factor,(note-1) fG	1.00	1.00
Directional flow rate,(note-2) vi	47 pc/h	36 pc/h

Base percent time-spent-following,(note-4) BPTSFd	5.8	%
Adjustment for no-passing zones, fnp	53.1	
Percent time-spent-following, PTSFd	35.8	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.03	
Peak 15-min vehicle-miles of travel, VMT15	8	veh-mi
Peak-hour vehicle-miles of travel, VMT60	26	veh-mi
Peak 15-min total travel time, TT15	0.2	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	0.7	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	53.3	mi/h
Percent time-spent-following, PTSFd (from above)	35.8	
Level of service,(note-1) LOSd (from above)	B	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-1.00	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.08	
Average travel speed including passing lane,(note-2) ATSpl	56.7	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	13.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-12.30	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.58	
Percent time-spent-following including passing lane,(note-3) PTSFpl	21.2	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	A	
Peak 15-min total travel time, TT15	0.1	veh-h

Notes:
1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	S.R. 15 Bypass Site 1
From/To:	0.5 mi S of CR312 to US 72
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	2		2	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.5	mph	0.5	mph
Free-flow speed	59.5	mph	59.5	mph

VOLUME

Direction	1		2	
Volume, V	147	vph	161	vph
Peak-hour factor, PHF	0.78		0.85	
Peak 15-minute volume, v15	47		47	
Trucks and buses	10	%	14	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.952		0.935	
Flow rate, vp	98	pcphpl	101	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	98	pcphpl	101	pcphpl
Free-flow speed, FFS	59.5	mph	59.5	mph
Avg. passenger-car travel speed, S	59.5	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	1.6	pc/mi/ln	1.7	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1700
Highway:	S.R. 15 Bypass Site 2
From/To:	0.5 mi S of CR312 to US 72
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	2		2	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	0.5	mph	0.5	mph
Free-flow speed	59.5	mph	59.5	mph

VOLUME

Direction	1		2	
Volume, V	134	vph	168	vph
Peak-hour factor, PHF	0.76		0.85	
Peak 15-minute volume, v15	44		49	
Trucks and buses	11	%	7	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.948		0.966	
Flow rate, vp	93	pcphpl	102	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	93	pcphpl	102	pcphpl
Free-flow speed, FFS	59.5	mph	59.5	mph
Avg. passenger-car travel speed, S	59.5	mph	59.5	mph
Level of service, LOS	A		A	
Density, D	1.6	pc/mi/ln	1.7	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	S.R. 15 Bypass Site 3
From/To:	US 72 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	330	vph	295	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	98		84	
Trucks and buses	6	%	13	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.971		0.939	
Flow rate, vp	202	pcphpl	178	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	202	pcphpl	178	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	3.7	pc/mi/ln	3.2	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	S.R. 15 Bypass Site 4
From/To:	US 72 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	327	vph	317	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	97		90	
Trucks and buses	9	%	11	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.957		0.948	
Flow rate, vp	203	pcphpl	190	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	203	pcphpl	190	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	3.7	pc/mi/ln	3.5	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

Phone: Fax:
E-mail:

OPERATIONAL ANALYSIS

Analyst:	tkk
Agency/Co:	Gresham, Smith & Partners
Date:	3/22/2011
Analysis Period:	1500
Highway:	S.R. 15 Bypass Site 5
From/To:	US 72 to TN State line
Jurisdiction:	MDOT
Analysis Year:	2040
Project ID:	SR 15 Purpose and Need

FREE-FLOW SPEED

Direction	1		2	
Lane width	12.0	ft	12.0	ft
Lateral clearance:				
Right edge	6.0	ft	6.0	ft
Left edge	6.0	ft	6.0	ft
Total lateral clearance	12.0	ft	12.0	ft
Access points per mile	20		20	
Median type	Divided		Divided	
Free-flow speed:	Base		Base	
FFS or BFFS	60.0	mph	60.0	mph
Lane width adjustment, FLW	0.0	mph	0.0	mph
Lateral clearance adjustment, FLC	0.0	mph	0.0	mph
Median type adjustment, FM	0.0	mph	0.0	mph
Access points adjustment, FA	5.0	mph	5.0	mph
Free-flow speed	55.0	mph	55.0	mph

VOLUME

Direction	1		2	
Volume, V	290	vph	326	vph
Peak-hour factor, PHF	0.84		0.88	
Peak 15-minute volume, v15	86		93	
Trucks and buses	11	%	12	%
Recreational vehicles	0	%	0	%
Terrain type	Level		Level	
Grade	0.00	%	0.00	%
Segment length	0.00	mi	0.00	mi
Number of lanes	2		2	
Driver population adjustment, fP	1.00		1.00	
Trucks and buses PCE, ET	1.5		1.5	
Recreational vehicles PCE, ER	1.2		1.2	
Heavy vehicle adjustment, fHV	0.948		0.943	
Flow rate, vp	182	pcphpl	196	pcphpl

RESULTS

Direction	1		2	
Flow rate, vp	182	pcphpl	196	pcphpl
Free-flow speed, FFS	55.0	mph	55.0	mph
Avg. passenger-car travel speed, S	55.0	mph	55.0	mph
Level of service, LOS	A		A	
Density, D	3.3	pc/mi/ln	3.6	pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

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TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		87	83	51	185	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Hourly Flow Rate, HFR		102	97	65	237	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				36		58
Peak Hour Factor, PHF				0.90		0.90
Hourly Flow Rate, HFR				40		64
Percent Heavy Vehicles				8		9
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		65					104	
C(m) (vph)		1305					633	
v/c		0.05					0.16	
95% queue length		0.16					0.58	
Control Delay		7.9					11.8	
LOS		A					B	
Approach Delay							11.8	
Approach LOS							B	

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Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		87	83	51	185	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Peak-15 Minute Volume		26	24	16	59	
Hourly Flow Rate, HFR		102	97	65	237	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				36		58
Peak Hour Factor, PHF				0.90		0.90
Peak-15 Minute Volume				10		16
Hourly Flow Rate, HFR				40		64
Percent Heavy Vehicles				8		9
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		No /
RT Channelized?						
Lanes				0		0
Configuration					LR	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		237
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1				7.1		6.2
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			14				8		9
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00				0.70		0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.2				6.5		6.3
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		14				8		9
t(f)		2.3				3.6		3.4

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)	
Arrival Type	
Effective Green, g (sec)	
Cycle Length, C (sec)	
Rp (from Exhibit 16-11)	
Proportion vehicles arriving on green P	
g(q1)	
g(q2)	
g(q)	

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		199				517		237
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		237
Potential Capacity		785
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		785
Probability of Queue free St.	1.00	0.92
Step 2: LT from Major St.	4	1
Conflicting Flows	199	
Potential Capacity	1305	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1305	
Probability of Queue free St.	0.95	1.00
Maj L-Shared Prob Q free St.	0.94	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		517
Potential Capacity		508
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.94	
Maj. L, Min T Adj. Imp Factor.	0.96	
Cap. Adj. factor due to Impeding mvmnt	0.88	0.95
Movement Capacity		483

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		517
Potential Capacity		508
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.94	
Maj. L, Min T Adj. Imp Factor.	0.96	
Cap. Adj. factor due to Impeding mvmnt	0.88	0.95
Movement Capacity		483
Results for Two-stage process:		
a		
y		
C t		483

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				40		64
Movement Capacity (vph)				483		785
Shared Lane Capacity (vph)					633	

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				483		785
Volume				40		64
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh					633	
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		65					104	
C(m) (vph)		1305					633	
v/c		0.05					0.16	
95% queue length		0.16					0.58	
Control Delay		7.9					11.8	
LOS		A					B	
Approach Delay							11.8	
Approach LOS							B	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.95
v(il), Volume for stream 2 or 5		237
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.94
d(M,LT), Delay for stream 1 or 4		7.9
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.5

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		87	83	51	185	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Hourly Flow Rate, HFR		102	97	65	237	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	58		36			
Peak Hour Factor, PHF	0.90		0.90			
Hourly Flow Rate, HFR	64		40			
Percent Heavy Vehicles	9		8			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes		0	0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		65		104				
C(m) (vph)		1305		583				
v/c		0.05		0.18				
95% queue length		0.16		0.64				
Control Delay		7.9		12.5				
LOS		A		B				
Approach Delay				12.5				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
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TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		87	83	51	185	
Peak-Hour Factor, PHF		0.85	0.85	0.78	0.78	
Peak-15 Minute Volume		26	24	16	59	
Hourly Flow Rate, HFR		102	97	65	237	
Percent Heavy Vehicles		--	--	14	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	58		36			
Peak Hour Factor, PHF	0.90		0.90			
Peak-15 Minute Volume	16		10			
Hourly Flow Rate, HFR	64		40			
Percent Heavy Vehicles	9		8			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0	0				
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

		Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2	Left-Turn							
	Through							
S5	Left-Turn							
	Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		237
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1	7.1		6.2			
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			14	9		8			
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00	0.70		0.00			
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.2	6.5		6.3			
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20	3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		14	9		8			
t(f)		2.3	3.6		3.4			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		199	517		150			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	150	
Potential Capacity	881	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	881	
Probability of Queue free St.	0.95	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows	199	
Potential Capacity	1305	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1305	
Probability of Queue free St.	0.95	1.00
Maj L-Shared Prob Q free St.	0.94	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	517	
Potential Capacity	506	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.94
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.95	0.91
Movement Capacity	481	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.94	0.94
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows	517	
Potential Capacity	506	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.94
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.95	0.91
Movement Capacity	481	
Results for Two-stage process:		
a		
y		
C t	481	

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	64		40			
Movement Capacity (vph)	481		881			
Shared Lane Capacity (vph)		583				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	481		881			
Volume	64		40			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		583				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		65		104				
C(m) (vph)		1305		583				
v/c		0.05		0.18				
95% queue length		0.16		0.64				
Control Delay		7.9		12.5				
LOS		A		B				
Approach Delay				12.5				
Approach LOS				B				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.95
v(il), Volume for stream 2 or 5		237
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.94
d(M,LT), Delay for stream 1 or 4		7.9
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.5

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	38	85			198	84
Peak-Hour Factor, PHF	0.85	0.85			0.78	0.78
Hourly Flow Rate, HFR	44	99			253	107
Percent Heavy Vehicles	7	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	38		30			
Peak Hour Factor, PHF	0.88		0.88			
Hourly Flow Rate, HFR	43		34			
Percent Heavy Vehicles	7		0			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	44			77				
C(m) (vph)	1171			640				
v/c	0.04			0.12				
95% queue length	0.12			0.41				
Control Delay	8.2			11.4				
LOS	A			B				
Approach Delay				11.4				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 0715 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	38	85			198	84
Peak-Hour Factor, PHF	0.85	0.85			0.78	0.78
Peak-15 Minute Volume	11	25			63	27
Hourly Flow Rate, HFR	44	99			253	107
Percent Heavy Vehicles	7	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	38		30			
Peak Hour Factor, PHF	0.88		0.88			
Peak-15 Minute Volume	11		9			
Hourly Flow Rate, HFR	43		34			
Percent Heavy Vehicles	7		0			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0		0			
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	99	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	7		7		0			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.2		6.5		6.2			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	7		7		0			
t(f)	2.3		3.6		3.3			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)				
Arrival Type				
Effective Green, g (sec)				
Cycle Length, C (sec)				
Rp (from Exhibit 16-11)				
Proportion vehicles arriving on green P				
g(q1)				
g(q2)				
g(q)				

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	360		493		99			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	99	
Potential Capacity	962	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	962	
Probability of Queue free St.	0.96	1.00

Step 2: LT from Major St.	4	1
Conflicting Flows		360
Potential Capacity		1171
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1171
Probability of Queue free St.	1.00	0.96
Maj L-Shared Prob Q free St.		0.96

Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.96	0.96
Movement Capacity		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10
Conflicting Flows	493	
Potential Capacity	526	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.96
Maj. L, Min T Adj. Imp Factor.		0.97
Cap. Adj. factor due to Impeding mvmnt	0.96	0.94
Movement Capacity	506	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.96	0.96
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	493	
Potential Capacity	526	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.96
Maj. L, Min T Adj. Imp Factor.		0.97
Cap. Adj. factor due to Impeding mvmnt	0.96	0.94
Movement Capacity	506	

Results for Two-stage process:	
a	
y	
C t	506

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	43		34			
Movement Capacity (vph)	506		962			
Shared Lane Capacity (vph)		640				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	506		962			
Volume	43		34			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		640				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	44			77				
C(m) (vph)	1171			640				
v/c	0.04			0.12				
95% queue length	0.12			0.41				
Control Delay	8.2			11.4				
LOS	A			B				
Approach Delay				11.4				
Approach LOS				B				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.96	1.00
v(il), Volume for stream 2 or 5	99	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.96	
d(M,LT), Delay for stream 1 or 4	8.2	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	0.3	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1130 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		61	74	46	177	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Hourly Flow Rate, HFR		85	104	55	213	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				41		72
Peak Hour Factor, PHF				0.73		0.73
Hourly Flow Rate, HFR				56		98
Percent Heavy Vehicles				11		5
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		55					154	
C(m) (vph)		1397					679	
v/c		0.04					0.23	
95% queue length		0.12					0.87	
Control Delay		7.7					11.9	
LOS		A					B	
Approach Delay							11.9	
Approach LOS							B	

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
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TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1130 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		61	74	46	177	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Peak-15 Minute Volume		21	26	14	53	
Hourly Flow Rate, HFR		85	104	55	213	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				41		72
Peak Hour Factor, PHF				0.73		0.73
Peak-15 Minute Volume				14		25
Hourly Flow Rate, HFR				56		98
Percent Heavy Vehicles				11		5
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		No /
RT Channelized?						
Lanes				0	0	
Configuration					LR	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

		Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2	Left-Turn							
	Through							
S5	Left-Turn							
	Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		213
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1				7.1		6.2
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0				11		5
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00				0.70		0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.1				6.5		6.3
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0				11		5
t(f)		2.2				3.6		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		189				460		213
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		213
Potential Capacity		820
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		820
Probability of Queue free St.	1.00	0.88
Step 2: LT from Major St.	4	1
Conflicting Flows	189	
Potential Capacity	1397	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1397	
Probability of Queue free St.	0.96	1.00
Maj L-Shared Prob Q free St.	0.95	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		460
Potential Capacity		543
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.95	
Maj. L, Min T Adj. Imp Factor.	0.97	
Cap. Adj. factor due to Impeding mvmnt	0.85	0.96
Movement Capacity		522

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		460
Potential Capacity		543
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.95	
Maj. L, Min T Adj. Imp Factor.	0.97	
Cap. Adj. factor due to Impeding mvmnt	0.85	0.96
Movement Capacity		522
Results for Two-stage process:		
a		
y		
C t		522

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				56		98
Movement Capacity (vph)				522		820
Shared Lane Capacity (vph)					679	

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				522		820
Volume				56		98
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh					679	
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		55					154	
C(m) (vph)		1397					679	
v/c		0.04					0.23	
95% queue length		0.12					0.87	
Control Delay		7.7					11.9	
LOS		A					B	
Approach Delay							11.9	
Approach LOS							B	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.96
v(il), Volume for stream 2 or 5		213
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.95
d(M,LT), Delay for stream 1 or 4		7.7
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.3

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		61	74	46	177	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Hourly Flow Rate, HFR		85	104	55	213	
Percent Heavy Vehicles		--	--	12	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	72		41			
Peak Hour Factor, PHF	0.73		0.73			
Hourly Flow Rate, HFR	98		56			
Percent Heavy Vehicles	5		11			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes		0	0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		55		154				
C(m) (vph)		1327		622				
v/c		0.04		0.25				
95% queue length		0.13		0.97				
Control Delay		7.8		12.7				
LOS		A		B				
Approach Delay				12.7				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1200 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		61	74	46	177	
Peak-Hour Factor, PHF		0.71	0.71	0.83	0.83	
Peak-15 Minute Volume		21	26	14	53	
Hourly Flow Rate, HFR		85	104	55	213	
Percent Heavy Vehicles		--	--	12	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	72		41			
Peak Hour Factor, PHF	0.73		0.73			
Peak-15 Minute Volume	25		14			
Hourly Flow Rate, HFR	98		56			
Percent Heavy Vehicles	5		11			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0	0				
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		213
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)		4.1	7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)		12	5		11			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)		0.00	0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage		4.2	6.4		6.3			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20	3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		12	5		11			
t(f)		2.3	3.5		3.4			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		189	460		137			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	137	
Potential Capacity	888	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	888	
Probability of Queue free St.	0.94	1.00
Step 2: LT from Major St.	**4**	**1**
Conflicting Flows	189	
Potential Capacity	1327	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1327	
Probability of Queue free St.	0.96	1.00
Maj L-Shared Prob Q free St.	0.95	
Step 3: TH from Minor St.	**8**	**11**
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	**7**	**10**
Conflicting Flows	460	
Potential Capacity	554	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.95
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.96	0.90
Movement Capacity	531	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	460	
Potential Capacity	554	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.95
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.96	0.90
Movement Capacity	531	

Results for Two-stage process:	
a	
y	
C t	531

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	98		56			
Movement Capacity (vph)	531		888			
Shared Lane Capacity (vph)		622				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	531		888			
Volume	98		56			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		622				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		55		154				
C(m) (vph)		1327		622				
v/c		0.04		0.25				
95% queue length		0.13		0.97				
Control Delay		7.8		12.7				
LOS		A		B				
Approach Delay				12.7				
Approach LOS				B				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.96
v(il), Volume for stream 2 or 5		213
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.95
d(M,LT), Delay for stream 1 or 4		7.8
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.4

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1130 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	81			159	38
Peak-Hour Factor, PHF	0.71	0.71			0.83	0.83
Hourly Flow Rate, HFR	29	114			191	45
Percent Heavy Vehicles	19	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	64		51			
Peak Hour Factor, PHF	0.81		0.81			
Hourly Flow Rate, HFR	79		62			
Percent Heavy Vehicles	20		20			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0		0			
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	29			141				
C(m) (vph)	1238			677				
v/c	0.02			0.21				
95% queue length	0.07			0.78				
Control Delay	8.0			11.7				
LOS	A			B				
Approach Delay				11.7				
Approach LOS				B				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1130 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	21	81			159	38
Peak-Hour Factor, PHF	0.71	0.71			0.83	0.83
Peak-15 Minute Volume	7	29			48	11
Hourly Flow Rate, HFR	29	114			191	45
Percent Heavy Vehicles	19	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	64		51			
Peak Hour Factor, PHF	0.81		0.81			
Peak-15 Minute Volume	20		16			
Hourly Flow Rate, HFR	79		62			
Percent Heavy Vehicles	20		20			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0		0			
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	114	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	19		20		20			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.3		6.6		6.4			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	19		20		20			
t(f)	2.4		3.7		3.5			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	236		386		114			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	114	
Potential Capacity	892	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	892	
Probability of Queue free St.	0.93	1.00

Step 2: LT from Major St.	4	1
Conflicting Flows		236
Potential Capacity		1238
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1238
Probability of Queue free St.	1.00	0.98
Maj L-Shared Prob Q free St.		0.97

Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.97	0.97
Movement Capacity		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10
Conflicting Flows	386	
Potential Capacity	583	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.97
Maj. L, Min T Adj. Imp Factor.		0.98
Cap. Adj. factor due to Impeding mvmnt	0.98	0.91
Movement Capacity	569	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.97	0.97
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	386	
Potential Capacity	583	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.97
Maj. L, Min T Adj. Imp Factor.		0.98
Cap. Adj. factor due to Impeding mvmnt	0.98	0.91
Movement Capacity	569	

Results for Two-stage process:	
a	
y	
C t	569

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	79		62			
Movement Capacity (vph)	569		892			
Shared Lane Capacity (vph)		677				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	569		892			
Volume	79		62			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		677				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	29			141				
C(m) (vph)	1238			677				
v/c	0.02			0.21				
95% queue length	0.07			0.78				
Control Delay	8.0			11.7				
LOS	A			B				
Approach Delay				11.7				
Approach LOS				B				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.98	1.00
v(il), Volume for stream 2 or 5	114	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.97	
d(M,LT), Delay for stream 1 or 4	8.0	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	0.2	

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		111	102	58	241	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Hourly Flow Rate, HFR		158	145	95	395	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				73		75
Peak Hour Factor, PHF				0.80		0.80
Hourly Flow Rate, HFR				91		93
Percent Heavy Vehicles				0		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		95					184	
C(m) (vph)		1269					435	
v/c		0.07					0.42	
95% queue length		0.24					2.06	
Control Delay		8.1					19.2	
LOS		A					C	
Approach Delay							19.2	
Approach LOS							C	

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 EB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		111	102	58	241	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Peak-15 Minute Volume		40	36	24	99	
Hourly Flow Rate, HFR		158	145	95	395	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				73		75
Peak Hour Factor, PHF				0.80		0.80
Peak-15 Minute Volume				23		23
Hourly Flow Rate, HFR				91		93
Percent Heavy Vehicles				0		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		No /
RT Channelized?						
Lanes				0	0	
Configuration					LR	

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

		Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2	Left-Turn							
	Through							
S5	Left-Turn							
	Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		395
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1				7.1		6.2
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0				0		2
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00				0.70		0.00
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.1				6.4		6.2
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20				3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0				0		2
t(f)		2.2				3.5		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		303				815		395
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s						1500		
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows		395
Potential Capacity		654
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		654
Probability of Queue free St.	1.00	0.86
Step 2: LT from Major St.	4	1
Conflicting Flows	303	
Potential Capacity	1269	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1269	
Probability of Queue free St.	0.93	1.00
Maj L-Shared Prob Q free St.	0.90	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.90	0.90
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows		815
Potential Capacity		350
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.90	
Maj. L, Min T Adj. Imp Factor.	0.93	
Cap. Adj. factor due to Impeding mvmnt	0.79	0.93
Movement Capacity		324

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.90	0.90
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		815
Potential Capacity		350
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor	0.90	
Maj. L, Min T Adj. Imp Factor.	0.93	
Cap. Adj. factor due to Impeding mvmnt	0.79	0.93
Movement Capacity		324
Results for Two-stage process:		
a		
y		
C t		324

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				91		93
Movement Capacity (vph)				324		654
Shared Lane Capacity (vph)					435	

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep				324		654
Volume				91		93
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh					435	
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT					LR	
v (vph)		95					184	
C(m) (vph)		1269					435	
v/c		0.07					0.42	
95% queue length		0.24					2.06	
Control Delay		8.1					19.2	
LOS		A					C	
Approach Delay							19.2	
Approach LOS							C	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.93
v(il), Volume for stream 2 or 5		395
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.90
d(M,LT), Delay for stream 1 or 4		8.1
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.8

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		111	102	58	241	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Hourly Flow Rate, HFR		158	145	95	395	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	75		73			
Peak Hour Factor, PHF	0.80		0.80			
Hourly Flow Rate, HFR	93		91			
Percent Heavy Vehicles	2		0			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
Lanes	0	0				
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		95		184				
C(m) (vph)		1269		458				
v/c		0.07		0.40				
95% queue length		0.24		1.91				
Control Delay		8.1		18.0				
LOS		A		C				
Approach Delay				18.0				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst:
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 EB ramps (loop)
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		111	102	58	241	
Peak-Hour Factor, PHF		0.70	0.70	0.61	0.61	
Peak-15 Minute Volume		40	36	24	99	
Hourly Flow Rate, HFR		158	145	95	395	
Percent Heavy Vehicles		--	--	0	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes		1	0	0	1	
Configuration			TR	LT		
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	75		73			
Peak Hour Factor, PHF	0.80		0.80			
Peak-15 Minute Volume	23		23			
Hourly Flow Rate, HFR	93		91			
Percent Heavy Vehicles	2		0			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0	0				
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		395
Shared ln volume, major rt vehicles:		0
Sat flow rate, major th vehicles:		1700
Sat flow rate, major rt vehicles:		1700
Number of major street through lanes:		1

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement		1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)			4.1	7.1		6.2			
t(c,hv)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)			0	2		0			
t(c,g)				0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade				0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)			0.00	0.70		0.00			
t(c,T):	1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c)	1-stage		4.1	6.4		6.2			
	2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)		2.20	3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)		0	2		0			
t(f)		2.2	3.5		3.3			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)	
Arrival Type	
Effective Green, g (sec)	
Cycle Length, C (sec)	
Rp (from Exhibit 16-11)	
Proportion vehicles arriving on green P	
g(q1)	
g(q2)	
g(q)	

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		303	815		230			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	230	
Potential Capacity	814	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	814	
Probability of Queue free St.	0.89	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows	303	
Potential Capacity	1269	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	1269	
Probability of Queue free St.	0.93	1.00
Maj L-Shared Prob Q free St.	0.90	
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.90	0.90
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	815	
Potential Capacity	347	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.90
Maj. L, Min T Adj. Imp Factor.		0.93
Cap. Adj. factor due to Impeding mvmnt	0.93	0.82
Movement Capacity	321	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.90	0.90
Movement Capacity		

Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		

Part 3 - Single Stage		
Conflicting Flows	815	
Potential Capacity	347	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.90
Maj. L, Min T Adj. Imp Factor.		0.93
Cap. Adj. factor due to Impeding mvmnt	0.93	0.82
Movement Capacity	321	

Results for Two-stage process:	
a	
y	
C t	321

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	93		91			
Movement Capacity (vph)	321		814			
Shared Lane Capacity (vph)		458				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	321		814			
Volume	93		91			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		458				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		95		184				
C(m) (vph)		1269		458				
v/c		0.07		0.40				
95% queue length		0.24		1.91				
Control Delay		8.1		18.0				
LOS		A		C				
Approach Delay				18.0				
Approach LOS				C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.93
v(il), Volume for stream 2 or 5		395
v(i2), Volume for stream 3 or 6		0
s(il), Saturation flow rate for stream 2 or 5		1700
s(i2), Saturation flow rate for stream 3 or 6		1700
P*(oj)		0.90
d(M,LT), Delay for stream 1 or 4		8.1
N, Number of major street through lanes		1
d(rank,1) Delay for stream 2 or 5		0.8

HCS+: Unsignalized Intersections Release 5.3

TWO-WAY STOP CONTROL SUMMARY

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	34	150			232	45
Peak-Hour Factor, PHF	0.70	0.70			0.61	0.61
Hourly Flow Rate, HFR	48	214			380	73
Percent Heavy Vehicles	15	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	68		38			
Peak Hour Factor, PHF	0.86		0.86			
Hourly Flow Rate, HFR	79		44			
Percent Heavy Vehicles	6		8			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No /			/
Lanes	0	0				
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	48			123				
C(m) (vph)	1042			457				
v/c	0.05			0.27				
95% queue length	0.14			1.08				
Control Delay	8.6			15.8				
LOS	A			C				
Approach Delay				15.8				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.3

Phone: Fax:
E-Mail:

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: TKK
Agency/Co.: Gresham, Smith & Partners
Date Performed: 5/10/2011
Analysis Time Period: 1615 Alt C
Intersection: US 72 WB ramps
Jurisdiction: MDOT
Units: U. S. Customary
Analysis Year: 2040
Project ID: S.R. 15 Purpose and Need
East/West Street: U.S. 72
North/South Street: bypass S.R. 15
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	34	150			232	45
Peak-Hour Factor, PHF	0.70	0.70			0.61	0.61
Peak-15 Minute Volume	12	54			95	18
Hourly Flow Rate, HFR	48	214			380	73
Percent Heavy Vehicles	15	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	68		38			
Peak Hour Factor, PHF	0.86		0.86			
Peak-15 Minute Volume	20		11			
Hourly Flow Rate, HFR	79		44			
Percent Heavy Vehicles	6		8			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			No	/		/
RT Channelized?						
Lanes	0		0			
Configuration		LR				

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:	214	
Shared ln volume, major rt vehicles:	0	
Sat flow rate, major th vehicles:	1700	
Sat flow rate, major rt vehicles:	1700	
Number of major street through lanes:	1	

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1		7.1		6.2			
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	15		6		8			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00		0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.3		6.5		6.3			
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20		3.50		3.30			
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	15		6		8			
t(f)	2.3		3.6		3.4			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				

Total Saturation Flow Rate, s (vph)
Arrival Type
Effective Green, g (sec)
Cycle Length, C (sec)
Rp (from Exhibit 16-11)
Proportion vehicles arriving on green P
g(q1)
g(q2)
g(q)

Computation 2-Proportion of TWSC Intersection Time blocked	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p	0.000		0.000	

Computation 3-Platoon Event Periods	Result
p(2)	0.000
p(5)	0.000
p(dom)	
p(subo)	
Constrained or unconstrained?	

Proportion unblocked for minor movements, p(x)	(1) Single-stage Process	(2) Two-Stage Process Stage I	(3) Two-Stage Process Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5
Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	453		726		214			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

7	8	10	11

	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)								
s		1500						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	214	
Potential Capacity	811	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	811	
Probability of Queue free St.	0.95	1.00
Step 2: LT from Major St.	4	1
Conflicting Flows		453
Potential Capacity		1042
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity		1042
Probability of Queue free St.	1.00	0.95
Maj L-Shared Prob Q free St.		0.95
Step 3: TH from Minor St.	8	11
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Conflicting Flows	726	
Potential Capacity	386	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.95
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.95	0.91
Movement Capacity	368	

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Probability of Queue free St.		

Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.95	0.95
Movement Capacity		
Result for 2 stage process:		
a		
y		
C t		
Probability of Queue free St.	1.00	1.00
Step 4: LT from Minor St.	7	10
Part 1 - First Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 2 - Second Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor		
Cap. Adj. factor due to Impeding mvmnt		
Movement Capacity		
Part 3 - Single Stage		
Conflicting Flows	726	
Potential Capacity	386	
Pedestrian Impedance Factor	1.00	1.00
Maj. L, Min T Impedance factor		0.95
Maj. L, Min T Adj. Imp Factor.		0.96
Cap. Adj. factor due to Impeding mvmnt	0.95	0.91
Movement Capacity	368	
Results for Two-stage process:		
a		
y		
C t	368	

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)	79		44			
Movement Capacity (vph)	368		811			
Shared Lane Capacity (vph)		457				

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
C sep	368		811			
Volume	79		44			
Delay						
Q sep						
Q sep +1						
round (Qsep +1)						
n max						
C sh		457				
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config	LT			LR				
v (vph)	48			123				
C(m) (vph)	1042			457				
v/c	0.05			0.27				
95% queue length	0.14			1.08				
Control Delay	8.6			15.8				
LOS	A			C				
Approach Delay				15.8				
Approach LOS				C				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	0.95	1.00
v(il), Volume for stream 2 or 5	214	
v(i2), Volume for stream 3 or 6	0	
s(il), Saturation flow rate for stream 2 or 5	1700	
s(i2), Saturation flow rate for stream 3 or 6	1700	
P*(oj)	0.95	
d(M,LT), Delay for stream 1 or 4	8.6	
N, Number of major street through lanes	1	
d(rank,1) Delay for stream 2 or 5	0.5	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	226	46	6	218	22	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.975				0.980	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2886	0	1805	2935	1713	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2886	0	1805	2935	1713	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Heavy Vehicles (%)	26%	2%	0%	23%	5%	0%
Adj. Flow (vph)	276	56	7	245	51	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	0	7	245	60	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	226	46	6	218	22	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Hourly flow rate (vph)	276	56	7	245	51	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			332		440	166
vC1, stage 1 conf vol					304	
vC2, stage 2 conf vol					136	
vCu, unblocked vol			332		440	166
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		92	99
cM capacity (veh/h)			1239		668	856

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	184	148	7	122	122	60
Volume Left	0	0	7	0	0	51
Volume Right	0	56	0	0	0	9
cSH	1700	1700	1239	1700	1700	692
Volume to Capacity	0.11	0.09	0.01	0.07	0.07	0.09
Queue Length 95th (ft)	0	0	0	0	0	7
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.7
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			10.7
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	205	32	29	183	46	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.980				0.971	
Flt Protected			0.950		0.962	
Satd. Flow (prot)	2752	0	1752	2798	1721	0
Flt Permitted			0.950		0.962	
Satd. Flow (perm)	2752	0	1752	2798	1721	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Heavy Vehicles (%)	31%	13%	3%	29%	4%	0%
Adj. Flow (vph)	225	35	31	197	69	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	260	0	31	197	88	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	205	32	29	183	46	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Hourly flow rate (vph)	225	35	31	197	69	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			260		404	130
vC1, stage 1 conf vol					243	
vC2, stage 2 conf vol					161	
vCu, unblocked vol			260		404	130
tC, single (s)			4.2		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		90	98
cM capacity (veh/h)			1294		697	902

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	150	110	31	98	98	88
Volume Left	0	0	31	0	0	69
Volume Right	0	35	0	0	0	19
cSH	1700	1700	1294	1700	1700	734
Volume to Capacity	0.09	0.06	0.02	0.06	0.06	0.12
Queue Length 95th (ft)	0	0	2	0	0	10
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.6
Lane LOS			A			B
Approach Delay (s)	0.0		1.1			10.6
Approach LOS						B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	89	44	29	135	18	29	58	63	31	89	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			49			20			74			65
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Adj. Flow (vph)	24	99	49	33	153	20	34	68	74	40	114	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	99	49	33	153	20	34	68	74	40	114	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	15.0	50.0	50.0	15.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	47.6%	47.6%	14.3%	47.6%	47.6%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Maximum Green (s)	9.0	42.0	42.0	9.0	42.0	42.0	13.0	13.0	13.0	13.0	13.0	13.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.8	23.5	23.5	8.9	23.5	23.5	10.4	10.4	10.4	11.6	11.6	11.6
Actuated g/C Ratio	0.14	0.38	0.38	0.14	0.38	0.38	0.17	0.17	0.17	0.19	0.19	0.19
v/c Ratio	0.10	0.09	0.08	0.14	0.14	0.04	0.12	0.23	0.24	0.14	0.37	0.20
Control Delay	30.3	23.4	9.2	30.3	23.7	12.3	27.6	28.8	10.1	26.9	29.9	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	23.4	9.2	30.3	23.7	12.3	27.6	28.8	10.1	26.9	29.9	9.9
LOS	C	C	A	C	C	B	C	C	B	C	C	A
Approach Delay		20.3			23.7			20.7			23.4	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	8	14	0	11	22	0	10	21	0	12	35	0
Queue Length 95th (ft)	32	42	27	39	58	17	36	61	31	38	84	24
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	259	2033	1066	264	1986	1038	382	390	390	352	374	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.05	0.05	0.13	0.08	0.02	0.09	0.17	0.19	0.11	0.30	0.17

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 61.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 40.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	89	44	29	135	18	29	58	63	31	89	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Adj. Flow (vph)	24	99	49	33	153	20	34	68	74	40	114	65
RTOR Reduction (vph)	0	0	34	0	0	14	0	0	65	0	0	57
Lane Group Flow (vph)	24	99	15	33	153	6	34	68	9	40	114	8
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4
Actuated Green, G (s)	2.9	20.9	20.9	2.9	20.9	20.9	7.9	7.9	7.9	8.9	8.9	8.9
Effective Green, g (s)	2.9	20.9	20.9	2.9	20.9	20.9	7.9	7.9	7.9	8.9	8.9	8.9
Actuated g/C Ratio	0.04	0.30	0.30	0.04	0.30	0.30	0.12	0.12	0.12	0.13	0.13	0.13
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	70	873	452	71	852	443	194	199	169	202	214	187
v/s Ratio Prot	0.01	0.03		c0.02	c0.05		0.02	c0.04		0.03	c0.07	
v/s Ratio Perm			0.01			0.00			0.01			0.01
v/c Ratio	0.34	0.11	0.03	0.46	0.18	0.01	0.18	0.34	0.05	0.20	0.53	0.05
Uniform Delay, d1	31.9	17.2	16.8	32.1	17.5	16.7	27.4	28.0	27.0	26.7	27.9	26.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	0.1	0.1	9.7	0.2	0.0	0.9	2.1	0.3	1.0	4.6	0.2
Delay (s)	38.0	17.3	16.8	41.8	17.8	16.7	28.3	30.1	27.3	27.7	32.5	26.3
Level of Service	D	B	B	D	B	B	C	C	C	C	C	C
Approach Delay (s)		20.0			21.5			28.6			29.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	28.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	201	1	34	200	1	4	1	28	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.884				
Flt Protected	0.950			0.950				0.994				
Satd. Flow (prot)	1805	2959	1615	1703	2900	0	0	1575	0	0	950	0
Flt Permitted	0.950			0.950				0.994				
Satd. Flow (perm)	1805	2959	1615	1703	2900	0	0	1575	0	0	950	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Heavy Vehicles (%)	0%	22%	0%	6%	24%	100%	0%	0%	7%	0%	100%	0%
Adj. Flow (vph)	1	221	1	35	208	1	5	1	37	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	221	1	35	209	0	0	43	0	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	201	1	34	200	1	4	1	28	0	1	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Hourly flow rate (vph)	1	221	1	35	208	1	5	1	37	0	4	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	209			222			400	503	110	430	504	105
vC1, stage 1 conf vol							223	223		280	280	
vC2, stage 2 conf vol							177	280		151	224	
vCu, unblocked vol	209			222			400	503	110	430	504	105
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	8.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	7.5	
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	5.0	3.3
p0 queue free %	100			97			99	100	96	100	99	100
cM capacity (veh/h)	1373			1316			674	597	906	626	409	936

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	110	110	1	35	139	70	44	4
Volume Left	1	0	0	0	35	0	0	5	0
Volume Right	0	0	0	1	0	0	1	37	0
cSH	1373	1700	1700	1700	1316	1700	1700	857	409
Volume to Capacity	0.00	0.06	0.06	0.00	0.03	0.08	0.04	0.05	0.01
Queue Length 95th (ft)	0	0	0	0	2	0	0	4	1
Control Delay (s)	7.6	0.0	0.0	0.0	7.8	0.0	0.0	9.4	13.9
Lane LOS	A				A			A	B
Approach Delay (s)	0.0				1.1			9.4	13.9
Approach LOS								A	B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	14	14	32	30	10	18	116	19	18	159	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.982			0.979			0.989	
Flt Protected		0.986			0.978		0.950			0.950		
Satd. Flow (prot)	0	1783	0	0	1777	0	1805	1713	0	1703	1731	0
Flt Permitted		0.986			0.978		0.950			0.950		
Satd. Flow (perm)	0	1783	0	0	1777	0	1805	1713	0	1703	1731	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	3%	0%	10%	0%	10%	0%	6%	8%	15%
Adj. Flow (vph)	20	24	24	46	43	14	21	133	22	21	185	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	103	0	21	155	0	21	200	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	14	14	32	30	10	18	116	19	18	159	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Hourly flow rate (vph)	20	24	24	46	43	14	21	133	22	21	185	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	445	431	192	448	427	144	200			155		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	419	405	160	422	401	144	168			155		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	96	95	97	90	92	98	99			99		
cM capacity (veh/h)	481	510	869	483	512	882	1388			1401		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	68	104	21	155	21	200
Volume Left	20	46	21	0	21	0
Volume Right	24	14	0	22	0	15
cSH	584	529	1388	1700	1401	1700
Volume to Capacity	0.12	0.20	0.01	0.09	0.01	0.12
Queue Length 95th (ft)	10	18	1	0	1	0
Control Delay (s)	12.0	13.5	7.6	0.0	7.6	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.0	13.5	0.9		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1	7	6	3	15	4	196	3	1	186	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.912			0.915			0.998			0.994	
Flt Protected		0.988			0.987			0.999				
Satd. Flow (prot)	0	1712	0	0	1716	0	0	1735	0	0	1724	0
Flt Permitted		0.988			0.987			0.999				
Satd. Flow (perm)	0	1712	0	0	1716	0	0	1735	0	0	1724	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	9%	33%	0%	10%	0%
Adj. Flow (vph)	5	2	13	9	4	22	5	255	4	1	278	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	35	0	0	264	0	0	292	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	1	7	6	3	15	4	196	3	1	186	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Hourly flow rate (vph)	5	2	13	9	4	22	5	255	4	1	278	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	579	556	284	568	561	256	291			258		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579	556	284	568	561	256	291			258		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	98	98	99	97	100			100		
cM capacity (veh/h)	412	440	759	426	437	787	1282			1318		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	20	36	264	293
Volume Left	5	9	5	1
Volume Right	13	22	4	13
cSH	586	600	1282	1318
Volume to Capacity	0.03	0.06	0.00	0.00
Queue Length 95th (ft)	3	5	0	0
Control Delay (s)	11.4	11.4	0.2	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	11.4	11.4	0.2	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	22	16	4	52	40	25	111	9	58	99	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.963			0.944			0.992			0.975	
Flt Protected		0.983			0.998			0.991			0.985	
Satd. Flow (prot)	0	1770	0	0	1731	0	0	1775	0	0	1701	0
Flt Permitted		0.983			0.998			0.991			0.985	
Satd. Flow (perm)	0	1770	0	0	1731	0	0	1775	0	0	1701	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Heavy Vehicles (%)	0%	0%	6%	0%	4%	3%	8%	5%	0%	2%	12%	3%
Adj. Flow (vph)	32	35	25	6	73	56	29	129	10	81	138	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	135	0	0	168	0	0	270	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	22	16	4	52	40	25	111	9	58	99	37
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Hourly flow rate (vph)	32	35	25	6	73	56	29	129	10	81	138	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	610	522	163	560	542	134	189			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	610	522	163	560	542	134	189			140		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	90	92	97	99	82	94	98			94		
cM capacity (veh/h)	313	427	871	379	411	912	1350			1444		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	135	169	269
Volume Left	32	6	29	81
Volume Right	25	56	10	51
cSH	433	530	1350	1444
Volume to Capacity	0.21	0.26	0.02	0.06
Queue Length 95th (ft)	20	25	2	4
Control Delay (s)	15.5	14.1	1.5	2.6
Lane LOS	C	B	A	A
Approach Delay (s)	15.5	14.1	1.5	2.6
Approach LOS	C	B		

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	255	17	2	235	12	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991				0.957	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	2868	0	1805	2935	1758	0
Flt Permitted			0.950		0.967	
Satd. Flow (perm)	2868	0	1805	2935	1758	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Heavy Vehicles (%)	26%	6%	0%	23%	0%	0%
Adj. Flow (vph)	297	20	3	297	19	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	3	297	28	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	255	17	2	235	12	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Hourly flow rate (vph)	297	20	3	297	19	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			316		460	158
vC1, stage 1 conf vol					306	
vC2, stage 2 conf vol					154	
vCu, unblocked vol			316		460	158
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1255		675	865

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	198	119	3	149	149	28
Volume Left	0	0	3	0	0	19
Volume Right	0	20	0	0	0	9
cSH	1700	1700	1255	1700	1700	729
Volume to Capacity	0.12	0.07	0.00	0.09	0.09	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.1
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			10.1
Approach LOS						B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	241	23	12	202	43	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.987				0.981	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2761	0	1805	2843	1757	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2761	0	1805	2843	1757	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Heavy Vehicles (%)	31%	9%	0%	27%	2%	0%
Adj. Flow (vph)	268	26	14	235	68	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	294	0	14	235	79	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	241	23	12	202	43	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Hourly flow rate (vph)	268	26	14	235	68	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			293		426	147
vC1, stage 1 conf vol					281	
vC2, stage 2 conf vol					145	
vCu, unblocked vol			293		426	147
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		90	99
cM capacity (veh/h)			1280		688	880

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	179	115	14	117	117	79
Volume Left	0	0	14	0	0	68
Volume Right	0	26	0	0	0	11
cSH	1700	1700	1280	1700	1700	710
Volume to Capacity	0.11	0.07	0.01	0.07	0.07	0.11
Queue Length 95th (ft)	0	0	1	0	0	9
Control Delay (s)	0.0	0.0	7.8	0.0	0.0	10.7
Lane LOS			A			B
Approach Delay (s)	0.0		0.4			10.7
Approach LOS						B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	149	55	49	162	31	16	47	56	28	68	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			38			79			28
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Adj. Flow (vph)	34	204	75	60	200	38	23	66	79	34	82	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	204	75	60	200	38	23	66	79	34	82	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	15.0	50.0	50.0	15.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	47.6%	47.6%	14.3%	47.6%	47.6%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Maximum Green (s)	9.0	42.0	42.0	9.0	42.0	42.0	13.0	13.0	13.0	13.0	13.0	13.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	9.0	24.3	24.3	9.2	26.9	26.9	10.6	10.6	10.6	11.0	11.0	11.0
Actuated g/C Ratio	0.14	0.38	0.38	0.14	0.42	0.42	0.16	0.16	0.16	0.17	0.17	0.17
v/c Ratio	0.15	0.20	0.12	0.28	0.17	0.07	0.09	0.25	0.26	0.13	0.29	0.10
Control Delay	32.3	24.8	7.8	34.3	22.3	9.8	29.0	30.7	10.2	28.9	31.1	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	24.8	7.8	34.3	22.3	9.8	29.0	30.7	10.2	28.9	31.1	12.5
LOS	C	C	A	C	C	A	C	C	B	C	C	B
Approach Delay		21.6			23.1			20.9			26.9	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	14	42	0	25	29	0	9	27	0	14	34	0
Queue Length 95th (ft)	34	61	21	58	66	20	24	50	21	36	70	19
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	243	1893	1072	227	1923	907	330	353	378	344	356	360
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.11	0.07	0.26	0.10	0.04	0.07	0.19	0.21	0.10	0.23	0.08

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 64.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.29
Intersection Signal Delay: 22.8 Intersection LOS: C
Intersection Capacity Utilization 43.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	149	55	49	162	31	16	47	56	28	68	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Peak-hour factor, PHF	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Adj. Flow (vph)	34	204	75	60	200	38	23	66	79	34	82	28
RTOR Reduction (vph)	0	0	51	0	0	25	0	0	70	0	0	25
Lane Group Flow (vph)	34	204	24	60	200	13	23	66	9	34	82	3
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	3.0	22.6	22.6	4.6	24.2	24.2	8.0	8.0	8.0	8.3	8.3	8.3
Effective Green, g (s)	3.0	22.6	22.6	4.6	24.2	24.2	8.0	8.0	8.0	8.3	8.3	8.3
Actuated g/C Ratio	0.04	0.32	0.32	0.06	0.34	0.34	0.11	0.11	0.11	0.12	0.12	0.12
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	68	878	486	97	954	444	170	182	163	184	190	180
v/s Ratio Prot	0.02	c0.07		c0.04	0.07		0.02	c0.04		0.02	c0.05	
v/s Ratio Perm			0.02			0.01			0.01			0.00
v/c Ratio	0.50	0.23	0.05	0.62	0.21	0.03	0.14	0.36	0.05	0.18	0.43	0.02
Uniform Delay, d1	33.5	18.0	17.0	32.6	16.8	15.8	28.6	29.4	28.4	28.5	29.4	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.6	0.3	0.1	15.8	0.2	0.1	0.8	2.6	0.3	1.0	3.3	0.1
Delay (s)	45.1	18.3	17.1	48.4	17.1	15.9	29.4	32.0	28.7	29.6	32.7	28.1
Level of Service	D	B	B	D	B	B	C	C	C	C	C	C
Approach Delay (s)		20.9			23.2			30.1			31.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	28.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	233	4	23	235	1	6	1	17	0	4	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.904			0.903	
Flt Protected	0.950			0.950				0.988				
Satd. Flow (prot)	1444	2865	1292	1597	2890	0	0	1628	0	0	1716	0
Flt Permitted	0.950			0.950				0.988				
Satd. Flow (perm)	1444	2865	1292	1597	2890	0	0	1628	0	0	1716	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Heavy Vehicles (%)	25%	26%	25%	13%	25%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	281	5	29	301	1	7	1	20	0	13	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	281	5	29	302	0	0	28	0	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 26.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	233	4	23	235	1	6	1	17	0	4	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Hourly flow rate (vph)	5	281	5	29	301	1	7	1	20	0	12	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	303			286			537	652	140	531	656	151
vC1, stage 1 conf vol							290	290		361	361	
vC2, stage 2 conf vol							247	362		170	295	
vCu, unblocked vol	303			286			537	652	140	531	656	151
tC, single (s)	4.6			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.5			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			99	100	98	100	98	96
cM capacity (veh/h)	1105			1197			537	537	888	570	530	874

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	5	140	140	5	29	201	102	28	44
Volume Left	5	0	0	0	29	0	0	7	0
Volume Right	0	0	0	5	0	0	1	20	31
cSH	1105	1700	1700	1700	1197	1700	1700	746	737
Volume to Capacity	0.00	0.08	0.08	0.00	0.02	0.12	0.06	0.04	0.06
Queue Length 95th (ft)	0	0	0	0	2	0	0	3	5
Control Delay (s)	8.3	0.0	0.0	0.0	8.1	0.0	0.0	10.0	10.2
Lane LOS	A				A			B	B
Approach Delay (s)	0.1				0.7			10.0	10.2
Approach LOS								B	B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	7	30	23	14	10	30	125	24	15	134	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.912			0.971			0.976			0.991	
Flt Protected		0.990			0.976		0.950			0.950		
Satd. Flow (prot)	0	1547	0	0	1801	0	1687	1580	0	1805	1584	0
Flt Permitted		0.990			0.976		0.950			0.950		
Satd. Flow (perm)	0	1547	0	0	1801	0	1687	1580	0	1805	1584	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	33%	0%	7%	0%	0%	0%	7%	20%	4%	0%	18%	33%
Adj. Flow (vph)	10	8	34	27	17	12	36	149	29	17	156	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	56	0	36	178	0	17	166	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	7	30	23	14	10	30	125	24	15	134	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Hourly flow rate (vph)	10	8	34	27	17	12	36	149	29	17	156	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	436	445	161	463	436	163	166			177		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	436	445	161	463	436	163	166			177		
tC, single (s)	7.4	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	98	98	96	94	97	99	97			99		
cM capacity (veh/h)	449	492	871	472	497	887	1382			1411		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	52	56	36	177	17	166
Volume Left	10	27	36	0	17	0
Volume Right	34	12	0	29	0	10
cSH	669	533	1382	1700	1411	1700
Volume to Capacity	0.08	0.10	0.03	0.10	0.01	0.10
Queue Length 95th (ft)	6	9	2	0	1	0
Control Delay (s)	10.8	12.5	7.7	0.0	7.6	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.8	12.5	1.3		0.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	0	15	6	3	13	8	169	2	2	157	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904			0.921			0.998			0.993	
Flt Protected		0.986			0.986			0.998			0.999	
Satd. Flow (prot)	0	1694	0	0	1725	0	0	1663	0	0	1652	0
Flt Permitted		0.986			0.986			0.998			0.999	
Satd. Flow (perm)	0	1694	0	0	1725	0	0	1663	0	0	1652	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	50%	0%	15%	0%
Adj. Flow (vph)	8	0	20	10	5	21	11	225	3	2	165	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	36	0	0	239	0	0	176	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	15	6	3	13	8	169	2	2	157	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Hourly flow rate (vph)	8	0	20	10	5	21	11	225	3	2	165	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	446	424	170	442	427	227	175			228		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446	424	170	442	427	227	175			228		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	98	98	99	97	99			100		
cM capacity (veh/h)	505	520	879	513	518	818	1414			1352		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	28	36	239	177
Volume Left	8	10	11	2
Volume Right	20	21	3	9
cSH	726	659	1414	1352
Volume to Capacity	0.04	0.05	0.01	0.00
Queue Length 95th (ft)	3	4	1	0
Control Delay (s)	10.2	10.8	0.4	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	10.2	10.8	0.4	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	16	10	11	9	50	10	132	9	51	112	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.963			0.903			0.992			0.991	
Flt Protected		0.986			0.992			0.997			0.986	
Satd. Flow (prot)	0	1804	0	0	1702	0	0	1687	0	0	1704	0
Flt Permitted		0.986			0.992			0.997			0.986	
Satd. Flow (perm)	0	1804	0	0	1702	0	0	1687	0	0	1704	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	14%	0%
Adj. Flow (vph)	20	30	19	13	10	57	12	161	11	55	120	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	79	0	0	184	0	0	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 32.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	16	10	11	9	50	10	132	9	51	112	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Hourly flow rate (vph)	20	30	19	12	10	57	12	161	11	55	120	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	489	433	127	461	434	166	133			172		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	489	433	127	461	434	166	133			172		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	94	98	97	98	94	99			96		
cM capacity (veh/h)	437	495	929	464	494	883	1464			1417		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	69	80	184	188
Volume Left	20	12	12	55
Volume Right	19	57	11	13
cSH	542	710	1464	1417
Volume to Capacity	0.13	0.11	0.01	0.04
Queue Length 95th (ft)	11	9	1	3
Control Delay (s)	12.6	10.7	0.6	2.5
Lane LOS	B	B	A	A
Approach Delay (s)	12.6	10.7	0.6	2.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	272	17	24	233	16	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991				0.962	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	3187	0	1736	3034	1764	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	3187	0	1736	3034	1764	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Heavy Vehicles (%)	13%	0%	4%	19%	0%	0%
Adj. Flow (vph)	289	18	28	268	23	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	307	0	28	268	32	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	272	17	24	233	16	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Hourly flow rate (vph)	289	18	28	268	23	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			307		487	154
vC1, stage 1 conf vol					298	
vC2, stage 2 conf vol					189	
vCu, unblocked vol			307		487	154
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	99
cM capacity (veh/h)			1236		661	871

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	193	115	28	134	134	32
Volume Left	0	0	28	0	0	23
Volume Right	0	18	0	0	0	9
cSH	1700	1700	1236	1700	1700	708
Volume to Capacity	0.11	0.07	0.02	0.08	0.08	0.05
Queue Length 95th (ft)	0	0	2	0	0	4
Control Delay (s)	0.0	0.0	8.0	0.0	0.0	10.3
Lane LOS			A			B
Approach Delay (s)	0.0		0.7			10.3
Approach LOS						B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	247	26	19	222	41	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.986				0.975	
Flt Protected			0.950		0.961	
Satd. Flow (prot)	3128	0	1805	3008	1710	0
Flt Permitted			0.950		0.961	
Satd. Flow (perm)	3128	0	1805	3008	1710	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Heavy Vehicles (%)	14%	12%	0%	20%	5%	0%
Adj. Flow (vph)	257	27	21	249	49	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	284	0	21	249	60	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	247	26	19	222	41	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Hourly flow rate (vph)	257	27	21	249	49	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			284		438	142
vC1, stage 1 conf vol					271	
vC2, stage 2 conf vol					167	
vCu, unblocked vol			284		438	142
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		93	99
cM capacity (veh/h)			1289		676	886

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	172	113	21	125	125	60
Volume Left	0	0	21	0	0	49
Volume Right	0	27	0	0	0	11
cSH	1700	1700	1289	1700	1700	706
Volume to Capacity	0.10	0.07	0.02	0.07	0.07	0.09
Queue Length 95th (ft)	0	0	1	0	0	7
Control Delay (s)	0.0	0.0	7.8	0.0	0.0	10.6
Lane LOS			A			B
Approach Delay (s)	0.0		0.6			10.6
Approach LOS						B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

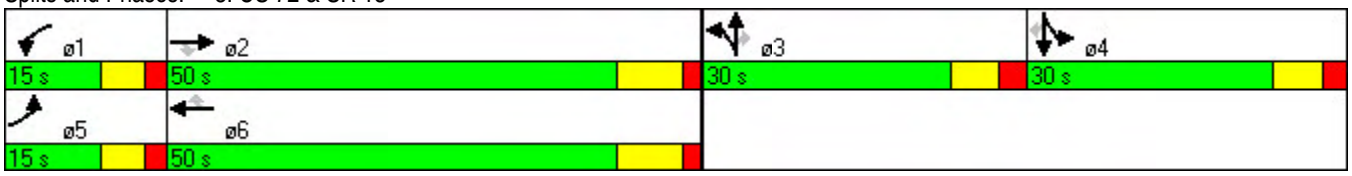
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	165	57	52	175	23	26	90	78	35	105	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			71			27			111			44
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Adj. Flow (vph)	55	206	71	60	203	27	37	129	111	57	172	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	206	71	60	203	27	37	129	111	57	172	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	15.0	50.0	50.0	15.0	50.0	50.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	12.0%	40.0%	40.0%	12.0%	40.0%	40.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%
Maximum Green (s)	9.0	42.0	42.0	9.0	42.0	42.0	23.0	23.0	23.0	23.0	23.0	23.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.9	15.9	15.9	8.9	16.0	16.0	13.5	13.5	13.5	15.2	15.2	15.2
Actuated g/C Ratio	0.11	0.20	0.20	0.11	0.20	0.20	0.17	0.17	0.17	0.19	0.19	0.19
v/c Ratio	0.27	0.33	0.19	0.31	0.34	0.08	0.14	0.44	0.31	0.16	0.51	0.13
Control Delay	40.1	31.6	9.8	41.2	31.8	13.0	31.5	36.7	9.3	29.7	35.9	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	31.6	9.8	41.2	31.8	13.0	31.5	36.7	9.3	29.7	35.9	10.3
LOS	D	C	A	D	C	B	C	D	A	C	D	B
Approach Delay		28.3			32.0			25.1			30.5	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	26	48	0	28	47	0	16	59	0	24	79	0
Queue Length 95th (ft)	61	80	28	72	85	21	35	93	21	40	97	11
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	213	1687	905	201	1632	829	474	517	546	545	526	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.12	0.08	0.30	0.12	0.03	0.08	0.25	0.20	0.10	0.33	0.09

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 78.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 29.0 — Intersection LOS: C
Intersection Capacity Utilization 43.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	165	57	52	175	23	26	90	78	35	105	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Peak-hour factor, PHF	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Adj. Flow (vph)	55	206	71	60	203	27	37	129	111	57	172	44
RTOR Reduction (vph)	0	0	57	0	0	22	0	0	92	0	0	36
Lane Group Flow (vph)	55	206	14	60	203	5	37	129	19	57	172	8
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	6.7	15.9	15.9	6.8	16.0	16.0	13.5	13.5	13.5	15.2	15.2	15.2
Effective Green, g (s)	6.7	15.9	15.9	6.8	16.0	16.0	13.5	13.5	13.5	15.2	15.2	15.2
Actuated g/C Ratio	0.08	0.20	0.20	0.09	0.20	0.20	0.17	0.17	0.17	0.19	0.19	0.19
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	152	613	317	146	596	299	267	291	264	346	334	289
v/s Ratio Prot	0.03	0.07		c0.04	c0.07		0.02	c0.08		0.03	c0.10	
v/s Ratio Perm			0.01			0.00			0.01			0.01
v/c Ratio	0.36	0.34	0.04	0.41	0.34	0.02	0.14	0.44	0.07	0.16	0.51	0.03
Uniform Delay, d1	34.3	27.2	25.6	34.4	27.2	25.4	28.0	29.6	27.7	26.8	28.8	26.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.7	0.1	3.9	0.7	0.1	0.5	2.2	0.2	0.5	2.7	0.1
Delay (s)	37.4	27.9	25.7	38.3	27.9	25.5	28.5	31.8	27.9	27.3	31.5	26.2
Level of Service	D	C	C	D	C	C	C	C	C	C	C	C
Approach Delay (s)		29.0			29.8			29.8			29.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	314	0	36	247	0	5	0	28	0	4	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.885				
Flt Protected	0.950			0.950				0.993				
Satd. Flow (prot)	1805	3167	1900	1805	3059	0	0	1575	0	0	1900	0
Flt Permitted	0.950			0.950				0.993				
Satd. Flow (perm)	1805	3167	1900	1805	3059	0	0	1575	0	0	1900	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Heavy Vehicles (%)	0%	14%	0%	0%	18%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	1	345	0	44	301	0	8	0	47	0	8	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	345	0	44	301	0	0	55	0	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	314	0	36	247	0	5	0	28	0	4	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Hourly flow rate (vph)	1	345	0	44	301	0	8	0	47	0	8	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	301			345			590	736	173	611	736	151
vC1, stage 1 conf vol							347	347		389	389	
vC2, stage 2 conf vol							242	389		222	347	
vCu, unblocked vol	301			345			590	736	173	611	736	151
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			96			98	100	94	100	98	100
cM capacity (veh/h)	1271			1225			562	507	826	520	494	875

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	173	173	0	44	201	100	56	8
Volume Left	1	0	0	0	44	0	0	8	0
Volume Right	0	0	0	0	0	0	0	47	0
cSH	1271	1700	1700	1700	1225	1700	1700	771	494
Volume to Capacity	0.00	0.10	0.10	0.00	0.04	0.12	0.06	0.07	0.02
Queue Length 95th (ft)	0	0	0	0	3	0	0	6	1
Control Delay (s)	7.8	0.0	0.0	0.0	8.0	0.0	0.0	10.0	12.4
Lane LOS	A				A			B	B
Approach Delay (s)	0.0				1.0			10.0	12.4
Approach LOS								B	B

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	12	35	20	18	11	32	164	24	15	171	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.931			0.970			0.981			0.994	
Flt Protected		0.984			0.980		0.950			0.950		
Satd. Flow (prot)	0	1670	0	0	1806	0	1805	1771	0	1805	1834	0
Flt Permitted		0.984			0.980		0.950			0.950		
Satd. Flow (perm)	0	1670	0	0	1806	0	1805	1771	0	1805	1834	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	9%	8%	0%	0%	0%	0%	0%	6%	0%	0%	2%	25%
Adj. Flow (vph)	28	15	45	24	22	13	41	208	30	16	180	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	0	0	59	0	41	238	0	16	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	22	12	35	20	18	11	32	164	24	15	171	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Hourly flow rate (vph)	28	15	45	24	22	13	41	208	30	16	180	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	529	535	184	568	524	223	188			238		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	529	535	184	568	524	223	188			238		
tC, single (s)	7.2	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	95	94	95	98	97			99		
cM capacity (veh/h)	413	425	863	390	442	822	1398			1341		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	60	41	238	16	188
Volume Left	28	24	41	0	16	0
Volume Right	45	13	0	30	0	8
cSH	565	465	1398	1700	1341	1700
Volume to Capacity	0.16	0.13	0.03	0.14	0.01	0.11
Queue Length 95th (ft)	14	11	2	0	1	0
Control Delay (s)	12.5	13.9	7.7	0.0	7.7	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.5	13.9	1.1		0.6	
Approach LOS	B	B				

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	0	37	2	2	18	20	216	2	1	176	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.895			0.893			0.999			0.996	
Flt Protected		0.989			0.995			0.996				
Satd. Flow (prot)	0	1682	0	0	1688	0	0	1778	0	0	1726	0
Flt Permitted		0.989			0.995			0.996				
Satd. Flow (perm)	0	1682	0	0	1688	0	0	1778	0	0	1726	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	10%	0%
Adj. Flow (vph)	16	0	55	3	3	23	26	281	3	1	200	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	29	0	0	310	0	0	207	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	11	0	37	2	2	18	20	216	2	1	176	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	16	0	55	3	3	23	26	281	3	1	200	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	563	540	203	594	542	282	206			283		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	563	540	203	594	542	282	206			283		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	93	99	99	97	98			100		
cM capacity (veh/h)	419	442	843	386	442	762	1378			1291		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	72	28	309	207
Volume Left	16	3	26	1
Volume Right	55	23	3	6
cSH	684	660	1378	1291
Volume to Capacity	0.10	0.04	0.02	0.00
Queue Length 95th (ft)	9	3	1	0
Control Delay (s)	10.9	10.7	0.8	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	10.9	10.7	0.8	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	11	10	6	14	45	8	161	6	63	136	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.949			0.906			0.995			0.994	
Flt Protected		0.989			0.996			0.998			0.985	
Satd. Flow (prot)	0	1783	0	0	1689	0	0	1804	0	0	1824	0
Flt Permitted		0.989			0.996			0.998			0.985	
Satd. Flow (perm)	0	1783	0	0	1689	0	0	1804	0	0	1824	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	17%	0%	0%	0%	5%	0%	0%	3%	0%
Adj. Flow (vph)	14	26	24	7	17	56	10	209	8	72	155	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	0	0	80	0	0	227	0	0	237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	11	10	6	14	45	8	161	6	63	136	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	14	26	24	7	17	56	10	209	8	72	155	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	601	541	160	574	542	213	165			217		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	601	541	160	574	542	213	165			217		
tC, single (s)	7.1	6.5	6.2	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	96	94	97	98	96	93	99			95		
cM capacity (veh/h)	359	424	891	362	424	832	1426			1365		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	64	80	227	236
Volume Left	14	7	10	72
Volume Right	24	56	8	10
cSH	501	627	1426	1365
Volume to Capacity	0.13	0.13	0.01	0.05
Queue Length 95th (ft)	11	11	1	4
Control Delay (s)	13.2	11.6	0.4	2.7
Lane LOS	B	B	A	A
Approach Delay (s)	13.2	11.6	0.4	2.7
Approach LOS	B	B		

Intersection Summary				
Average Delay		4.1		
Intersection Capacity Utilization		34.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	462	61	8	446	29	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.983				0.979	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2880	0	1805	2935	1711	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2880	0	1805	2935	1711	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Heavy Vehicles (%)	26%	2%	0%	23%	5%	0%
Adj. Flow (vph)	563	74	9	501	67	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	637	0	9	501	79	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	462	61	8	446	29	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Hourly flow rate (vph)	563	74	9	501	67	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			638		869	319
vC1, stage 1 conf vol					601	
vC2, stage 2 conf vol					269	
vCu, unblocked vol			638		869	319
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	98
cM capacity (veh/h)			956		461	683

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	376	262	9	251	251	79
Volume Left	0	0	9	0	0	67
Volume Right	0	74	0	0	0	12
cSH	1700	1700	956	1700	1700	484
Volume to Capacity	0.22	0.15	0.01	0.15	0.15	0.16
Queue Length 95th (ft)	0	0	1	0	0	14
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	13.9
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			13.9
Approach LOS						B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	420	43	39	374	61	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.986				0.971	
Flt Protected			0.950		0.962	
Satd. Flow (prot)	2752	0	1752	2798	1721	0
Flt Permitted			0.950		0.962	
Satd. Flow (perm)	2752	0	1752	2798	1721	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Heavy Vehicles (%)	31%	13%	3%	29%	4%	0%
Adj. Flow (vph)	462	47	42	402	91	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	509	0	42	402	116	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	420	43	39	374	61	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Hourly flow rate (vph)	462	47	42	402	91	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			509		770	254
vC1, stage 1 conf vol					485	
vC2, stage 2 conf vol					285	
vCu, unblocked vol			509		770	254
tC, single (s)			4.2		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		82	97
cM capacity (veh/h)			1045		511	751

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	308	201	42	201	201	116
Volume Left	0	0	42	0	0	91
Volume Right	0	47	0	0	0	25
cSH	1700	1700	1045	1700	1700	549
Volume to Capacity	0.18	0.12	0.04	0.12	0.12	0.21
Queue Length 95th (ft)	0	0	3	0	0	20
Control Delay (s)	0.0	0.0	8.6	0.0	0.0	13.3
Lane LOS			A			B
Approach Delay (s)	0.0		0.8			13.3
Approach LOS						B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.950			0.950			0.660			0.698		
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1172	1727	1468	1143	1652	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			27			152			87
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	20.0	39.0	39.0	26.0	45.0	45.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	19.0%	37.1%	37.1%	24.8%	42.9%	42.9%	38.1%	38.1%	38.1%	38.1%	38.1%	38.1%
Maximum Green (s)	14.0	31.0	31.0	20.0	37.0	37.0	33.0	33.0	33.0	33.0	33.0	33.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	9.0	16.1	16.1	10.0	19.6	19.6	12.6	12.6	12.6	12.8	12.8	12.8
Actuated g/C Ratio	0.17	0.30	0.30	0.19	0.37	0.37	0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.11	0.23	0.19	0.21	0.30	0.05	0.25	0.22	0.33	0.19	0.38	0.21
Control Delay	24.6	18.4	6.2	23.7	15.7	8.2	21.7	20.4	6.5	21.0	22.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	18.4	6.2	23.7	15.7	8.2	21.7	20.4	6.5	21.0	22.6	6.9
LOS	C	B	A	C	B	A	C	C	A	C	C	A
Approach Delay		15.3			16.5			13.9			17.7	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	10	29	0	21	27	0	20	27	0	15	46	0
Queue Length 95th (ft)	34	62	33	55	87	16	51	60	34	37	85	22
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	459	1760	949	669	2051	1074	766	1129	1013	747	1080	973
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.11	0.11	0.10	0.15	0.03	0.09	0.08	0.15	0.07	0.14	0.09

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 53.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 15.9 Intersection LOS: B
Intersection Capacity Utilization 44.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.66	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1172	1727	1468	1143	1652	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
RTOR Reduction (vph)	0	0	70	0	0	18	0	0	118	0	0	68
Lane Group Flow (vph)	32	202	30	67	314	9	69	91	34	53	153	19
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	3.2	17.2	17.2	5.6	19.6	19.6	12.6	12.6	12.6	12.6	12.6	12.6
Effective Green, g (s)	3.2	17.2	17.2	5.6	19.6	19.6	12.6	12.6	12.6	12.6	12.6	12.6
Actuated g/C Ratio	0.06	0.30	0.30	0.10	0.35	0.35	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	94	874	452	168	972	506	262	386	328	255	369	322
v/s Ratio Prot	0.02	0.07		c0.04	c0.11			0.05			c0.09	
v/s Ratio Perm			0.02			0.01	0.06		0.02	0.05		0.01
v/c Ratio	0.34	0.23	0.07	0.40	0.32	0.02	0.26	0.24	0.10	0.21	0.41	0.06
Uniform Delay, d1	25.6	14.7	13.9	23.8	13.5	12.1	18.1	18.0	17.4	17.8	18.7	17.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.3	0.1	3.2	0.4	0.0	1.1	0.7	0.3	0.8	1.6	0.2
Delay (s)	30.1	14.9	14.0	27.1	13.9	12.1	19.2	18.6	17.7	18.7	20.3	17.4
Level of Service	C	B	B	C	B	B	B	B	B	B	C	B
Approach Delay (s)		16.1			16.0			18.3			19.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	411	1	45	409	1	5	1	37	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.884				
Flt Protected	0.950			0.950				0.994				
Satd. Flow (prot)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Flt Permitted	0.950			0.950				0.994				
Satd. Flow (perm)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Heavy Vehicles (%)	0%	22%	0%	6%	24%	100%	0%	0%	7%	0%	100%	0%
Adj. Flow (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	452	1	47	427	0	0	57	0	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 31.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	411	1	45	409	1	5	1	37	0	1	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Hourly flow rate (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	427			453			763	975	226	798	975	214
vC1, stage 1 conf vol							454	454		520	520	
vC2, stage 2 conf vol							309	521		278	455	
vCu, unblocked vol	427			453			763	975	226	798	975	214
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	8.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	7.5	
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	5.0	3.3
p0 queue free %	100			96			99	100	94	100	98	100
cM capacity (veh/h)	1143			1076			479	428	762	431	254	798

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	226	226	1	47	284	143	57	4
Volume Left	1	0	0	0	47	0	0	7	0
Volume Right	0	0	0	1	0	0	1	49	0
cSH	1143	1700	1700	1700	1076	1700	1700	701	254
Volume to Capacity	0.00	0.13	0.13	0.00	0.04	0.17	0.08	0.08	0.02
Queue Length 95th (ft)	0	0	0	0	3	0	0	7	1
Control Delay (s)	8.2	0.0	0.0	0.0	8.5	0.0	0.0	10.6	19.4
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			10.6	19.4
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	19	19	43	40	20	24	155	25	37	212	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959			0.974			0.979			0.983	
Flt Protected		0.981			0.980		0.950			0.950		
Satd. Flow (prot)	0	1787	0	0	1757	0	1805	1713	0	1703	1717	0
Flt Permitted		0.981			0.980		0.950			0.950		
Satd. Flow (perm)	0	1787	0	0	1757	0	1805	1713	0	1703	1717	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	3%	0%	10%	0%	10%	0%	6%	8%	15%
Adj. Flow (vph)	42	32	32	62	58	29	28	178	29	43	247	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	149	0	28	207	0	43	278	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 33.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	19	19	43	40	20	24	155	25	37	212	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Hourly flow rate (vph)	42	32	32	62	58	29	28	178	29	43	247	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	640	610	262	629	612	193	278			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	619	589	233	608	591	193	249			207		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	87	92	96	82	85	97	98			97		
cM capacity (veh/h)	324	392	792	343	391	829	1298			1341		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	107	149	28	207	43	278
Volume Left	42	62	28	0	43	0
Volume Right	32	29	0	29	0	31
cSH	421	409	1298	1700	1341	1700
Volume to Capacity	0.25	0.37	0.02	0.12	0.03	0.16
Queue Length 95th (ft)	25	41	2	0	2	0
Control Delay (s)	16.4	18.8	7.8	0.0	7.8	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.4	18.8	0.9		1.0	
Approach LOS	C	C				

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	1	9	8	4	20	5	262	4	1	248	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.914			0.916			0.998			0.994	
Flt Protected		0.986			0.988			0.999				
Satd. Flow (prot)	0	1712	0	0	1720	0	0	1735	0	0	1725	0
Flt Permitted		0.986			0.988			0.999				
Satd. Flow (perm)	0	1712	0	0	1720	0	0	1735	0	0	1725	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	9%	33%	0%	10%	0%
Adj. Flow (vph)	7	2	16	12	6	30	6	340	5	1	370	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	48	0	0	351	0	0	389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	1	9	8	4	20	5	262	4	1	248	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Hourly flow rate (vph)	7	2	16	12	6	30	6	340	5	1	370	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	771	741	379	755	747	343	388			345		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	771	741	379	755	747	343	388			345		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	96	98	96	99			100		
cM capacity (veh/h)	300	344	672	317	342	704	1181			1225		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	25	48	352	390
Volume Left	7	12	6	1
Volume Right	16	30	5	18
cSH	473	489	1181	1225
Volume to Capacity	0.05	0.10	0.01	0.00
Queue Length 95th (ft)	4	8	0	0
Control Delay (s)	13.0	13.1	0.2	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	13.0	13.1	0.2	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	29	21	5	69	53	33	148	12	77	132	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.963			0.943			0.992			0.974	
Flt Protected		0.983			0.998			0.992			0.985	
Satd. Flow (prot)	0	1770	0	0	1729	0	0	1777	0	0	1699	0
Flt Permitted		0.983			0.998			0.992			0.985	
Satd. Flow (perm)	0	1770	0	0	1729	0	0	1777	0	0	1699	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Heavy Vehicles (%)	0%	0%	6%	0%	4%	3%	8%	5%	0%	2%	12%	3%
Adj. Flow (vph)	43	46	33	7	97	75	38	172	14	107	183	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	0	0	179	0	0	224	0	0	358	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	29	21	5	69	53	33	148	12	77	132	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Hourly flow rate (vph)	43	46	33	7	97	75	38	172	14	107	183	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	810	694	217	743	721	179	251			186		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	810	694	217	743	721	179	251			186		
tC, single (s)	7.1	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	78	86	96	97	69	91	97			92		
cM capacity (veh/h)	193	330	812	263	314	861	1280			1388		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	122	179	224	358
Volume Left	43	7	38	107
Volume Right	33	75	14	68
cSH	304	423	1280	1388
Volume to Capacity	0.40	0.42	0.03	0.08
Queue Length 95th (ft)	47	51	2	6
Control Delay (s)	24.6	19.6	1.6	2.8
Lane LOS	C	C	A	A
Approach Delay (s)	24.6	19.6	1.6	2.8
Approach LOS	C	C		

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			27			152			87
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	15.0	50.0	50.0	15.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	47.6%	47.6%	14.3%	47.6%	47.6%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Maximum Green (s)	9.0	42.0	42.0	9.0	42.0	42.0	13.0	13.0	13.0	13.0	13.0	13.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.6	16.8	16.8	8.8	22.7	22.7	10.9	10.9	10.9	12.5	12.5	12.5
Actuated g/C Ratio	0.12	0.23	0.23	0.12	0.31	0.31	0.15	0.15	0.15	0.17	0.17	0.17
v/c Ratio	0.17	0.31	0.24	0.33	0.37	0.06	0.28	0.36	0.44	0.20	0.55	0.28
Control Delay	35.0	27.0	7.6	38.1	23.6	10.3	33.5	35.0	10.3	31.6	39.1	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	27.0	7.6	38.1	23.6	10.3	33.5	35.0	10.3	31.6	39.1	10.2
LOS	C	C	A	D	C	B	C	C	B	C	D	B
Approach Delay		22.0			25.1			22.6			29.2	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	14	43	0	30	52	0	30	39	0	22	67	0
Queue Length 95th (ft)	42	75	37	71	110	19	66	82	43	49	116	28
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	206	1662	902	210	1624	856	303	310	389	279	297	330
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.12	0.11	0.32	0.19	0.03	0.23	0.29	0.39	0.19	0.52	0.26

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 74
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 24.6 Intersection LOS: C
Intersection Capacity Utilization 44.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
RTOR Reduction (vph)	0	0	75	0	0	19	0	0	131	0	0	73
Lane Group Flow (vph)	32	202	25	67	314	8	69	91	21	53	153	14
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4
Actuated Green, G (s)	3.3	19.2	19.2	6.8	22.7	22.7	10.9	10.9	10.9	12.5	12.5	12.5
Effective Green, g (s)	3.3	19.2	19.2	6.8	22.7	22.7	10.9	10.9	10.9	12.5	12.5	12.5
Actuated g/C Ratio	0.04	0.25	0.25	0.09	0.29	0.29	0.14	0.14	0.14	0.16	0.16	0.16
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	71	711	368	148	821	427	238	243	207	251	267	233
v/s Ratio Prot	0.02	0.07		c0.04	c0.11		0.04	c0.05		0.03	c0.09	
v/s Ratio Perm			0.02			0.01			0.01			0.01
v/c Ratio	0.45	0.28	0.07	0.45	0.38	0.02	0.29	0.37	0.10	0.21	0.57	0.06
Uniform Delay, d1	36.2	23.5	22.3	33.5	21.8	19.4	29.8	30.2	29.0	28.2	30.0	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.2	0.5	0.2	4.5	0.6	0.0	1.4	2.0	0.5	0.9	4.7	0.2
Delay (s)	45.4	24.0	22.4	38.1	22.4	19.5	31.2	32.2	29.5	29.1	34.7	27.7
Level of Service	D	C	C	D	C	B	C	C	C	C	C	C
Approach Delay (s)		25.6			24.8			30.6			31.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	77.4	Sum of lost time (s)	28.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	522	23	3	481	16	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.994				0.956	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	2867	0	1805	2935	1756	0
Flt Permitted			0.950		0.967	
Satd. Flow (perm)	2867	0	1805	2935	1756	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Heavy Vehicles (%)	26%	6%	0%	23%	0%	0%
Adj. Flow (vph)	607	27	4	609	25	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	634	0	4	609	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	522	23	3	481	16	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Hourly flow rate (vph)	607	27	4	609	25	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			634		932	317
vC1, stage 1 conf vol					620	
vC2, stage 2 conf vol					312	
vCu, unblocked vol			634		932	317
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	98
cM capacity (veh/h)			959		457	685

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	405	229	4	304	304	38
Volume Left	0	0	4	0	0	25
Volume Right	0	27	0	0	0	12
cSH	1700	1700	959	1700	1700	514
Volume to Capacity	0.24	0.13	0.00	0.18	0.18	0.07
Queue Length 95th (ft)	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	12.6
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			12.6
Approach LOS						B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	493	31	16	413	57	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991				0.982	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2758	0	1805	2843	1759	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2758	0	1805	2843	1759	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Heavy Vehicles (%)	31%	9%	0%	27%	2%	0%
Adj. Flow (vph)	548	34	19	480	90	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	582	0	19	480	104	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	493	31	16	413	57	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Hourly flow rate (vph)	548	34	19	480	90	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked					0.96	
vC, conflicting volume			582		842	291
vC1, stage 1 conf vol					565	
vC2, stage 2 conf vol					277	
vCu, unblocked vol			582		751	291
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		82	98
cM capacity (veh/h)			1002		496	711

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	365	217	19	240	240	105
Volume Left	0	0	19	0	0	90
Volume Right	0	34	0	0	0	14
cSH	1700	1700	1002	1700	1700	518
Volume to Capacity	0.21	0.13	0.02	0.14	0.14	0.20
Queue Length 95th (ft)	0	0	1	0	0	19
Control Delay (s)	0.0	0.0	8.7	0.0	0.0	13.7
Lane LOS			A			B
Approach Delay (s)	0.0		0.3			13.7
Approach LOS						B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.950			0.950			0.686			0.699		
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1095	1624	1455	1165	1638	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			51			162			37
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	17.0	44.0	44.0	31.0	58.0	58.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	16.2%	41.9%	41.9%	29.5%	55.2%	55.2%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%
Maximum Green (s)	11.0	36.0	36.0	25.0	50.0	50.0	23.0	23.0	23.0	23.0	23.0	23.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	9.6	20.1	20.1	13.3	26.4	26.4	12.2	12.2	12.2	12.3	12.3	12.3
Actuated g/C Ratio	0.15	0.32	0.32	0.21	0.42	0.42	0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.18	0.47	0.26	0.39	0.35	0.09	0.22	0.28	0.39	0.20	0.34	0.11
Control Delay	30.8	21.6	5.2	29.2	15.3	5.2	28.5	28.3	8.5	28.0	29.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	21.6	5.2	29.2	15.3	5.2	28.5	28.3	8.5	28.0	29.3	10.7
LOS	C	C	A	C	B	A	C	C	A	C	C	B
Approach Delay		18.2			17.4			17.5			25.4	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	16	71	0	42	63	0	15	30	0	15	38	0
Queue Length 95th (ft)	42	104	21	93	97	17	39	63	22	45	89	21
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	302	1700	1001	639	2219	1044	428	635	668	456	640	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.25	0.15	0.19	0.18	0.05	0.11	0.14	0.24	0.10	0.17	0.06

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 63.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 18.6 — Intersection LOS: B
Intersection Capacity Utilization 44.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1095	1624	1455	1165	1638	1553
Peak-hour factor, PHF	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
RTOR Reduction (vph)	0	0	104	0	0	30	0	0	132	0	0	30
Lane Group Flow (vph)	45	418	51	123	410	21	46	89	30	45	110	7
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.3	21.4	21.4	10.4	26.5	26.5	12.2	12.2	12.2	12.2	12.2	12.2
Effective Green, g (s)	5.3	21.4	21.4	10.4	26.5	26.5	12.2	12.2	12.2	12.2	12.2	12.2
Actuated g/C Ratio	0.08	0.33	0.33	0.16	0.41	0.41	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	131	914	506	241	1150	535	206	305	273	219	307	291
v/s Ratio Prot	0.03	c0.15		c0.08	c0.15			0.05			c0.07	
v/s Ratio Perm			0.03			0.02	0.04		0.02	0.04		0.00
v/c Ratio	0.34	0.46	0.10	0.51	0.36	0.04	0.22	0.29	0.11	0.21	0.36	0.02
Uniform Delay, d1	28.2	17.2	15.1	25.0	13.3	11.6	22.4	22.7	21.9	22.3	23.0	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.8	0.2	3.6	0.4	0.1	1.2	1.1	0.4	1.0	1.5	0.1
Delay (s)	31.5	18.0	15.3	28.6	13.7	11.6	23.5	23.8	22.3	23.3	24.5	21.6
Level of Service	C	B	B	C	B	B	C	C	C	C	C	C
Approach Delay (s)		18.3			16.7			22.9			23.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	477	5	31	481	1	8	1	23	0	5	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.901			0.903	
Flt Protected	0.950			0.950				0.988				
Satd. Flow (prot)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Flt Permitted	0.950			0.950				0.988				
Satd. Flow (perm)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Heavy Vehicles (%)	25%	26%	25%	13%	25%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	575	6	40	618	0	0	37	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	477	5	31	481	1	8	1	23	0	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Hourly flow rate (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	618			581			1023	1284	287	1024	1290	309
vC1, stage 1 conf vol							587	587		697	697	
vC2, stage 2 conf vol							436	697		327	593	
vCu, unblocked vol	618			581			1023	1284	287	1024	1290	309
tC, single (s)	4.6			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.5			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			97	100	96	100	95	94
cM capacity (veh/h)	817			917			334	345	715	347	337	693

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	6	287	287	6	40	411	207	37	56
Volume Left	6	0	0	0	40	0	0	9	0
Volume Right	0	0	0	6	0	0	1	27	41
cSH	817	1700	1700	1700	917	1700	1700	542	536
Volume to Capacity	0.01	0.17	0.17	0.00	0.04	0.24	0.12	0.07	0.11
Queue Length 95th (ft)	1	0	0	0	3	0	0	6	9
Control Delay (s)	9.4	0.0	0.0	0.0	9.1	0.0	0.0	12.1	12.5
Lane LOS	A				A			B	B
Approach Delay (s)	0.1				0.6			12.1	12.5
Approach LOS								B	B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	9	40	31	19	20	40	167	32	31	179	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.961			0.976			0.986	
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1525	0	0	1786	0	1687	1579	0	1805	1569	0
Flt Permitted		0.987			0.978		0.950			0.950		
Satd. Flow (perm)	0	1525	0	0	1786	0	1687	1579	0	1805	1569	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	33%	0%	7%	0%	0%	0%	7%	20%	4%	0%	18%	33%
Adj. Flow (vph)	20	10	45	37	23	24	48	199	38	36	208	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	84	0	48	237	0	36	229	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	9	40	31	19	20	40	167	32	31	179	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Hourly flow rate (vph)	20	10	45	37	23	24	48	199	38	36	208	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	620	623	219	644	614	218	229			237		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	620	623	219	644	614	218	229			237		
tC, single (s)	7.4	6.5	6.3	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	94	97	94	89	94	97	96			97		
cM capacity (veh/h)	318	380	809	342	384	827	1310			1342		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	76	83	48	237	36	229
Volume Left	20	37	48	0	36	0
Volume Right	45	24	0	38	0	21
cSH	516	426	1310	1700	1342	1700
Volume to Capacity	0.15	0.20	0.04	0.14	0.03	0.13
Queue Length 95th (ft)	13	18	3	0	2	0
Control Delay (s)	13.2	15.5	7.9	0.0	7.8	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	13.2	15.5	1.3		1.1	
Approach LOS	B	C				

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	20	8	4	17	11	226	3	3	210	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.904			0.921			0.998			0.993	
Flt Protected		0.986			0.987			0.998			0.999	
Satd. Flow (prot)	0	1694	0	0	1727	0	0	1663	0	0	1654	0
Flt Permitted		0.986			0.987			0.998			0.999	
Satd. Flow (perm)	0	1694	0	0	1727	0	0	1663	0	0	1654	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	50%	0%	15%	0%
Adj. Flow (vph)	11	0	27	13	7	28	15	301	4	3	221	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	48	0	0	320	0	0	237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	20	8	4	17	11	226	3	3	210	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	27	13	7	28	15	301	4	3	221	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	597	568	227	593	573	303	234			305		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	597	568	227	593	573	303	234			305		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	97	97	98	96	99			100		
cM capacity (veh/h)	393	429	817	402	427	741	1346			1267		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	37	48	320	237
Volume Left	11	13	15	3
Volume Right	27	28	4	13
cSH	624	556	1346	1267
Volume to Capacity	0.06	0.09	0.01	0.00
Queue Length 95th (ft)	5	7	1	0
Control Delay (s)	11.1	12.1	0.5	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	11.1	12.1	0.5	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	21	13	15	12	67	13	176	12	68	149	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964			0.904			0.992			0.991	
Flt Protected		0.985			0.992			0.997			0.986	
Satd. Flow (prot)	0	1804	0	0	1704	0	0	1687	0	0	1704	0
Flt Permitted		0.985			0.992			0.997			0.986	
Satd. Flow (perm)	0	1804	0	0	1704	0	0	1687	0	0	1704	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	14%	0%
Adj. Flow (vph)	28	39	24	17	14	76	16	215	15	73	160	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	91	0	0	107	0	0	246	0	0	250	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	21	13	15	12	67	13	176	12	68	149	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Hourly flow rate (vph)	28	39	24	17	14	76	16	215	15	73	160	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	652	576	169	612	577	222	177			229		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	652	576	169	612	577	222	177			229		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	90	97	95	97	91	99			95		
cM capacity (veh/h)	323	403	880	350	402	823	1411			1351		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	107	245	251
Volume Left	28	17	16	73
Volume Right	24	76	15	17
cSH	432	610	1411	1351
Volume to Capacity	0.21	0.18	0.01	0.05
Queue Length 95th (ft)	20	16	1	4
Control Delay (s)	15.5	12.2	0.6	2.6
Lane LOS	C	B	A	A
Approach Delay (s)	15.5	12.2	0.6	2.6
Approach LOS	C	B		

Intersection Summary				
Average Delay		5.1		
Intersection Capacity Utilization		39.6%	ICU Level of Service	A
Analysis Period (min)		15		

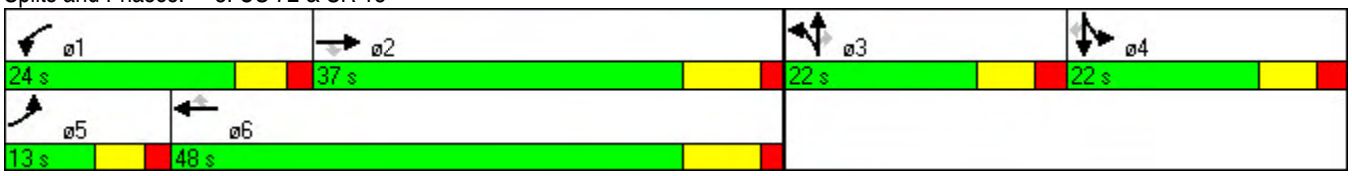
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			51			162			37
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	13.0	37.0	37.0	24.0	48.0	48.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	12.4%	35.2%	35.2%	22.9%	45.7%	45.7%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Maximum Green (s)	7.0	29.0	29.0	18.0	40.0	40.0	15.0	15.0	15.0	15.0	15.0	15.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.0	23.4	23.4	14.9	32.0	32.0	12.7	12.7	12.7	13.4	13.4	13.4
Actuated g/C Ratio	0.10	0.28	0.28	0.18	0.39	0.39	0.15	0.15	0.15	0.16	0.16	0.16
v/c Ratio	0.29	0.54	0.28	0.46	0.38	0.09	0.20	0.36	0.45	0.18	0.42	0.13
Control Delay	49.3	32.4	6.7	43.2	22.2	6.6	40.3	43.1	11.5	39.4	44.0	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	32.4	6.7	43.2	22.2	6.6	40.3	43.1	11.5	39.4	44.0	14.2
LOS	D	C	A	D	C	A	D	D	B	D	D	B
Approach Delay		27.2			25.3			25.4			37.1	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	25	112	0	65	95	0	24	47	0	23	58	0
Queue Length 95th (ft)	54	137	23	119	127	20	49	81	24	56	114	26
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	156	1112	709	374	1532	736	314	337	430	328	339	351
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.38	0.22	0.33	0.27	0.07	0.15	0.26	0.38	0.14	0.32	0.11

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 83.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 27.3 — Intersection LOS: C
Intersection Capacity Utilization 44.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Peak-hour factor, PHF	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
RTOR Reduction (vph)	0	0	111	0	0	32	0	0	138	0	0	33
Lane Group Flow (vph)	45	418	44	123	410	19	46	89	24	45	110	4
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	3.5	24.6	24.6	10.9	32.0	32.0	12.7	12.7	12.7	9.6	9.6	9.6
Effective Green, g (s)	3.5	24.6	24.6	10.9	32.0	32.0	12.7	12.7	12.7	9.6	9.6	9.6
Actuated g/C Ratio	0.04	0.29	0.29	0.13	0.37	0.37	0.15	0.15	0.15	0.11	0.11	0.11
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	66	796	441	191	1052	490	225	240	215	177	183	174
v/s Ratio Prot	0.03	c0.15		c0.08	0.15		0.03	c0.05		0.03	c0.07	
v/s Ratio Perm			0.03			0.01			0.02			0.00
v/c Ratio	0.68	0.53	0.10	0.64	0.39	0.04	0.20	0.37	0.11	0.25	0.60	0.02
Uniform Delay, d1	40.6	25.7	22.5	35.6	19.7	17.1	32.1	32.9	31.7	34.8	36.3	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.4	1.2	0.2	9.8	0.5	0.1	0.9	2.0	0.5	1.6	7.9	0.1
Delay (s)	72.0	26.9	22.7	45.4	20.2	17.2	33.1	35.0	32.1	36.4	44.2	34.0
Level of Service	E	C	C	D	C	B	C	C	C	D	D	C
Approach Delay (s)		29.1			25.3			33.1			40.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	28.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	557	23	32	477	21	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.994				0.961	
Flt Protected			0.950		0.966	
Satd. Flow (prot)	3190	0	1736	3034	1764	0
Flt Permitted			0.950		0.966	
Satd. Flow (perm)	3190	0	1736	3034	1764	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Heavy Vehicles (%)	13%	0%	4%	19%	0%	0%
Adj. Flow (vph)	593	24	37	548	30	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	617	0	37	548	42	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	557	23	32	477	21	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Hourly flow rate (vph)	593	24	37	548	30	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			617		952	309
vC1, stage 1 conf vol					605	
vC2, stage 2 conf vol					348	
vCu, unblocked vol			617		952	309
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		93	98
cM capacity (veh/h)			945		451	693

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	395	222	37	274	274	42
Volume Left	0	0	37	0	0	30
Volume Right	0	24	0	0	0	12
cSH	1700	1700	945	1700	1700	499
Volume to Capacity	0.23	0.13	0.04	0.16	0.16	0.08
Queue Length 95th (ft)	0	0	3	0	0	7
Control Delay (s)	0.0	0.0	9.0	0.0	0.0	12.9
Lane LOS			A			B
Approach Delay (s)	0.0		0.6			12.9
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	505	35	25	454	55	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.990				0.976	
Flt Protected			0.950		0.960	
Satd. Flow (prot)	3139	0	1805	3008	1710	0
Flt Permitted			0.950		0.960	
Satd. Flow (perm)	3139	0	1805	3008	1710	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Heavy Vehicles (%)	14%	12%	0%	20%	5%	0%
Adj. Flow (vph)	526	36	28	510	66	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	562	0	28	510	80	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	505	35	25	454	55	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Hourly flow rate (vph)	526	36	28	510	66	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked					0.94	
vC, conflicting volume			562		856	281
vC1, stage 1 conf vol					544	
vC2, stage 2 conf vol					311	
vCu, unblocked vol			562		723	281
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		87	98
cM capacity (veh/h)			1019		498	722

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	351	212	28	255	255	81
Volume Left	0	0	28	0	0	66
Volume Right	0	36	0	0	0	14
cSH	1700	1700	1019	1700	1700	527
Volume to Capacity	0.21	0.12	0.03	0.15	0.15	0.15
Queue Length 95th (ft)	0	0	2	0	0	13
Control Delay (s)	0.0	0.0	8.6	0.0	0.0	13.1
Lane LOS			A			B
Approach Delay (s)	0.0		0.5			13.1
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.950			0.950			0.597			0.649		
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	986	1712	1553	1233	1743	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			36			229			59
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	20.0	42.0	42.0	27.0	49.0	49.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	18.2%	38.2%	38.2%	24.5%	44.5%	44.5%	37.3%	37.3%	37.3%	37.3%	37.3%	37.3%
Maximum Green (s)	14.0	34.0	34.0	21.0	41.0	41.0	34.0	34.0	34.0	34.0	34.0	34.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	10.8	20.1	20.1	13.1	22.0	22.0	17.2	17.2	17.2	17.2	17.2	17.2
Actuated g/C Ratio	0.16	0.30	0.30	0.19	0.32	0.32	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.26	0.47	0.26	0.38	0.43	0.07	0.30	0.39	0.41	0.25	0.52	0.14
Control Delay	32.8	24.0	5.8	32.0	21.6	7.5	27.8	27.2	6.3	26.0	29.5	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	24.0	5.8	32.0	21.6	7.5	27.8	27.2	6.3	26.0	29.5	8.0
LOS	C	C	A	C	C	A	C	C	A	C	C	A
Approach Delay		20.9			22.9			17.3			25.3	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	28	78	0	46	74	0	26	61	0	26	85	0
Queue Length 95th (ft)	70	129	30	109	130	19	56	104	18	47	115	11
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	399	1644	918	565	1918	973	564	979	986	705	996	888
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.26	0.16	0.22	0.22	0.04	0.13	0.17	0.23	0.11	0.23	0.07

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 68.1
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 21.4 Intersection LOS: C
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	987	1712	1553	1233	1743	1509
Peak-hour factor, PHF	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
RTOR Reduction (vph)	0	0	103	0	0	24	0	0	171	0	0	44
Lane Group Flow (vph)	74	422	43	123	416	12	76	171	58	77	230	15
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	8.2	20.1	20.1	10.1	22.0	22.0	17.2	17.2	17.2	17.2	17.2	17.2
Effective Green, g (s)	8.2	20.1	20.1	10.1	22.0	22.0	17.2	17.2	17.2	17.2	17.2	17.2
Actuated g/C Ratio	0.12	0.29	0.29	0.15	0.32	0.32	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	216	899	465	251	952	477	248	431	391	310	438	379
v/s Ratio Prot	0.04	0.14		c0.07	c0.14			0.10			c0.13	
v/s Ratio Perm			0.03			0.01	0.08		0.04	0.06		0.01
v/c Ratio	0.34	0.47	0.09	0.49	0.44	0.02	0.31	0.40	0.15	0.25	0.53	0.04
Uniform Delay, d1	27.6	19.8	17.5	26.8	18.3	15.9	20.8	21.3	19.9	20.4	22.1	19.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.8	0.2	3.1	0.7	0.0	1.5	1.3	0.4	0.9	2.2	0.1
Delay (s)	29.6	20.6	17.7	29.9	19.0	15.9	22.2	22.5	20.3	21.3	24.2	19.4
Level of Service	C	C	B	C	B	B	C	C	C	C	C	B
Approach Delay (s)		21.0			21.1			21.4			22.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	643	0	48	505	0	7	0	37	0	5	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.887				
Flt Protected	0.950			0.950				0.992				
Satd. Flow (prot)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Flt Permitted	0.950			0.950				0.992				
Satd. Flow (perm)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Heavy Vehicles (%)	0%	14%	0%	0%	18%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	707	0	59	616	0	0	75	0	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	643	0	48	505	0	7	0	37	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Hourly flow rate (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	616			707			1139	1442	353	1151	1442	308
vC1, stage 1 conf vol							709	709		733	733	
vC2, stage 2 conf vol							430	733		418	709	
vCu, unblocked vol	616			707			1139	1442	353	1151	1442	308
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			94			96	100	90	100	97	100
cM capacity (veh/h)	974			901			336	313	629	303	295	694

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	353	353	0	59	411	205	75	10
Volume Left	1	0	0	0	59	0	0	12	0
Volume Right	0	0	0	0	0	0	0	63	0
cSH	974	1700	1700	1700	901	1700	1700	552	295
Volume to Capacity	0.00	0.21	0.21	0.00	0.06	0.24	0.12	0.14	0.03
Queue Length 95th (ft)	0	0	0	0	5	0	0	12	3
Control Delay (s)	8.7	0.0	0.0	0.0	9.3	0.0	0.0	12.5	17.6
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			12.5	17.6
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	16	47	27	24	23	43	219	32	31	228	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.942			0.958			0.981			0.990	
Flt Protected		0.980			0.982		0.950			0.950		
Satd. Flow (prot)	0	1671	0	0	1787	0	1805	1771	0	1805	1817	0
Flt Permitted		0.980			0.982		0.950			0.950		
Satd. Flow (perm)	0	1671	0	0	1787	0	1805	1771	0	1805	1817	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	9%	8%	0%	0%	0%	0%	0%	6%	0%	0%	2%	25%
Adj. Flow (vph)	58	21	60	33	29	28	54	277	41	33	240	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	90	0	54	318	0	33	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	45	16	47	27	24	23	43	219	32	31	228	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Hourly flow rate (vph)	58	21	60	33	29	28	54	277	41	33	240	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	742	740	248	782	728	297	257			318		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	742	740	248	782	728	297	257			318		
tC, single (s)	7.2	6.6	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	79	93	92	87	91	96	96			97		
cM capacity (veh/h)	275	315	795	262	329	747	1320			1254		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	138	90	54	318	33	257
Volume Left	58	33	54	0	33	0
Volume Right	60	28	0	41	0	17
cSH	395	358	1320	1700	1254	1700
Volume to Capacity	0.35	0.25	0.04	0.19	0.03	0.15
Queue Length 95th (ft)	39	25	3	0	2	0
Control Delay (s)	19.0	18.4	7.8	0.0	7.9	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	19.0	18.4	1.1		0.9	
Approach LOS	C	C				

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	0	49	3	3	24	27	288	3	1	235	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.896			0.893			0.999			0.996	
Flt Protected		0.989			0.995			0.996				
Satd. Flow (prot)	0	1684	0	0	1688	0	0	1778	0	0	1725	0
Flt Permitted		0.989			0.995			0.996				
Satd. Flow (perm)	0	1684	0	0	1688	0	0	1778	0	0	1725	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	10%	0%
Adj. Flow (vph)	22	0	73	4	4	30	35	374	4	1	267	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	95	0	0	38	0	0	413	0	0	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 46.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	49	3	3	24	27	288	3	1	235	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	22	0	73	4	4	30	35	374	4	1	267	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	752	721	271	793	723	376	275			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	752	721	271	793	723	376	275			378		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	91	99	99	95	97			100		
cM capacity (veh/h)	305	346	773	274	345	675	1300			1192		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	96	38	413	276
Volume Left	22	4	35	1
Volume Right	73	30	4	8
cSH	568	543	1300	1192
Volume to Capacity	0.17	0.07	0.03	0.00
Queue Length 95th (ft)	15	6	2	0
Control Delay (s)	12.6	12.1	0.9	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	12.6	12.1	0.9	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	15	13	8	19	60	11	215	8	84	181	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.951			0.907			0.996			0.994	
Flt Protected		0.989			0.995			0.998			0.985	
Satd. Flow (prot)	0	1787	0	0	1688	0	0	1805	0	0	1824	0
Flt Permitted		0.989			0.995			0.998			0.985	
Satd. Flow (perm)	0	1787	0	0	1688	0	0	1805	0	0	1824	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	17%	0%	0%	0%	5%	0%	0%	3%	0%
Adj. Flow (vph)	19	36	31	10	23	74	14	279	10	95	206	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	107	0	0	303	0	0	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 43.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	15	13	8	19	60	11	215	8	84	181	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	19	36	31	10	23	74	14	279	10	95	206	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	802	722	212	765	723	284	219			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	802	722	212	765	723	284	219			290		
tC, single (s)	7.1	6.5	6.2	7.3	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	92	89	96	96	93	90	99			93		
cM capacity (veh/h)	243	326	833	250	325	759	1362			1284		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	86	107	304	315
Volume Left	19	10	14	95
Volume Right	31	74	10	14
cSH	381	513	1362	1284
Volume to Capacity	0.23	0.21	0.01	0.07
Queue Length 95th (ft)	21	20	1	6
Control Delay (s)	17.2	13.9	0.5	2.9
Lane LOS	C	B	A	A
Approach Delay (s)	17.2	13.9	0.5	2.9
Approach LOS	C	B		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

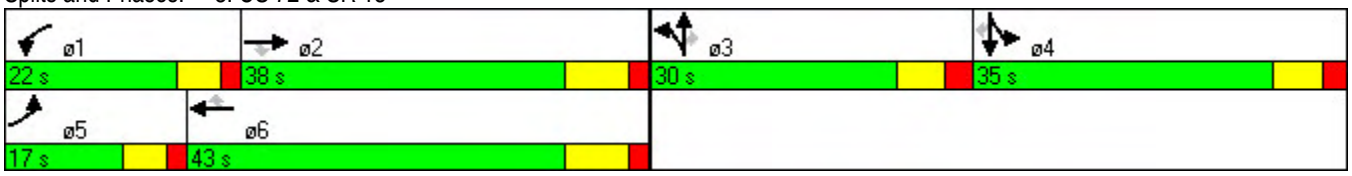
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			36			229			59
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	17.0	38.0	38.0	22.0	43.0	43.0	30.0	30.0	30.0	35.0	35.0	35.0
Total Split (%)	13.6%	30.4%	30.4%	17.6%	34.4%	34.4%	24.0%	24.0%	24.0%	28.0%	28.0%	28.0%
Maximum Green (s)	11.0	30.0	30.0	16.0	35.0	35.0	23.0	23.0	23.0	28.0	28.0	28.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	10.3	22.9	22.9	13.8	30.1	30.1	17.4	17.4	17.4	20.7	20.7	20.7
Actuated g/C Ratio	0.10	0.22	0.22	0.13	0.29	0.29	0.17	0.17	0.17	0.20	0.20	0.20
v/c Ratio	0.41	0.63	0.32	0.54	0.48	0.08	0.29	0.60	0.51	0.21	0.66	0.17
Control Delay	56.7	42.3	8.1	55.4	35.3	10.8	44.4	51.7	9.9	39.1	50.1	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.7	42.3	8.1	55.4	35.3	10.8	44.4	51.7	9.9	39.1	50.1	11.1
LOS	E	D	A	E	D	B	D	D	A	D	D	B
Approach Delay		36.2			38.1			30.4			41.5	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	47	136	0	78	127	0	45	108	0	44	144	0
Queue Length 95th (ft)	96	186	36	153	190	25	77	151	17	63	161	12
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	198	914	576	271	1032	540	360	392	532	504	486	463
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.46	0.25	0.45	0.40	0.07	0.21	0.44	0.43	0.15	0.47	0.13

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 103.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 36.3 Intersection LOS: D
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Peak-hour factor, PHF	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
RTOR Reduction (vph)	0	0	112	0	0	26	0	0	191	0	0	47
Lane Group Flow (vph)	74	422	34	123	416	10	76	171	38	77	230	12
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	8.2	24.5	24.5	13.8	30.1	30.1	17.4	17.4	17.4	20.7	20.7	20.7
Effective Green, g (s)	8.2	24.5	24.5	13.8	30.1	30.1	17.4	17.4	17.4	20.7	20.7	20.7
Actuated g/C Ratio	0.08	0.23	0.23	0.13	0.29	0.29	0.17	0.17	0.17	0.20	0.20	0.20
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	142	718	371	225	853	427	262	285	259	358	346	299
v/s Ratio Prot	0.04	c0.14		c0.07	c0.14		0.05	c0.10		0.04	c0.13	
v/s Ratio Perm			0.02			0.01			0.02			0.01
v/c Ratio	0.52	0.59	0.09	0.55	0.49	0.02	0.29	0.60	0.15	0.22	0.66	0.04
Uniform Delay, d1	46.2	35.5	31.3	42.4	30.8	26.6	38.1	40.3	37.2	35.0	38.6	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	1.9	0.2	4.7	0.9	0.0	1.3	5.1	0.6	0.6	6.3	0.1
Delay (s)	52.6	37.4	31.5	47.1	31.7	26.7	39.4	45.3	37.7	35.7	44.9	33.9
Level of Service	D	D	C	D	C	C	D	D	D	D	D	C
Approach Delay (s)		37.8			34.7			40.7			41.2	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	36.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	462	61	8	446	29	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.983				0.979	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2880	0	1805	2935	1711	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2880	0	1805	2935	1711	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Heavy Vehicles (%)	26%	2%	0%	23%	5%	0%
Adj. Flow (vph)	563	74	9	501	67	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	637	0	9	501	79	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	462	61	8	446	29	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Hourly flow rate (vph)	563	74	9	501	67	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			638		869	319
vC1, stage 1 conf vol					601	
vC2, stage 2 conf vol					269	
vCu, unblocked vol			638		869	319
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	98
cM capacity (veh/h)			956		461	683

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	376	262	9	251	251	79
Volume Left	0	0	9	0	0	67
Volume Right	0	74	0	0	0	12
cSH	1700	1700	956	1700	1700	484
Volume to Capacity	0.22	0.15	0.01	0.15	0.15	0.16
Queue Length 95th (ft)	0	0	1	0	0	14
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	13.9
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			13.9
Approach LOS						B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	420	43	39	374	61	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.986				0.971	
Flt Protected			0.950		0.962	
Satd. Flow (prot)	2752	0	1752	2798	1721	0
Flt Permitted			0.950		0.962	
Satd. Flow (perm)	2752	0	1752	2798	1721	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Heavy Vehicles (%)	31%	13%	3%	29%	4%	0%
Adj. Flow (vph)	462	47	42	402	91	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	509	0	42	402	116	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	420	43	39	374	61	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Hourly flow rate (vph)	462	47	42	402	91	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked					0.99	
vC, conflicting volume			509		770	254
vC1, stage 1 conf vol					485	
vC2, stage 2 conf vol					285	
vCu, unblocked vol			509		750	254
tC, single (s)			4.2		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		82	97
cM capacity (veh/h)			1045		515	751

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	308	201	42	201	201	116
Volume Left	0	0	42	0	0	91
Volume Right	0	47	0	0	0	25
cSH	1700	1700	1045	1700	1700	553
Volume to Capacity	0.18	0.12	0.04	0.12	0.12	0.21
Queue Length 95th (ft)	0	0	3	0	0	20
Control Delay (s)	0.0	0.0	8.6	0.0	0.0	13.2
Lane LOS			A			B
Approach Delay (s)	0.0		0.8			13.2
Approach LOS						B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	3282	1468	1556	3139	1442
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	3282	1468	1556	3139	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			27			152			87
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	15.0	50.0	50.0	15.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	14.3%	47.6%	47.6%	14.3%	47.6%	47.6%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Maximum Green (s)	9.0	42.0	42.0	9.0	42.0	42.0	13.0	13.0	13.0	13.0	13.0	13.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.6	16.8	16.8	8.9	22.8	22.8	10.5	10.5	10.5	10.9	10.9	10.9
Actuated g/C Ratio	0.12	0.23	0.23	0.12	0.32	0.32	0.15	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.16	0.30	0.24	0.32	0.35	0.06	0.28	0.19	0.44	0.23	0.32	0.30
Control Delay	34.3	26.2	7.5	37.1	22.8	10.2	33.1	30.4	10.4	32.4	31.6	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.3	26.2	7.5	37.1	22.8	10.2	33.1	30.4	10.4	32.4	31.6	10.7
LOS	C	C	A	D	C	B	C	C	B	C	C	B
Approach Delay		21.4			24.3			21.3			25.6	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	13	41	0	28	48	0	28	19	0	21	33	0
Queue Length 95th (ft)	42	75	37	71	110	19	66	41	43	49	56	28
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	212	1712	926	216	1672	880	312	607	396	288	580	338
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.12	0.11	0.31	0.19	0.03	0.22	0.15	0.38	0.18	0.26	0.26

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 72.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 44.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	182	90	59	276	24	59	77	129	41	119	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	3282	1468	1556	3139	1442
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	3282	1468	1556	3139	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Adj. Flow (vph)	32	202	100	67	314	27	69	91	152	53	153	87
RTOR Reduction (vph)	0	0	75	0	0	19	0	0	131	0	0	74
Lane Group Flow (vph)	32	202	25	67	314	8	69	91	21	53	153	13
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4
Actuated Green, G (s)	3.2	19.2	19.2	6.8	22.8	22.8	10.5	10.5	10.5	10.9	10.9	10.9
Effective Green, g (s)	3.2	19.2	19.2	6.8	22.8	22.8	10.5	10.5	10.5	10.9	10.9	10.9
Actuated g/C Ratio	0.04	0.25	0.25	0.09	0.30	0.30	0.14	0.14	0.14	0.14	0.14	0.14
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	70	730	377	152	846	440	235	457	204	225	454	208
v/s Ratio Prot	0.02	0.07		c0.04	c0.11		c0.04	0.03		0.03	c0.05	
v/s Ratio Perm			0.02			0.01			0.01			0.01
v/c Ratio	0.46	0.28	0.07	0.44	0.37	0.02	0.29	0.20	0.10	0.24	0.34	0.06
Uniform Delay, d1	35.3	22.5	21.3	32.5	20.7	18.5	29.1	28.7	28.3	28.6	29.0	27.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.4	0.2	4.2	0.6	0.0	1.5	0.4	0.5	1.1	0.9	0.3
Delay (s)	44.8	23.0	21.5	36.7	21.2	18.5	30.6	29.2	28.8	29.7	29.9	28.1
Level of Service	D	C	C	D	C	B	C	C	C	C	C	C
Approach Delay (s)		24.6			23.6			29.3			29.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	28.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	411	1	45	409	1	5	1	37	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.884				
Flt Protected	0.950			0.950				0.994				
Satd. Flow (prot)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Flt Permitted	0.950			0.950				0.994				
Satd. Flow (perm)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Heavy Vehicles (%)	0%	22%	0%	6%	24%	100%	0%	0%	7%	0%	100%	0%
Adj. Flow (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	452	1	47	427	0	0	57	0	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 31.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	411	1	45	409	1	5	1	37	0	1	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Hourly flow rate (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	427			453			763	975	226	798	975	214
vC1, stage 1 conf vol							454	454		520	520	
vC2, stage 2 conf vol							309	521		278	455	
vCu, unblocked vol	427			453			763	975	226	798	975	214
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	8.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	7.5	
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	5.0	3.3
p0 queue free %	100			96			99	100	94	100	98	100
cM capacity (veh/h)	1143			1076			479	428	762	431	254	798

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	226	226	1	47	284	143	57	4
Volume Left	1	0	0	0	47	0	0	7	0
Volume Right	0	0	0	1	0	0	1	49	0
cSH	1143	1700	1700	1700	1076	1700	1700	701	254
Volume to Capacity	0.00	0.13	0.13	0.00	0.04	0.17	0.08	0.08	0.02
Queue Length 95th (ft)	0	0	0	0	3	0	0	7	1
Control Delay (s)	8.2	0.0	0.0	0.0	8.5	0.0	0.0	10.6	19.4
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			10.6	19.4
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	19	19	43	40	20	24	155	25	37	212	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.959			0.974			0.979			0.983	
Flt Protected		0.981			0.980		0.950			0.950		
Satd. Flow (prot)	0	1787	0	0	1757	0	1805	3254	0	1703	3262	0
Flt Permitted		0.981			0.980		0.950			0.950		
Satd. Flow (perm)	0	1787	0	0	1757	0	1805	3254	0	1703	3262	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	3%	0%	10%	0%	10%	0%	6%	8%	15%
Adj. Flow (vph)	42	32	32	62	58	29	28	178	29	43	247	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	149	0	28	207	0	43	278	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 27.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	19	19	43	40	20	24	155	25	37	212	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Hourly flow rate (vph)	42	32	32	62	58	29	28	178	29	43	247	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	550	610	139	505	612	103	278			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	550	610	139	505	612	103	278			207		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.1	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	88	92	96	84	85	97	98			97		
cM capacity (veh/h)	348	390	890	388	389	906	1297			1333		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	107	149	28	119	88	43	164	114
Volume Left	42	62	28	0	0	43	0	0
Volume Right	32	29	0	0	29	0	0	31
cSH	444	437	1297	1700	1700	1333	1700	1700
Volume to Capacity	0.24	0.34	0.02	0.07	0.05	0.03	0.10	0.07
Queue Length 95th (ft)	23	37	2	0	0	3	0	0
Control Delay (s)	15.7	17.4	7.8	0.0	0.0	7.8	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	15.7	17.4	0.9			1.0		
Approach LOS	C	C						

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	1	9	8	4	20	5	262	4	1	248	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.914			0.916			0.998			0.993	
Flt Protected		0.986			0.988			0.999				
Satd. Flow (prot)	0	1712	0	0	1720	0	0	3296	0	0	3273	0
Flt Permitted		0.986			0.988			0.999				
Satd. Flow (perm)	0	1712	0	0	1720	0	0	3296	0	0	3273	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	9%	33%	0%	10%	0%
Adj. Flow (vph)	7	2	16	12	6	30	6	340	5	1	370	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	48	0	0	351	0	0	389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 20.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	1	9	8	4	20	5	262	4	1	248	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Hourly flow rate (vph)	7	2	16	12	6	30	6	340	5	1	370	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	598	741	194	561	747	173	388			345		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	598	741	194	561	747	173	388			345		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	97	98	96	99			100		
cM capacity (veh/h)	370	344	821	403	342	847	1181			1225		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	25	48	177	175	187	203
Volume Left	7	12	6	0	1	0
Volume Right	16	30	0	5	0	18
cSH	567	580	1181	1700	1225	1700
Volume to Capacity	0.04	0.08	0.01	0.10	0.00	0.12
Queue Length 95th (ft)	4	7	0	0	0	0
Control Delay (s)	11.6	11.8	0.3	0.0	0.1	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.6	11.8	0.2		0.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	29	21	5	69	53	33	148	12	77	132	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.963			0.943			0.991			0.972	
Flt Protected		0.983			0.998			0.992			0.985	
Satd. Flow (prot)	0	1770	0	0	1729	0	0	3374	0	0	3221	0
Flt Permitted		0.983			0.998			0.992			0.985	
Satd. Flow (perm)	0	1770	0	0	1729	0	0	3374	0	0	3221	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Heavy Vehicles (%)	0%	0%	6%	0%	4%	3%	8%	5%	0%	2%	12%	3%
Adj. Flow (vph)	43	46	33	7	97	75	38	172	14	107	183	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	0	0	179	0	0	224	0	0	358	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 37.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	29	21	5	69	53	33	148	12	77	132	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Hourly flow rate (vph)	43	46	33	7	97	75	38	172	14	107	183	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	717	694	126	618	721	93	251			186		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717	694	126	618	721	93	251			186		
tC, single (s)	7.5	6.5	7.0	7.5	6.6	7.0	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	79	86	96	98	69	92	97			92		
cM capacity (veh/h)	207	330	889	299	311	943	1268			1386		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	122	179	124	100	199	160
Volume Left	43	7	38	0	107	0
Volume Right	33	75	0	14	0	68
cSH	318	431	1268	1700	1386	1700
Volume to Capacity	0.38	0.41	0.03	0.06	0.08	0.09
Queue Length 95th (ft)	44	50	2	0	6	0
Control Delay (s)	23.2	19.1	2.6	0.0	4.5	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	23.2	19.1	1.5		2.5	
Approach LOS	C	C				

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	522	23	3	481	16	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.994				0.956	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	2867	0	1805	2935	1756	0
Flt Permitted			0.950		0.967	
Satd. Flow (perm)	2867	0	1805	2935	1756	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Heavy Vehicles (%)	26%	6%	0%	23%	0%	0%
Adj. Flow (vph)	607	27	4	609	25	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	634	0	4	609	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	522	23	3	481	16	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Hourly flow rate (vph)	607	27	4	609	25	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			634		932	317
vC1, stage 1 conf vol					620	
vC2, stage 2 conf vol					312	
vCu, unblocked vol			634		932	317
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	98
cM capacity (veh/h)			959		457	685

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	405	229	4	304	304	38
Volume Left	0	0	4	0	0	25
Volume Right	0	27	0	0	0	12
cSH	1700	1700	959	1700	1700	514
Volume to Capacity	0.24	0.13	0.00	0.18	0.18	0.07
Queue Length 95th (ft)	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	8.8	0.0	0.0	12.6
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			12.6
Approach LOS						B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	493	31	16	413	57	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991				0.982	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	2758	0	1805	2843	1759	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	2758	0	1805	2843	1759	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Heavy Vehicles (%)	31%	9%	0%	27%	2%	0%
Adj. Flow (vph)	548	34	19	480	90	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	582	0	19	480	104	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	493	31	16	413	57	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Hourly flow rate (vph)	548	34	19	480	90	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked					0.94	
vC, conflicting volume			582		842	291
vC1, stage 1 conf vol					565	
vC2, stage 2 conf vol					277	
vCu, unblocked vol			582		698	291
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		82	98
cM capacity (veh/h)			1002		503	711

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	365	217	19	240	240	105
Volume Left	0	0	19	0	0	90
Volume Right	0	34	0	0	0	14
cSH	1700	1700	1002	1700	1700	524
Volume to Capacity	0.21	0.13	0.02	0.14	0.14	0.20
Queue Length 95th (ft)	0	0	1	0	0	18
Control Delay (s)	0.0	0.0	8.7	0.0	0.0	13.6
Lane LOS			A			B
Approach Delay (s)	0.0		0.3			13.6
Approach LOS						B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

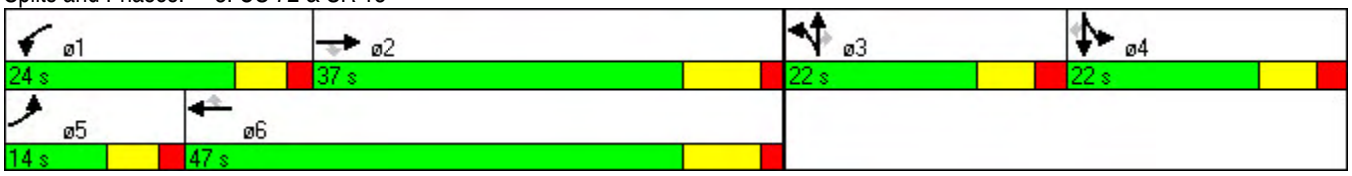
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	3085	1455	1583	3112	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	3085	1455	1583	3112	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			51			162			37
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	14.0	37.0	37.0	24.0	47.0	47.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	13.3%	35.2%	35.2%	22.9%	44.8%	44.8%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Maximum Green (s)	8.0	29.0	29.0	18.0	39.0	39.0	15.0	15.0	15.0	15.0	15.0	15.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.9	22.6	22.6	14.5	30.5	30.5	11.2	11.2	11.2	11.3	11.3	11.3
Actuated g/C Ratio	0.11	0.29	0.29	0.18	0.39	0.39	0.14	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.25	0.52	0.28	0.44	0.38	0.09	0.21	0.20	0.47	0.20	0.25	0.15
Control Delay	44.5	30.2	6.5	40.5	21.1	6.5	39.5	37.6	11.8	39.6	38.4	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	30.2	6.5	40.5	21.1	6.5	39.5	37.6	11.8	39.6	38.4	14.7
LOS	D	C	A	D	C	A	D	D	B	D	D	B
Approach Delay		25.3			23.9			23.8			34.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	22	101	0	59	88	0	22	22	0	22	27	0
Queue Length 95th (ft)	52	134	23	118	127	19	48	40	24	56	57	26
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	186	1159	733	390	1565	751	328	666	441	342	672	364
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.36	0.21	0.32	0.26	0.07	0.14	0.13	0.37	0.13	0.16	0.10

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 78.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 25.6 Intersection LOS: C
Intersection Capacity Utilization 44.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	305	113	100	332	41	33	63	115	37	91	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	3085	1455	1583	3112	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	3085	1455	1583	3112	1553
Peak-hour factor, PHF	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Adj. Flow (vph)	45	418	155	123	410	51	46	89	162	45	110	37
RTOR Reduction (vph)	0	0	110	0	0	32	0	0	140	0	0	33
Lane Group Flow (vph)	45	418	45	123	410	19	46	89	22	45	110	4
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	4.1	23.9	23.9	10.7	30.5	30.5	11.2	11.2	11.2	7.9	7.9	7.9
Effective Green, g (s)	4.1	23.9	23.9	10.7	30.5	30.5	11.2	11.2	11.2	7.9	7.9	7.9
Actuated g/C Ratio	0.05	0.29	0.29	0.13	0.37	0.37	0.14	0.14	0.14	0.10	0.10	0.10
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	81	812	450	197	1053	490	208	423	199	153	301	150
v/s Ratio Prot	0.03	c0.15		c0.08	0.15		c0.03	0.03		0.03	c0.04	
v/s Ratio Perm			0.03			0.01			0.02			0.00
v/c Ratio	0.56	0.51	0.10	0.62	0.39	0.04	0.22	0.21	0.11	0.29	0.37	0.02
Uniform Delay, d1	37.9	24.1	21.1	33.6	18.8	16.3	31.4	31.3	30.9	34.3	34.6	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.3	1.1	0.2	8.4	0.5	0.1	1.1	0.5	0.5	2.2	1.6	0.1
Delay (s)	51.2	25.2	21.3	42.0	19.3	16.3	32.5	31.8	31.4	36.5	36.1	33.5
Level of Service	D	C	C	D	B	B	C	C	C	D	D	C
Approach Delay (s)		26.1			23.8			31.7			35.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	28.0
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	477	5	31	481	1	8	1	23	0	5	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.901			0.903	
Flt Protected	0.950			0.950				0.988				
Satd. Flow (prot)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Flt Permitted	0.950			0.950				0.988				
Satd. Flow (perm)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Heavy Vehicles (%)	25%	26%	25%	13%	25%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	575	6	40	618	0	0	37	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	477	5	31	481	1	8	1	23	0	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Hourly flow rate (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	618			581			1023	1284	287	1024	1290	309
vC1, stage 1 conf vol							587	587		697	697	
vC2, stage 2 conf vol							436	697		327	593	
vCu, unblocked vol	618			581			1023	1284	287	1024	1290	309
tC, single (s)	4.6			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.5			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			97	100	96	100	95	94
cM capacity (veh/h)	817			917			334	345	715	347	337	693

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	6	287	287	6	40	411	207	37	56
Volume Left	6	0	0	0	40	0	0	9	0
Volume Right	0	0	0	6	0	0	1	27	41
cSH	817	1700	1700	1700	917	1700	1700	542	536
Volume to Capacity	0.01	0.17	0.17	0.00	0.04	0.24	0.12	0.07	0.11
Queue Length 95th (ft)	1	0	0	0	3	0	0	6	9
Control Delay (s)	9.4	0.0	0.0	0.0	9.1	0.0	0.0	12.1	12.5
Lane LOS	A				A			B	B
Approach Delay (s)	0.1				0.6			12.1	12.5
Approach LOS								B	B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	9	40	31	19	20	40	167	32	31	179	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.919			0.961			0.976			0.986	
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1525	0	0	1786	0	1687	3000	0	1805	2982	0
Flt Permitted		0.987			0.978		0.950			0.950		
Satd. Flow (perm)	0	1525	0	0	1786	0	1687	3000	0	1805	2982	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	33%	0%	7%	0%	0%	0%	7%	20%	4%	0%	18%	33%
Adj. Flow (vph)	20	10	45	37	23	24	48	199	38	36	208	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	84	0	48	237	0	36	229	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	9	40	31	19	20	40	167	32	31	179	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Hourly flow rate (vph)	20	10	45	37	23	24	48	199	38	36	208	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	520	623	115	540	614	118	229			237		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	520	623	115	540	614	118	229			237		
tC, single (s)	8.2	6.5	7.0	7.5	6.5	6.9	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	94	97	95	90	94	97	96			97		
cM capacity (veh/h)	333	380	900	380	384	917	1300			1342		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	76	83	48	133	104	36	139	90
Volume Left	20	37	48	0	0	36	0	0
Volume Right	45	24	0	0	38	0	0	21
cSH	549	458	1300	1700	1700	1342	1700	1700
Volume to Capacity	0.14	0.18	0.04	0.08	0.06	0.03	0.08	0.05
Queue Length 95th (ft)	12	16	3	0	0	2	0	0
Control Delay (s)	12.6	14.6	7.9	0.0	0.0	7.8	0.0	0.0
Lane LOS	B	B	A			A		
Approach Delay (s)	12.6	14.6	1.3			1.1		
Approach LOS	B	B						

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	20	8	4	17	11	226	3	3	210	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.904			0.921			0.998			0.992	
Flt Protected		0.986			0.987			0.998			0.999	
Satd. Flow (prot)	0	1694	0	0	1727	0	0	3160	0	0	3139	0
Flt Permitted		0.986			0.987			0.998			0.999	
Satd. Flow (perm)	0	1694	0	0	1727	0	0	3160	0	0	3139	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	50%	0%	15%	0%
Adj. Flow (vph)	11	0	27	13	7	28	15	301	4	3	221	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	48	0	0	320	0	0	237	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	20	8	4	17	11	226	3	3	210	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	27	13	7	28	15	301	4	3	221	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	445	568	117	476	573	153	234			305		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	445	568	117	476	573	153	234			305		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	97	97	98	97	99			100		
cM capacity (veh/h)	475	429	920	458	427	872	1346			1267		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	48	165	155	114	123
Volume Left	11	13	15	0	3	0
Volume Right	27	28	0	4	0	13
cSH	726	626	1346	1700	1267	1700
Volume to Capacity	0.05	0.08	0.01	0.09	0.00	0.07
Queue Length 95th (ft)	4	6	1	0	0	0
Control Delay (s)	10.2	11.2	0.8	0.0	0.2	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	10.2	11.2	0.4		0.1	
Approach LOS	B	B				

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	21	13	15	12	67	13	176	12	68	149	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.964			0.904			0.991			0.990	
Flt Protected		0.985			0.992			0.997			0.986	
Satd. Flow (prot)	0	1804	0	0	1704	0	0	3203	0	0	3234	0
Flt Permitted		0.985			0.992			0.997			0.986	
Satd. Flow (perm)	0	1804	0	0	1704	0	0	3203	0	0	3234	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	14%	0%
Adj. Flow (vph)	28	39	24	17	14	76	16	215	15	73	160	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	91	0	0	107	0	0	246	0	0	250	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	21	13	15	12	67	13	176	12	68	149	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Hourly flow rate (vph)	28	39	24	17	14	76	16	215	15	73	160	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	537	576	89	524	577	115	177			229		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	537	576	89	524	577	115	177			229		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	90	97	95	97	92	99			95		
cM capacity (veh/h)	366	403	958	379	402	923	1411			1351		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	91	107	123	122	153	97
Volume Left	28	17	16	0	73	0
Volume Right	24	76	0	15	0	17
cSH	460	662	1411	1700	1351	1700
Volume to Capacity	0.20	0.16	0.01	0.07	0.05	0.06
Queue Length 95th (ft)	18	14	1	0	4	0
Control Delay (s)	14.8	11.5	1.1	0.0	4.0	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	14.8	11.5	0.5		2.4	
Approach LOS	B	B				

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	557	23	32	477	21	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.994				0.961	
Flt Protected			0.950		0.966	
Satd. Flow (prot)	3190	0	1736	3034	1764	0
Flt Permitted			0.950		0.966	
Satd. Flow (perm)	3190	0	1736	3034	1764	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Heavy Vehicles (%)	13%	0%	4%	19%	0%	0%
Adj. Flow (vph)	593	24	37	548	30	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	617	0	37	548	42	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	557	23	32	477	21	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Hourly flow rate (vph)	593	24	37	548	30	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			617		952	309
vC1, stage 1 conf vol					605	
vC2, stage 2 conf vol					348	
vCu, unblocked vol			617		952	309
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		93	98
cM capacity (veh/h)			945		451	693

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	395	222	37	274	274	42
Volume Left	0	0	37	0	0	30
Volume Right	0	24	0	0	0	12
cSH	1700	1700	945	1700	1700	499
Volume to Capacity	0.23	0.13	0.04	0.16	0.16	0.08
Queue Length 95th (ft)	0	0	3	0	0	7
Control Delay (s)	0.0	0.0	9.0	0.0	0.0	12.9
Lane LOS			A			B
Approach Delay (s)	0.0		0.6			12.9
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	505	35	25	454	55	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.990				0.976	
Flt Protected			0.950		0.960	
Satd. Flow (prot)	3139	0	1805	3008	1710	0
Flt Permitted			0.950		0.960	
Satd. Flow (perm)	3139	0	1805	3008	1710	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Heavy Vehicles (%)	14%	12%	0%	20%	5%	0%
Adj. Flow (vph)	526	36	28	510	66	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	562	0	28	510	80	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	505	35	25	454	55	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Hourly flow rate (vph)	526	36	28	510	66	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked					0.92	
vC, conflicting volume			562		856	281
vC1, stage 1 conf vol					544	
vC2, stage 2 conf vol					311	
vCu, unblocked vol			562		678	281
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		87	98
cM capacity (veh/h)			1019		504	722

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	351	212	28	255	255	81
Volume Left	0	0	28	0	0	66
Volume Right	0	36	0	0	0	14
cSH	1700	1700	1019	1700	1700	533
Volume to Capacity	0.21	0.12	0.03	0.15	0.15	0.15
Queue Length 95th (ft)	0	0	2	0	0	13
Control Delay (s)	0.0	0.0	8.6	0.0	0.0	13.0
Lane LOS			A			B
Approach Delay (s)	0.0		0.5			13.0
Approach LOS						B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	3252	1553	1805	3312	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	3252	1553	1805	3312	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			36			229			59
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			12			12	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	18.0	41.0	41.0	25.0	48.0	48.0	30.0	30.0	30.0	24.0	24.0	24.0
Total Split (%)	15.0%	34.2%	34.2%	20.8%	40.0%	40.0%	25.0%	25.0%	25.0%	20.0%	20.0%	20.0%
Maximum Green (s)	12.0	33.0	33.0	19.0	40.0	40.0	23.0	23.0	23.0	17.0	17.0	17.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	10.6	21.8	21.8	13.9	28.7	28.7	13.4	13.4	13.4	13.6	13.6	13.6
Actuated g/C Ratio	0.12	0.24	0.24	0.15	0.31	0.31	0.15	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.35	0.58	0.30	0.47	0.45	0.07	0.33	0.36	0.54	0.29	0.47	0.21
Control Delay	46.8	35.2	7.1	44.6	28.8	9.0	42.5	39.6	10.8	41.4	41.2	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	35.2	7.1	44.6	28.8	9.0	42.5	39.6	10.8	41.4	41.2	13.0
LOS	D	D	A	D	C	A	D	D	B	D	D	B
Approach Delay		30.1			31.0			26.2			36.7	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	39	112	0	65	106	0	40	46	0	39	63	0
Queue Length 95th (ft)	88	163	33	135	161	22	73	70	18	64	80	13
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	243	1133	678	363	1328	685	405	840	571	345	632	336
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.37	0.22	0.34	0.31	0.05	0.19	0.20	0.40	0.22	0.36	0.18

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 91.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 30.6 Intersection LOS: C
Intersection Capacity Utilization 51.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	338	117	106	358	31	53	120	160	47	140	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	3252	1553	1805	3312	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	3252	1553	1805	3312	1509
Peak-hour factor, PHF	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Adj. Flow (vph)	74	422	146	123	416	36	76	171	229	77	230	59
RTOR Reduction (vph)	0	0	109	0	0	25	0	0	196	0	0	50
Lane Group Flow (vph)	74	422	37	123	416	11	76	171	33	77	230	9
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	8.6	23.4	23.4	13.9	28.7	28.7	13.4	13.4	13.4	13.6	13.6	13.6
Effective Green, g (s)	8.6	23.4	23.4	13.9	28.7	28.7	13.4	13.4	13.4	13.6	13.6	13.6
Actuated g/C Ratio	0.09	0.25	0.25	0.15	0.31	0.31	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	168	776	401	256	920	461	228	472	225	266	488	222
v/s Ratio Prot	0.04	c0.14		c0.07	c0.14		0.05	c0.05		0.04	c0.07	
v/s Ratio Perm			0.02			0.01			0.02			0.01
v/c Ratio	0.44	0.54	0.09	0.48	0.45	0.02	0.33	0.36	0.15	0.29	0.47	0.04
Uniform Delay, d1	39.6	29.8	26.3	35.9	25.5	22.1	35.4	35.6	34.5	35.0	36.1	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	1.4	0.2	3.0	0.7	0.0	1.8	1.0	0.6	1.3	1.5	0.2
Delay (s)	43.4	31.2	26.5	38.8	26.2	22.1	37.2	36.6	35.1	36.3	37.6	33.9
Level of Service	D	C	C	D	C	C	D	D	D	D	D	C
Approach Delay (s)		31.5			28.7			36.0			36.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	92.3	Sum of lost time (s)	36.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	643	0	48	505	0	7	0	37	0	5	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.887				
Flt Protected	0.950			0.950				0.992				
Satd. Flow (prot)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Flt Permitted	0.950			0.950				0.992				
Satd. Flow (perm)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Heavy Vehicles (%)	0%	14%	0%	0%	18%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	707	0	59	616	0	0	75	0	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	643	0	48	505	0	7	0	37	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Hourly flow rate (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	616			707			1139	1442	353	1151	1442	308
vC1, stage 1 conf vol							709	709		733	733	
vC2, stage 2 conf vol							430	733		418	709	
vCu, unblocked vol	616			707			1139	1442	353	1151	1442	308
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			94			96	100	90	100	97	100
cM capacity (veh/h)	974			901			336	313	629	303	295	694

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	353	353	0	59	411	205	75	10
Volume Left	1	0	0	0	59	0	0	12	0
Volume Right	0	0	0	0	0	0	0	63	0
cSH	974	1700	1700	1700	901	1700	1700	552	295
Volume to Capacity	0.00	0.21	0.21	0.00	0.06	0.24	0.12	0.14	0.03
Queue Length 95th (ft)	0	0	0	0	5	0	0	12	3
Control Delay (s)	8.7	0.0	0.0	0.0	9.3	0.0	0.0	12.5	17.6
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			12.5	17.6
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	16	47	27	24	23	43	219	32	31	228	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.942			0.958			0.981			0.990	
Flt Protected		0.980			0.982		0.950			0.950		
Satd. Flow (prot)	0	1671	0	0	1787	0	1805	3366	0	1805	3452	0
Flt Permitted		0.980			0.982		0.950			0.950		
Satd. Flow (perm)	0	1671	0	0	1787	0	1805	3366	0	1805	3452	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	9%	8%	0%	0%	0%	0%	0%	6%	0%	0%	2%	25%
Adj. Flow (vph)	58	21	60	33	29	28	54	277	41	33	240	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	90	0	54	318	0	33	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 28.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	45	16	47	27	24	23	43	219	32	31	228	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Hourly flow rate (vph)	58	21	60	33	29	28	54	277	41	33	240	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	604	740	128	662	728	159	257			318		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604	740	128	662	728	159	257			318		
tC, single (s)	7.7	6.7	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	93	93	89	91	97	96			97		
cM capacity (veh/h)	315	309	904	296	329	865	1320			1254		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	138	90	54	185	133	33	160	97
Volume Left	58	33	54	0	0	33	0	0
Volume Right	60	28	0	0	41	0	0	17
cSH	438	388	1320	1700	1700	1254	1700	1700
Volume to Capacity	0.32	0.23	0.04	0.11	0.08	0.03	0.09	0.06
Queue Length 95th (ft)	33	22	3	0	0	2	0	0
Control Delay (s)	17.0	17.1	7.8	0.0	0.0	7.9	0.0	0.0
Lane LOS	C	C	A			A		
Approach Delay (s)	17.0	17.1	1.1			0.9		
Approach LOS	C	C						

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	0	49	3	3	24	27	288	3	1	235	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.896			0.893			0.999			0.996	
Flt Protected		0.989			0.995			0.996				
Satd. Flow (prot)	0	1684	0	0	1688	0	0	3378	0	0	3278	0
Flt Permitted		0.989			0.995			0.996				
Satd. Flow (perm)	0	1684	0	0	1688	0	0	3378	0	0	3278	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	10%	0%
Adj. Flow (vph)	22	0	73	4	4	30	35	374	4	1	267	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	95	0	0	38	0	0	413	0	0	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	49	3	3	24	27	288	3	1	235	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	22	0	73	4	4	30	35	374	4	1	267	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	563	721	138	655	723	189	275			378		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	563	721	138	655	723	189	275			378		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	92	99	99	96	97			100		
cM capacity (veh/h)	387	346	892	319	345	827	1300			1192		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	96	38	222	191	135	141
Volume Left	22	4	35	0	1	0
Volume Right	73	30	0	4	0	8
cSH	683	637	1300	1700	1192	1700
Volume to Capacity	0.14	0.06	0.03	0.11	0.00	0.08
Queue Length 95th (ft)	12	5	2	0	0	0
Control Delay (s)	11.1	11.0	1.4	0.0	0.1	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	11.1	11.0	0.8		0.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	15	13	8	19	60	11	215	8	84	181	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.951			0.907			0.995			0.993	
Flt Protected		0.989			0.995			0.998			0.985	
Satd. Flow (prot)	0	1787	0	0	1688	0	0	3427	0	0	3463	0
Flt Permitted		0.989			0.995			0.998			0.985	
Satd. Flow (perm)	0	1787	0	0	1688	0	0	3427	0	0	3463	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	17%	0%	0%	0%	5%	0%	0%	3%	0%
Adj. Flow (vph)	19	36	31	10	23	74	14	279	10	95	206	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	107	0	0	303	0	0	315	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 30.0%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	15	13	8	19	60	11	215	8	84	181	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	19	36	31	10	23	74	14	279	10	95	206	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	657	722	110	656	723	145	219			290		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	657	722	110	656	723	145	219			290		
tC, single (s)	7.5	6.5	6.9	7.8	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	93	89	97	96	93	92	99			93		
cM capacity (veh/h)	287	326	929	268	325	883	1362			1284		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	86	107	154	150	198	116
Volume Left	19	10	14	0	95	0
Volume Right	31	74	0	10	0	14
cSH	409	556	1362	1700	1284	1700
Volume to Capacity	0.21	0.19	0.01	0.09	0.07	0.07
Queue Length 95th (ft)	19	18	1	0	6	0
Control Delay (s)	16.1	13.0	0.8	0.0	4.2	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	16.1	13.0	0.4		2.6	
Approach LOS	C	B				

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	2865	0	1900	2935	1810	0
Flt Permitted						
Satd. Flow (perm)	2865	0	1900	2935	1810	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Heavy Vehicles (%)	26%	2%	0%	23%	5%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.82	0.89	0.89	0.43	0.43
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1636		1014	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.15	0.00	0.15	0.15	0.16
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	2756	0	1845	2798	1827	0
Flt Permitted						
Satd. Flow (perm)	2756	0	1845	2798	1827	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Heavy Vehicles (%)	31%	13%	3%	29%	4%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.93	0.93	0.67	0.67
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.2		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1614		1017	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.18	0.12	0.00	0.12	0.12	0.21
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

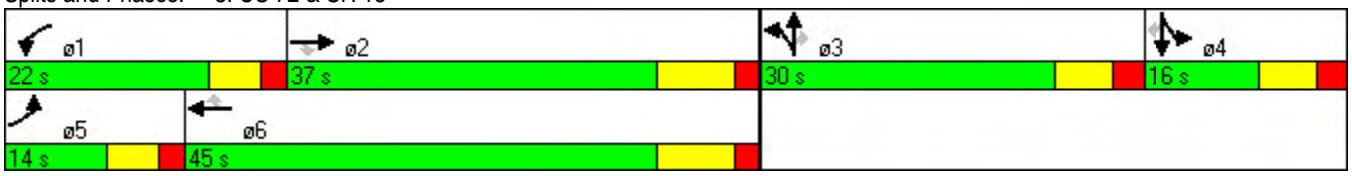
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	293	145	74	297	3	117	35	80	6	17	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			161			3			94			13
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Adj. Flow (vph)	4	326	161	84	338	3	138	41	94	8	22	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	326	161	84	338	3	138	41	94	8	22	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			24			24	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	14.0	37.0	37.0	22.0	45.0	45.0	30.0	30.0	30.0	16.0	16.0	16.0
Total Split (%)	13.3%	35.2%	35.2%	21.0%	42.9%	42.9%	28.6%	28.6%	28.6%	15.2%	15.2%	15.2%
Maximum Green (s)	8.0	29.0	29.0	16.0	37.0	37.0	23.0	23.0	23.0	9.0	9.0	9.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.3	21.4	21.4	11.5	33.0	33.0	13.8	13.8	13.8	8.8	8.8	8.8
Actuated g/C Ratio	0.11	0.29	0.29	0.16	0.45	0.45	0.19	0.19	0.19	0.12	0.12	0.12
v/c Ratio	0.02	0.39	0.29	0.31	0.27	0.00	0.43	0.13	0.27	0.04	0.11	0.07
Control Delay	39.0	27.2	6.7	36.0	16.5	13.0	35.2	30.6	9.6	38.3	38.8	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	27.2	6.7	36.0	16.5	13.0	35.2	30.6	9.6	38.3	38.8	20.7
LOS	D	C	A	D	B	B	D	C	A	D	D	C
Approach Delay		20.6			20.4			25.7			33.2	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	2	74	0	38	53	0	61	17	0	4	10	0
Queue Length 95th (ft)	13	132	48	90	117	6	125	47	36	17	32	15
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	196	1229	728	399	1547	806	574	588	562	207	220	203
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.27	0.22	0.21	0.22	0.00	0.24	0.07	0.17	0.04	0.10	0.06

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 73
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.43
Intersection Signal Delay: 22.1 — Intersection LOS: C
Intersection Capacity Utilization 48.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	293	145	74	297	3	117	35	80	6	17	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1656	2865	1482	1687	2798	1455	1687	1727	1468	1556	1652	1442
Peak-hour factor, PHF	0.90	0.90	0.90	0.88	0.88	0.88	0.85	0.85	0.85	0.78	0.78	0.78
Adj. Flow (vph)	4	326	161	84	338	3	138	41	94	8	22	13
RTOR Reduction (vph)	0	0	111	0	0	2	0	0	78	0	0	12
Lane Group Flow (vph)	4	326	50	84	338	1	138	41	16	8	22	1
Heavy Vehicles (%)	9%	26%	9%	7%	29%	11%	7%	10%	10%	16%	15%	12%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			4
Actuated Green, G (s)	1.2	25.1	25.1	9.1	33.0	33.0	13.8	13.8	13.8	4.4	4.4	4.4
Effective Green, g (s)	1.2	25.1	25.1	9.1	33.0	33.0	13.8	13.8	13.8	4.4	4.4	4.4
Actuated g/C Ratio	0.01	0.31	0.31	0.11	0.41	0.41	0.17	0.17	0.17	0.05	0.05	0.05
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	25	894	463	191	1148	597	290	296	252	85	90	79
v/s Ratio Prot	0.00	c0.11		c0.05	0.12		c0.08	0.02		0.01	c0.01	
v/s Ratio Perm			0.03			0.00			0.01			0.00
v/c Ratio	0.16	0.36	0.11	0.44	0.29	0.00	0.48	0.14	0.06	0.09	0.24	0.01
Uniform Delay, d1	39.1	21.5	19.7	33.3	15.9	14.0	30.0	28.3	27.9	36.1	36.4	35.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.5	0.2	3.4	0.3	0.0	2.6	0.4	0.2	1.0	3.0	0.1
Delay (s)	45.3	22.0	19.9	36.6	16.2	14.0	32.6	28.7	28.1	37.1	39.4	36.0
Level of Service	D	C	B	D	B	B	C	C	C	D	D	D
Approach Delay (s)		21.5			20.2			30.5			37.9	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	80.4	Sum of lost time (s)	28.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	411	1	45	409	1	5	1	37	0	1	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.884				
Flt Protected	0.950			0.950				0.994				
Satd. Flow (prot)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Flt Permitted	0.950			0.950				0.994				
Satd. Flow (perm)	1805	2959	1615	1703	2907	0	0	1575	0	0	950	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Heavy Vehicles (%)	0%	22%	0%	6%	24%	100%	0%	0%	7%	0%	100%	0%
Adj. Flow (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	452	1	47	427	0	0	57	0	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 31.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	411	1	45	409	1	5	1	37	0	1	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.75	0.75	0.75	0.25	0.25	0.25
Hourly flow rate (vph)	1	452	1	47	426	1	7	1	49	0	4	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	427			453			763	975	226	798	975	214
vC1, stage 1 conf vol							454	454		520	520	
vC2, stage 2 conf vol							309	521		278	455	
vCu, unblocked vol	427			453			763	975	226	798	975	214
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	8.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	7.5	
tF (s)	2.2			2.3			3.5	4.0	3.4	3.5	5.0	3.3
p0 queue free %	100			96			99	100	94	100	98	100
cM capacity (veh/h)	1143			1076			479	428	762	431	254	798

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	226	226	1	47	284	143	57	4
Volume Left	1	0	0	0	47	0	0	7	0
Volume Right	0	0	0	1	0	0	1	49	0
cSH	1143	1700	1700	1700	1076	1700	1700	701	254
Volume to Capacity	0.00	0.13	0.13	0.00	0.04	0.17	0.08	0.08	0.02
Queue Length 95th (ft)	0	0	0	0	3	0	0	7	1
Control Delay (s)	8.2	0.0	0.0	0.0	8.5	0.0	0.0	10.6	19.4
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			10.6	19.4
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	19	19	43	40	20	24	70	25	37	95	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.959			0.974			0.960			0.967	
Flt Protected		0.981			0.980		0.950			0.950		
Satd. Flow (prot)	0	1787	0	0	1757	0	1805	3229	0	1703	3187	0
Flt Permitted		0.981			0.980		0.950			0.950		
Satd. Flow (perm)	0	1787	0	0	1757	0	1805	3229	0	1703	3187	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	3%	0%	10%	0%	10%	0%	6%	8%	15%
Adj. Flow (vph)	42	32	32	62	58	29	28	80	29	43	110	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	149	0	28	109	0	43	141	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 24.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	19	19	43	40	20	24	70	25	37	95	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.69	0.69	0.69	0.87	0.87	0.87	0.86	0.86	0.86
Hourly flow rate (vph)	42	32	32	62	58	29	28	80	29	43	110	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	366	377	71	340	378	55	142			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	366	377	71	340	378	55	142			109		
tC, single (s)	7.5	6.5	6.9	7.6	6.5	7.1	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	2.2			2.3		
p0 queue free %	91	94	97	88	89	97	98			97		
cM capacity (veh/h)	489	531	984	522	530	975	1453			1450		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	107	149	28	54	56	43	74	68
Volume Left	42	62	28	0	0	43	0	0
Volume Right	32	29	0	0	29	0	0	31
cSH	593	578	1453	1700	1700	1450	1700	1700
Volume to Capacity	0.18	0.26	0.02	0.03	0.03	0.03	0.04	0.04
Queue Length 95th (ft)	16	26	1	0	0	2	0	0
Control Delay (s)	12.4	13.4	7.5	0.0	0.0	7.6	0.0	0.0
Lane LOS	B	B	A			A		
Approach Delay (s)	12.4	13.4	1.5			1.8		
Approach LOS	B	B						

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	1	9	8	4	20	5	118	4	1	112	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.914			0.916			0.995			0.985	
Flt Protected		0.986			0.988			0.998				
Satd. Flow (prot)	0	1712	0	0	1720	0	0	3277	0	0	3263	0
Flt Permitted		0.986			0.988			0.998				
Satd. Flow (perm)	0	1712	0	0	1720	0	0	3277	0	0	3263	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	9%	33%	0%	10%	0%
Adj. Flow (vph)	7	2	16	12	6	30	6	153	5	1	167	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	0	0	48	0	0	164	0	0	186	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 17.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	1	9	8	4	20	5	118	4	1	112	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.55	0.55	0.55	0.67	0.67	0.67	0.77	0.77	0.77	0.67	0.67	0.67
Hourly flow rate (vph)	7	2	16	12	6	30	6	153	5	1	167	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	302	351	93	273	357	79	185			158		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302	351	93	273	357	79	185			158		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	98	98	99	97	100			100		
cM capacity (veh/h)	606	574	953	648	569	972	1402			1433		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	25	48	83	82	85	101
Volume Left	7	12	6	0	1	0
Volume Right	16	30	0	5	0	18
cSH	787	801	1402	1700	1433	1700
Volume to Capacity	0.03	0.06	0.00	0.05	0.00	0.06
Queue Length 95th (ft)	3	5	0	0	0	0
Control Delay (s)	9.7	9.8	0.6	0.0	0.1	0.0
Lane LOS	A	A	A		A	
Approach Delay (s)	9.7	9.8	0.3		0.1	
Approach LOS	A	A				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	17.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	29	21	5	69	53	33	67	12	77	59	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.963			0.943			0.984			0.960	
Flt Protected		0.983			0.998			0.986			0.980	
Satd. Flow (prot)	0	1770	0	0	1729	0	0	3325	0	0	3221	0
Flt Permitted		0.983			0.998			0.986			0.980	
Satd. Flow (perm)	0	1770	0	0	1729	0	0	3325	0	0	3221	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Heavy Vehicles (%)	0%	0%	6%	0%	4%	3%	8%	5%	0%	2%	12%	3%
Adj. Flow (vph)	43	46	33	7	97	75	38	78	14	107	82	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	0	0	179	0	0	130	0	0	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	29	21	5	69	53	33	67	12	77	59	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.86	0.86	0.86	0.72	0.72	0.72
Hourly flow rate (vph)	43	46	33	7	97	75	38	78	14	107	82	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	569	498	75	473	526	46	150			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	569	498	75	473	526	46	150			92		
tC, single (s)	7.5	6.5	7.0	7.5	6.6	7.0	4.3			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	85	89	97	98	76	93	97			93		
cM capacity (veh/h)	287	430	958	394	408	1010	1386			1501		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	122	179	77	53	148	109
Volume Left	43	7	38	0	107	0
Volume Right	33	75	0	14	0	68
cSH	420	542	1386	1700	1501	1700
Volume to Capacity	0.29	0.33	0.03	0.03	0.07	0.06
Queue Length 95th (ft)	30	36	2	0	6	0
Control Delay (s)	17.0	14.9	3.9	0.0	5.6	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	17.0	14.9	2.3		3.2	
Approach LOS	C	B				

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	2865	0	1900	2935	1900	0
Flt Permitted						
Satd. Flow (perm)	2865	0	1900	2935	1900	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Heavy Vehicles (%)	26%	6%	0%	23%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.79	0.79	0.64	0.64
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1636		1029	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	2756	0	1900	2843	1863	0
Flt Permitted						
Satd. Flow (perm)	2756	0	1900	2843	1863	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Heavy Vehicles (%)	31%	9%	0%	27%	2%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.63	0.63
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1636		1023	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

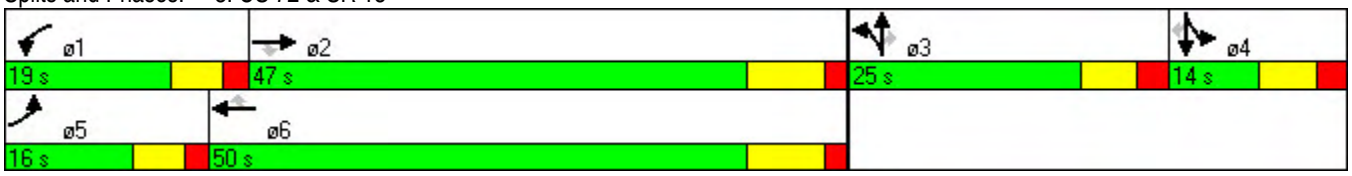
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	407	105	64	428	6	88	28	69	5	13	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			144			7			97			5
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Adj. Flow (vph)	7	558	144	79	528	7	124	39	97	6	16	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	558	144	79	528	7	124	39	97	6	16	5
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			24			24	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	16.0	47.0	47.0	19.0	50.0	50.0	25.0	25.0	25.0	14.0	14.0	14.0
Total Split (%)	15.2%	44.8%	44.8%	18.1%	47.6%	47.6%	23.8%	23.8%	23.8%	13.3%	13.3%	13.3%
Maximum Green (s)	10.0	39.0	39.0	13.0	42.0	42.0	18.0	18.0	18.0	7.0	7.0	7.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.5	29.4	29.4	11.3	40.7	40.7	13.9	13.9	13.9	7.5	7.5	7.5
Actuated g/C Ratio	0.11	0.38	0.38	0.15	0.53	0.53	0.18	0.18	0.18	0.10	0.10	0.10
v/c Ratio	0.04	0.53	0.21	0.36	0.36	0.01	0.46	0.13	0.28	0.04	0.10	0.03
Control Delay	41.4	23.9	5.0	41.2	14.0	9.5	39.2	33.8	10.6	43.0	43.7	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	23.9	5.0	41.2	14.0	9.5	39.2	33.8	10.6	43.0	43.7	27.8
LOS	D	C	A	D	B	A	D	C	B	D	D	C
Approach Delay		20.2			17.5			27.7			40.6	
Approach LOS		C			B			C			D	
Queue Length 50th (ft)	3	105	0	33	55	0	51	15	0	3	7	0
Queue Length 95th (ft)	15	158	20	87	158	8	103	41	22	16	30	11
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	224	1506	900	272	1719	803	380	407	437	154	160	156
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.37	0.16	0.29	0.31	0.01	0.33	0.10	0.22	0.04	0.10	0.03

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 77.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 20.7 — Intersection LOS: C
Intersection Capacity Utilization 46.5% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	407	105	64	428	6	88	28	69	5	13	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1612	2777	1538	1504	2820	1313	1517	1624	1455	1583	1638	1553
Peak-hour factor, PHF	0.73	0.73	0.73	0.81	0.81	0.81	0.71	0.71	0.71	0.83	0.83	0.83
Adj. Flow (vph)	7	558	144	79	528	7	124	39	97	6	16	5
RTOR Reduction (vph)	0	0	89	0	0	4	0	0	81	0	0	5
Lane Group Flow (vph)	7	558	55	79	528	3	124	39	16	6	16	0
Heavy Vehicles (%)	12%	30%	5%	20%	28%	23%	19%	17%	11%	14%	16%	4%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	1.4	33.2	33.2	8.9	40.7	40.7	13.9	13.9	13.9	2.2	2.2	2.2
Effective Green, g (s)	1.4	33.2	33.2	8.9	40.7	40.7	13.9	13.9	13.9	2.2	2.2	2.2
Actuated g/C Ratio	0.02	0.39	0.39	0.10	0.47	0.47	0.16	0.16	0.16	0.03	0.03	0.03
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	26	1070	592	155	1331	620	245	262	235	40	42	40
v/s Ratio Prot	0.00	c0.20		c0.05	0.19		c0.08	0.02		0.00	c0.01	
v/s Ratio Perm			0.04			0.00			0.01			0.00
v/c Ratio	0.27	0.52	0.09	0.51	0.40	0.01	0.51	0.15	0.07	0.15	0.38	0.00
Uniform Delay, d1	41.9	20.4	16.9	36.6	14.8	12.0	33.0	31.1	30.6	41.1	41.3	40.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.9	0.1	5.4	0.4	0.0	3.4	0.6	0.3	3.6	11.6	0.1
Delay (s)	53.2	21.3	17.0	42.0	15.2	12.0	36.4	31.6	30.9	44.7	53.0	41.0
Level of Service	D	C	B	D	B	B	D	C	C	D	D	D
Approach Delay (s)		20.7			18.6			33.6			48.9	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	86.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	477	5	31	481	1	8	1	23	0	5	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.901			0.903	
Flt Protected	0.950			0.950				0.988				
Satd. Flow (prot)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Flt Permitted	0.950			0.950				0.988				
Satd. Flow (perm)	1444	2865	1292	1597	2889	0	0	1624	0	0	1716	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Heavy Vehicles (%)	25%	26%	25%	13%	25%	0%	17%	0%	0%	0%	0%	0%
Adj. Flow (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	575	6	40	618	0	0	37	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 35.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	477	5	31	481	1	8	1	23	0	5	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.78	0.78	0.78	0.86	0.86	0.86	0.32	0.32	0.32
Hourly flow rate (vph)	6	575	6	40	617	1	9	1	27	0	16	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	618			581			1023	1284	287	1024	1290	309
vC1, stage 1 conf vol							587	587		697	697	
vC2, stage 2 conf vol							436	697		327	593	
vCu, unblocked vol	618			581			1023	1284	287	1024	1290	309
tC, single (s)	4.6			4.4			7.8	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.8	5.5		6.5	5.5	
tF (s)	2.5			2.3			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			97	100	96	100	95	94
cM capacity (veh/h)	817			917			334	345	715	347	337	693

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	6	287	287	6	40	411	207	37	56
Volume Left	6	0	0	0	40	0	0	9	0
Volume Right	0	0	0	6	0	0	1	27	41
cSH	817	1700	1700	1700	917	1700	1700	542	536
Volume to Capacity	0.01	0.17	0.17	0.00	0.04	0.24	0.12	0.07	0.11
Queue Length 95th (ft)	1	0	0	0	3	0	0	6	9
Control Delay (s)	9.4	0.0	0.0	0.0	9.1	0.0	0.0	12.1	12.5
Lane LOS	A				A			B	B
Approach Delay (s)	0.1				0.6			12.1	12.5
Approach LOS								B	B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	9	40	31	19	20	40	75	32	31	81	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.919			0.961			0.955			0.973	
Flt Protected		0.987			0.978		0.950			0.950		
Satd. Flow (prot)	0	1525	0	0	1786	0	1687	2992	0	1805	2909	0
Flt Permitted		0.987			0.978		0.950			0.950		
Satd. Flow (perm)	0	1525	0	0	1786	0	1687	2992	0	1805	2909	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	33%	0%	7%	0%	0%	0%	7%	20%	4%	0%	18%	33%
Adj. Flow (vph)	20	10	45	37	23	24	48	89	38	36	94	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	84	0	48	127	0	36	115	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 22.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	9	40	31	19	20	40	75	32	31	81	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86
Hourly flow rate (vph)	20	10	45	37	23	24	48	89	38	36	94	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	352	399	58	373	391	64	115			127		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	352	399	58	373	391	64	115			127		
tC, single (s)	8.2	6.5	7.0	7.5	6.5	6.9	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	96	98	95	93	96	98	97			98		
cM capacity (veh/h)	458	511	980	506	517	994	1436			1471		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	76	83	48	60	68	36	63	52
Volume Left	20	37	48	0	0	36	0	0
Volume Right	45	24	0	0	38	0	0	21
cSH	686	593	1436	1700	1700	1471	1700	1700
Volume to Capacity	0.11	0.14	0.03	0.04	0.04	0.02	0.04	0.03
Queue Length 95th (ft)	9	12	3	0	0	2	0	0
Control Delay (s)	10.9	12.1	7.6	0.0	0.0	7.5	0.0	0.0
Lane LOS	B	B	A			A		
Approach Delay (s)	10.9	12.1	2.1			1.8		
Approach LOS	B	B						

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	20	8	4	17	11	102	3	3	95	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.904			0.921			0.996			0.983	
Flt Protected		0.986			0.987			0.995			0.999	
Satd. Flow (prot)	0	1694	0	0	1727	0	0	3150	0	0	3139	0
Flt Permitted		0.986			0.987			0.995			0.999	
Satd. Flow (perm)	0	1694	0	0	1727	0	0	3150	0	0	3139	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	14%	50%	0%	15%	0%
Adj. Flow (vph)	11	0	27	13	7	28	15	136	4	3	100	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	48	0	0	155	0	0	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 17.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	20	8	4	17	11	102	3	3	95	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.61	0.61	0.61	0.75	0.75	0.75	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	27	13	7	28	15	136	4	3	100	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	241	282	56	250	286	70	113			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	241	282	56	250	286	70	113			140		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	97	98	99	97	99			100		
cM capacity (veh/h)	667	623	1005	664	619	985	1489			1456		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	48	83	72	53	63
Volume Left	11	13	15	0	3	0
Volume Right	27	28	0	4	0	13
cSH	878	811	1489	1700	1456	1700
Volume to Capacity	0.04	0.06	0.01	0.04	0.00	0.04
Queue Length 95th (ft)	3	5	1	0	0	0
Control Delay (s)	9.3	9.7	1.4	0.0	0.5	0.0
Lane LOS	A	A	A		A	
Approach Delay (s)	9.3	9.7	0.7		0.2	
Approach LOS	A	A				

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	21	13	15	12	67	13	79	12	68	67	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.964			0.904			0.982			0.984	
Flt Protected		0.985			0.992			0.994			0.978	
Satd. Flow (prot)	0	1804	0	0	1704	0	0	3208	0	0	3271	0
Flt Permitted		0.985			0.992			0.994			0.978	
Satd. Flow (perm)	0	1804	0	0	1704	0	0	3208	0	0	3271	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	14%	0%
Adj. Flow (vph)	28	39	24	17	14	76	16	96	15	73	72	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	91	0	0	107	0	0	127	0	0	162	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	21	13	15	12	67	13	79	12	68	67	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.54	0.54	0.54	0.88	0.88	0.88	0.82	0.82	0.82	0.93	0.93	0.93
Hourly flow rate (vph)	28	39	24	17	14	76	16	96	15	73	72	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	390	370	45	361	371	55	89			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	390	370	45	361	371	55	89			111		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	93	98	97	97	92	99			95		
cM capacity (veh/h)	475	530	1022	506	529	1006	1519			1492		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	91	107	64	63	109	53
Volume Left	28	17	16	0	73	0
Volume Right	24	76	0	15	0	17
cSH	584	790	1519	1700	1492	1700
Volume to Capacity	0.16	0.14	0.01	0.04	0.05	0.03
Queue Length 95th (ft)	14	12	1	0	4	0
Control Delay (s)	12.3	10.3	1.9	0.0	5.2	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.3	10.3	1.0		3.5	
Approach LOS	B	B				

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	3195	0	1827	3034	1900	0
Flt Permitted						
Satd. Flow (perm)	3195	0	1827	3034	1900	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	901			571	1044	
Travel Time (s)	11.2			7.1	23.7	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Heavy Vehicles (%)	13%	0%	4%	19%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.87	0.87	0.69	0.69
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.2		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1607		1029	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	3167	0	1900	3008	1810	0
Flt Permitted						
Satd. Flow (perm)	3167	0	1900	3008	1810	0
Link Speed (mph)	55			55	30	
Link Distance (ft)	571			907	1462	
Travel Time (s)	7.1			11.2	33.2	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Heavy Vehicles (%)	14%	12%	0%	20%	5%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	64			64	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	0	0	0	0	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.89	0.89	0.83	0.83
Hourly flow rate (vph)	0	0	0	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	Raised			Raised		
Median storage veh)	2			2		
Upstream signal (ft)				907		
pX, platoon unblocked						
vC, conflicting volume			0		0	0
vC1, stage 1 conf vol					0	
vC2, stage 2 conf vol					0	
vCu, unblocked vol			0		0	0
tC, single (s)			4.1		6.9	6.9
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1636		1014	1091

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	0	0	0	0	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						A
Approach Delay (s)	0.0		0.0			0.0
Approach LOS						A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	479	111	105	407	4	100	54	92	7	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		250	275		250	140		150	140		150
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			139			5			131			8
Link Speed (mph)		55			65			35			45	
Link Distance (ft)		907			1579			361			1024	
Travel Time (s)		11.2			16.6			7.0			15.5	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Adj. Flow (vph)	10	599	139	122	473	5	143	77	131	11	33	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	599	139	122	473	5	143	77	131	11	33	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		64			72			24			24	
Link Offset(ft)		0			-6			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	15.0	15.0	6.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	12.0	23.0	23.0	12.0	23.0	23.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	14.0	53.0	53.0	26.0	65.0	65.0	31.0	31.0	31.0	15.0	15.0	15.0
Total Split (%)	11.2%	42.4%	42.4%	20.8%	52.0%	52.0%	24.8%	24.8%	24.8%	12.0%	12.0%	12.0%
Maximum Green (s)	8.0	45.0	45.0	20.0	57.0	57.0	24.0	24.0	24.0	8.0	8.0	8.0
Yellow Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	1.0	30.0	30.0	1.0	30.0	30.0	1.0	1.0	1.0	1.0	1.0	1.0
Time To Reduce (s)	15.0	30.0	30.0	15.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	8.4	26.5	26.5	14.2	45.1	45.1	15.9	15.9	15.9	8.5	8.5	8.5
Actuated g/C Ratio	0.10	0.30	0.30	0.16	0.52	0.52	0.18	0.18	0.18	0.10	0.10	0.10
v/c Ratio	0.06	0.64	0.24	0.44	0.31	0.01	0.50	0.25	0.34	0.06	0.19	0.05
Control Delay	47.9	31.4	6.1	43.4	15.3	10.5	42.9	37.7	9.6	48.0	48.7	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	31.4	6.1	43.4	15.3	10.5	42.9	37.7	9.6	48.0	48.7	27.4
LOS	D	C	A	D	B	B	D	D	A	D	D	C
Approach Delay		27.0			20.9			29.3			45.3	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	6	163	0	67	82	0	79	40	0	6	19	0
Queue Length 95th (ft)	22	225	31	134	161	7	119	71	21	18	38	9
Internal Link Dist (ft)		827			1499			281			944	
Turn Bay Length (ft)	275		250	275		250	140		150	140		150
Base Capacity (vph)	180	1715	949	424	2087	1047	470	512	556	180	174	158
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.35	0.15	0.29	0.23	0.00	0.30	0.15	0.24	0.06	0.19	0.05

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 86.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 25.9 Intersection LOS: C
Intersection Capacity Utilization 48.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: US 72 & SR 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	479	111	105	407	4	100	54	92	7	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1805	3059	1583	1703	2959	1482	1570	1712	1553	1805	1743	1509
Peak-hour factor, PHF	0.80	0.80	0.80	0.86	0.86	0.86	0.70	0.70	0.70	0.61	0.61	0.61
Adj. Flow (vph)	10	599	139	122	473	5	143	77	131	11	33	8
RTOR Reduction (vph)	0	0	92	0	0	3	0	0	109	0	0	8
Lane Group Flow (vph)	10	599	47	122	473	2	143	77	22	11	33	0
Heavy Vehicles (%)	0%	18%	2%	6%	22%	9%	15%	11%	4%	0%	9%	7%
Turn Type	Prot		Perm	Prot		Perm	custom		Perm	custom		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6	3		3	4		4
Actuated Green, G (s)	1.2	32.1	32.1	14.2	45.1	45.1	15.9	15.9	15.9	4.0	4.0	4.0
Effective Green, g (s)	1.2	32.1	32.1	14.2	45.1	45.1	15.9	15.9	15.9	4.0	4.0	4.0
Actuated g/C Ratio	0.01	0.34	0.34	0.15	0.48	0.48	0.17	0.17	0.17	0.04	0.04	0.04
Clearance Time (s)	6.0	8.0	8.0	6.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	23	1042	539	257	1417	710	265	289	262	77	74	64
v/s Ratio Prot	0.01	c0.20		c0.07	0.16		c0.09	0.04		0.01	c0.02	
v/s Ratio Perm			0.03			0.00			0.01			0.00
v/c Ratio	0.43	0.57	0.09	0.47	0.33	0.00	0.54	0.27	0.08	0.14	0.45	0.01
Uniform Delay, d1	46.2	25.5	21.1	36.6	15.2	12.8	35.8	34.1	33.0	43.4	44.0	43.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.2	1.2	0.1	2.9	0.3	0.0	3.8	1.0	0.3	1.8	8.7	0.1
Delay (s)	71.4	26.7	21.2	39.5	15.5	12.8	39.6	35.1	33.3	45.2	52.7	43.3
Level of Service	E	C	C	D	B	B	D	D	C	D	D	D
Approach Delay (s)		26.3			20.4			36.3			49.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	28.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	643	0	48	505	0	7	0	37	0	5	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.887				
Flt Protected	0.950			0.950				0.992				
Satd. Flow (prot)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Flt Permitted	0.950			0.950				0.992				
Satd. Flow (perm)	1805	3167	1900	1805	3059	0	0	1579	0	0	1900	0
Link Speed (mph)		65			65			30			30	
Link Distance (ft)		1579			1366			906			1087	
Travel Time (s)		16.6			14.3			20.6			24.7	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Heavy Vehicles (%)	0%	14%	0%	0%	18%	0%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	707	0	59	616	0	0	75	0	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		52			52			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 40.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	643	0	48	505	0	7	0	37	0	5	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.82	0.82	0.82	0.59	0.59	0.59	0.50	0.50	0.50
Hourly flow rate (vph)	1	707	0	59	616	0	12	0	63	0	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		2			2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	616			707			1139	1442	353	1151	1442	308
vC1, stage 1 conf vol							709	709		733	733	
vC2, stage 2 conf vol							430	733		418	709	
vCu, unblocked vol	616			707			1139	1442	353	1151	1442	308
tC, single (s)	4.1			4.1			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			94			96	100	90	100	97	100
cM capacity (veh/h)	974			901			336	313	629	303	295	694

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1	353	353	0	59	411	205	75	10
Volume Left	1	0	0	0	59	0	0	12	0
Volume Right	0	0	0	0	0	0	0	63	0
cSH	974	1700	1700	1700	901	1700	1700	552	295
Volume to Capacity	0.00	0.21	0.21	0.00	0.06	0.24	0.12	0.14	0.03
Queue Length 95th (ft)	0	0	0	0	5	0	0	12	3
Control Delay (s)	8.7	0.0	0.0	0.0	9.3	0.0	0.0	12.5	17.6
Lane LOS	A				A			B	C
Approach Delay (s)	0.0				0.8			12.5	17.6
Approach LOS								B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	16	47	27	24	23	43	99	32	31	103	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	85		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.942			0.958			0.963			0.980	
Flt Protected		0.980			0.982		0.950			0.950		
Satd. Flow (prot)	0	1671	0	0	1787	0	1805	3326	0	1805	3365	0
Flt Permitted		0.980			0.982		0.950			0.950		
Satd. Flow (perm)	0	1671	0	0	1787	0	1805	3326	0	1805	3365	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		739			900			594			361	
Travel Time (s)		16.8			20.5			11.6			7.0	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Heavy Vehicles (%)	9%	8%	0%	0%	0%	0%	0%	6%	0%	0%	2%	25%
Adj. Flow (vph)	58	21	60	33	29	28	54	125	41	33	108	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	90	0	54	166	0	33	125	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 25.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	45	16	47	27	24	23	43	99	32	31	103	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.82	0.82	0.82	0.79	0.79	0.79	0.95	0.95	0.95
Hourly flow rate (vph)	58	21	60	33	29	28	54	125	41	33	108	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											361	
pX, platoon unblocked												
vC, conflicting volume	396	457	63	444	445	83	125			166		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396	457	63	444	445	83	125			166		
tC, single (s)	7.7	6.7	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	96	94	92	94	97	96			98		
cM capacity (veh/h)	461	457	996	435	481	966	1474			1425		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	138	90	54	84	82	33	72	53
Volume Left	58	33	54	0	0	33	0	0
Volume Right	60	28	0	0	41	0	0	17
cSH	601	545	1474	1700	1700	1425	1700	1700
Volume to Capacity	0.23	0.17	0.04	0.05	0.05	0.02	0.04	0.03
Queue Length 95th (ft)	22	15	3	0	0	2	0	0
Control Delay (s)	12.8	12.9	7.5	0.0	0.0	7.6	0.0	0.0
Lane LOS	B	B	A			A		
Approach Delay (s)	12.8	12.9	1.9			1.6		
Approach LOS	B	B						

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	25.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	0	49	3	3	24	27	130	3	1	106	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.896			0.893			0.997			0.991	
Flt Protected		0.989			0.995			0.992				
Satd. Flow (prot)	0	1684	0	0	1688	0	0	3378	0	0	3273	0
Flt Permitted		0.989			0.995			0.992				
Satd. Flow (perm)	0	1684	0	0	1688	0	0	3378	0	0	3273	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		758			856			1278			594	
Travel Time (s)		17.2			19.5			24.9			11.6	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	10%	0%
Adj. Flow (vph)	22	0	73	4	4	30	35	169	4	1	120	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	95	0	0	38	0	0	208	0	0	129	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 22.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	49	3	3	24	27	130	3	1	106	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.79	0.79	0.79	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	22	0	73	4	4	30	35	169	4	1	120	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											955	
pX, platoon unblocked												
vC, conflicting volume	314	370	64	377	372	86	128			173		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314	370	64	377	372	86	128			173		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	93	99	99	97	98			100		
cM capacity (veh/h)	587	549	993	510	548	962	1470			1416		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	96	38	119	88	61	68
Volume Left	22	4	35	0	1	0
Volume Right	73	30	0	4	0	8
cSH	855	826	1470	1700	1416	1700
Volume to Capacity	0.11	0.05	0.02	0.05	0.00	0.04
Queue Length 95th (ft)	9	4	2	0	0	0
Control Delay (s)	9.7	9.6	2.3	0.0	0.1	0.0
Lane LOS	A	A	A		A	
Approach Delay (s)	9.7	9.6	1.3		0.1	
Approach LOS	A	A				

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	15	13	8	19	60	11	97	8	84	81	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.951			0.907			0.990			0.990	
Flt Protected		0.989			0.995			0.995			0.977	
Satd. Flow (prot)	0	1787	0	0	1688	0	0	3413	0	0	3444	0
Flt Permitted		0.989			0.995			0.995			0.977	
Satd. Flow (perm)	0	1787	0	0	1688	0	0	3413	0	0	3444	0
Link Speed (mph)		30			30			45			35	
Link Distance (ft)		1024			1004			1091			1278	
Travel Time (s)		23.3			22.8			16.5			24.9	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	17%	0%	0%	0%	5%	0%	0%	3%	0%
Adj. Flow (vph)	19	36	31	10	23	74	14	126	10	95	92	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	107	0	0	150	0	0	201	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 23.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	15	13	8	19	60	11	97	8	84	81	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.42	0.42	0.42	0.81	0.81	0.81	0.77	0.77	0.77	0.88	0.88	0.88
Hourly flow rate (vph)	19	36	31	10	23	74	14	126	10	95	92	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467	455	53	445	456	68	106			136		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467	455	53	445	456	68	106			136		
tC, single (s)	7.5	6.5	6.9	7.8	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.0	3.3	2.2			2.2		
p0 queue free %	95	92	97	98	95	92	99			93		
cM capacity (veh/h)	406	467	1010	398	466	987	1498			1460		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	86	107	77	73	141	60
Volume Left	19	10	14	0	95	0
Volume Right	31	74	0	10	0	14
cSH	556	715	1498	1700	1460	1700
Volume to Capacity	0.15	0.15	0.01	0.04	0.07	0.04
Queue Length 95th (ft)	14	13	1	0	5	0
Control Delay (s)	12.6	10.9	1.4	0.0	5.3	0.0
Lane LOS	B	B	A		A	
Approach Delay (s)	12.6	10.9	0.7		3.7	
Approach LOS	B	B				

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		