

ACCESS JUSTIFICATION REPORT

INTERSTATE 57 AND ILLINOIS ROUTE 149 INTERCHANGE MODIFICATION

WEST FRANKFORT, ILLINOIS
FRANKLIN COUNTY

JULY 12, 2016

PREPARED FOR:



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ALTERNATIVE NO. 4103

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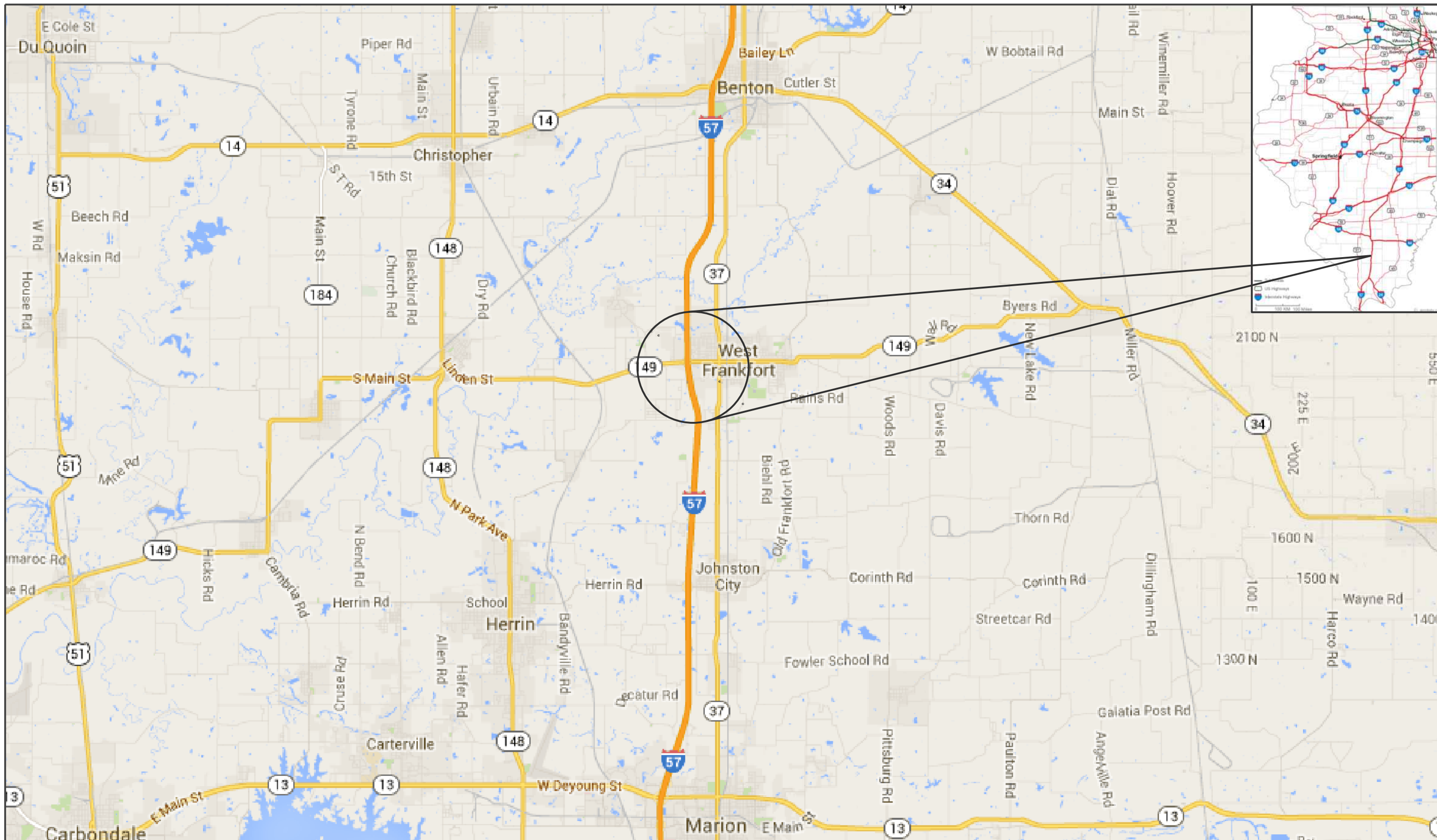
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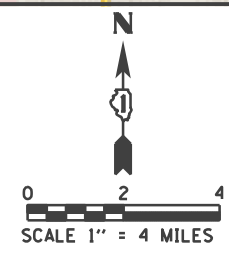
1 INTRODUCTION

The City of West Frankfort, Illinois retained the services of Brown & Roberts, Inc. and CHA Consulting, Inc. (formerly R.W. Armstrong, Inc.) to prepare an Access Justification Report for Interstate 57 (I-57) to submit to the Illinois Department of Transportation (IDOT) and the Federal Highway Administration (FHWA). This Access Justification Report (AJR) provides descriptions and analyses of potential interchange modification alternatives for the existing interchange connecting I-57 and IL 149 in the City of West Frankfort and identifies a preferred alternate. The purpose of the proposed improvements is to improve the safety and mobility of the roadway network within the boundaries of the project area. The general project location is shown in Figure 1-1 on the next page.



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Figure 1-1
Project Location Map



1.1 DESCRIPTION OF PROJECT AREA

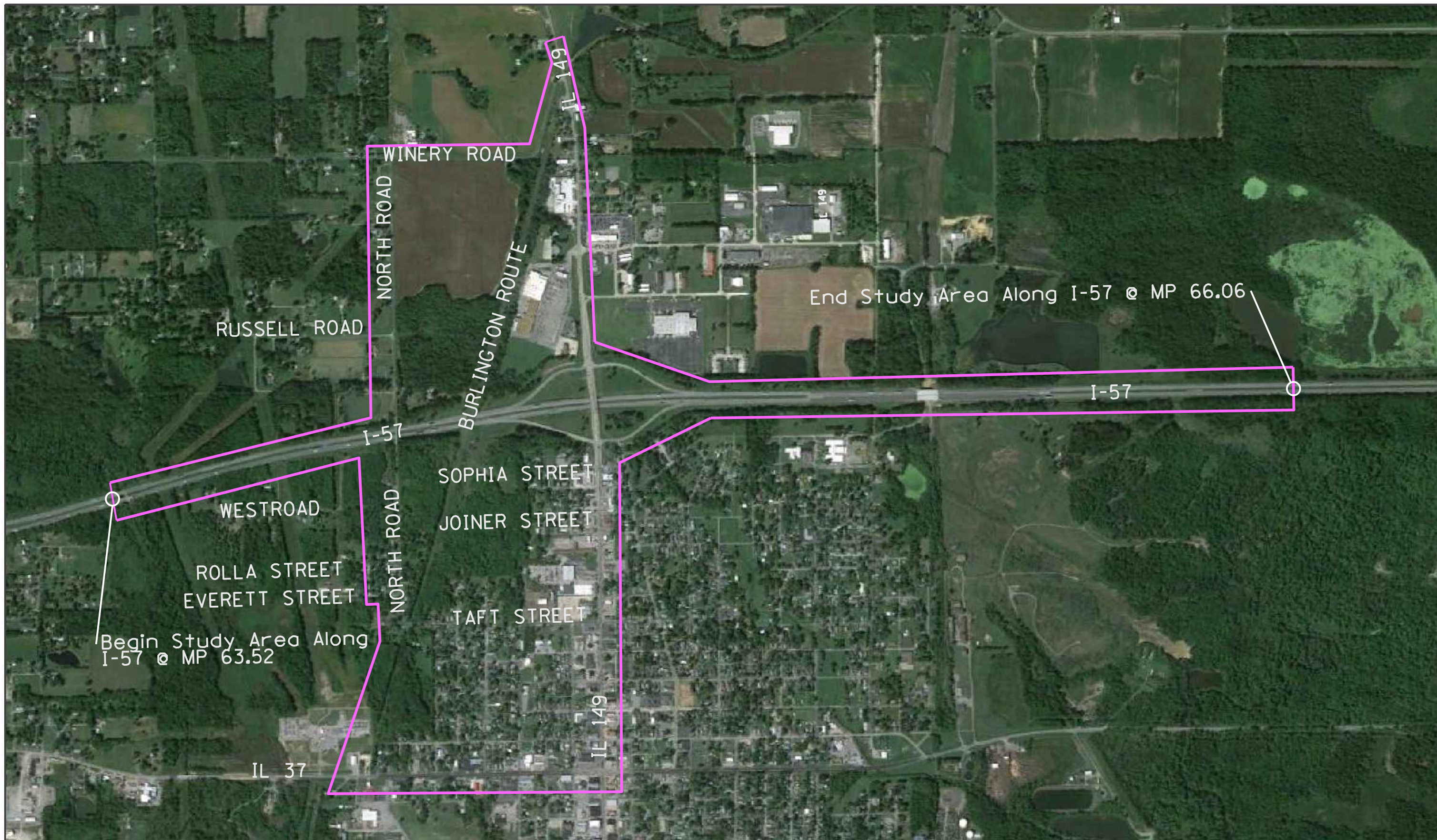
The Project Area Limits for this study, as depicted in Figure 1-2, include Interstate 57 (I-57), Illinois State Route 149 (IL 149/West Main Street) and North Road in West Frankfort, Franklin County, Illinois. The study corridor on I-57 extends one mile to the north and south of the existing interchange ramps for West Frankfort and Zeigler (Exit #65). Within the study boundary, I-57 currently consists of two travel lanes for both the northbound and southbound traffic. The average daily traffic on the four-lane interstate facility is currently 33,200 vehicles per day to the north of IL 149 and 32,000 to the south of IL 149. The study portion of I-57 is a designated truck route and includes approximately 23-30% heavy or commercial vehicle traffic volumes.

A standard diamond interchange provides access to I-57 from IL 149 and its existing overpass that crosses I-57. The east-west corridor of IL 149 within the study area is bounded by Winery Road, approximately one half (0.5) mile west of the existing I-57 southbound on/off ramps, and Illinois State Route 37 (IL 37), approximately seven tenths (0.7) of a mile east of the existing I-57 northbound on/off ramps. IL 149 is a two-lane roadway beginning west of the study area until its intersection with Ken Gray Boulevard/W. Frankfort Plaza. Then, six hundred (600) feet west of the existing southbound ramps, the roadway widens to a four lane section, two lanes in each direction, with a concrete center median and turn lanes at intersections as needed. Five hundred (500) feet east of the existing northbound ramps, the road narrows to a three-lane section, one travel lane in each direction and a two-way left-turn lane. The three-lane section continues to the east, beyond the IL 37 project boundary.

The study area encompasses approximately 1.6 miles of the former Burlington Northern Railroad Route and its respective right-of-way. The railroad route runs diagonally from northwest to southeast through the study area, from near the existing intersection of IL 149 & Winery Road to near the existing intersection of Cleveland Street & IL 37. The Burlington Route crosses I-57 via an existing overpass located at the south end of the existing I-57/IL 149 interchange.

North Road is an east-west two-lane local road that connects Winery Road and Taft Street, via an existing overpass that crosses I-57 running essentially parallel to and approximately four tenths (0.4) of a mile south of IL 149.

Photographs of the northbound and southbound views of the existing IL 149, Burlington Route and North Road overpasses are shown in Figure 1-3 through Figure 1-8.



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0 2 4
 SCALE 1" = 4 MILES

Figure 1-2
Project Area Limits

Figure 1-3: I-57 NB View of Existing IL 149 Overpass



Figure 1-4: I-57 SB View of Existing IL 149 Overpass



Figure 1-5: I-57 NB View of Existing Burlington Route Overpass



Figure 1-6: I-57 SB View of Existing Burlington Route Overpass



Figure 1-7: I-57 NB View of Existing North Road Overpass



Figure 1-8: I-57 SB View of Existing North Road Overpass



A detailed analysis was completed for the following existing intersections within the study area:

- IL 149 & Winery Road;
- IL 149 & W. Frankfort Plaza/Ken Gray Blvd;
- IL 149 & I-57 Southbound Ramps;
- IL 149 & I-57 Northbound Ramps;
- IL 149 & Taft Street;
- IL 149 & IL 37;
- North Road & Winery Road.

1.2 PROJECT HISTORY

Over the past several years, there have been an above average number of crashes within the study area along both I-57 and IL 149. These crashes are analyzed and discussed in depth in the *Operational and Safety Analysis* section (Section 18) of this report.

The current safety problems resulting from existing roadway deficiencies are recognized as a substantial reason for the proposed interchange modifications, with the potential for economic development enhancements as another substantial benefit for both the City of West Frankfort and the state of Illinois. The location of the former Burlington Northern Railroad Route provides an excellent opportunity for a new southeast-northwest connection between IL 37 and IL 149. For further discussion of the existing roadway deficiencies, see Section 18 of this report.

Given the local and regional importance of the existing interchange, the proposed improvements to the I-57 and IL 149 interchange have been a major topic of discussion in the local community. The Mayor of West Frankfort and the developer of the proposed project have both been very involved in discussions with IDOT, FHWA, the general public and residents of the city of West Frankfort. Based on several meetings and discussions throughout the AJR planning process to date, all parties are supportive of the proposed split-diamond interchange configuration as a potentially viable concept.

1.3 STUDIED ALTERNATIVES

Four design alternatives were analyzed for this AJR. The alternatives include the No-Build, Upgrade of Existing Diamond Interchange, and two proposed Split-Diamond Interchange scenarios. Each alternative was evaluated using both the existing and the projected future conditions within the project area. The proposed Split-Diamond Interchanges are viable design alternatives that provide benefits for all entities involved without increasing the number of access points required on the interstate system. The following report sections provide a brief description of each of the analyzed design alternatives. Further details of the analyses are provided in the Operational and Safety Analysis section of this report.

1.3.1 *Alternative No. 1 – No-Build*

The first scenario analyzed was the No-Build alternative. The existing conditions were analyzed with the current geometric configurations throughout the network of the project area, as shown in Figure 1-9. It should be noted that the existing interchange geometrics are not compliant with the current design standards established by IDOT and FHWA. Once the existing traffic volumes were established, the projected traffic volumes for the design year of 2032 were calculated by applying a straight-line growth rate to the existing volumes. Based on the low to moderate growth projected for the study area, IDOT approved the assumed growth rates of 1.0% and 1.5% for the purpose of this report. While the Level of Service (LOS) throughout the project area remains above the minimum acceptable levels for all but one unsignalized intersection (IL 149 & Taft Street), the current safety concerns are not mitigated under the No-Build alternative.

1.3.2 *Alternative No. 2 – Upgrade of Existing Diamond Interchange*

Since the current interchange geometrics are not compliant with current design standards, a second alternative is to upgrade the existing interchange to meet current design standards as shown in Figure 1-10. The existing northbound exit ramp and the southbound entry ramp gore points would require relocation farther to the south of their existing location in order for the interchange geometry to meet current design standards. Relocating the existing gore points would require the complete removal of the Burlington Northern Bridge across I-57. While feasible, this option would not improve traffic operations in the study area nor would it allow for the potential for economic growth and development within the vicinity of the interchange.

1.3.3 *Alternative No. 3 – Expanded Split-Diamond Interchange*

The third alternative analyzed for this AJR is a proposed Expanded Split-Diamond Interchange with one-way northbound and southbound Collector-Distributor (C-D) roads connecting North Road, the proposed Burlington Route Boulevard and IL 149, as depicted in Figure 1-11A. This alternative requires the replacement of the North Road Bridge in order to accommodate current design loads and the proposed roadway width. The existing Burlington Northern Bridge will remain in place with only minor modifications required to accommodate the proposed roadway section. In addition to the bridgework, Brown Street will also be extended to connect to West Road and facilitate the rerouting of West Road to meet the limited access requirements.

The Burlington Route Boulevard will provide a much-needed additional crossing of I-57 in this region. An additional benefit is the ability to provide emergency services to residents and businesses located west of the I-57 corridor. This expanded split-diamond interchange configuration will provide the most improved access and connectivity possible within the study area by linking IL 149 and IL 37 to the proposed development near I-57 without forcing traffic through the center of West Frankfort, while maintaining the North Road Bridge connection across I-57. The additional access allows for significantly improved distribution of traffic throughout the study area, thereby significantly reducing the existing capacity concerns along IL 149. Less congestion will potentially result in a reduction in the number of crashes along IL 149. The configuration of this expanded split-diamond interchange will also increase safety along the mainline of I-57 by nearly doubling the distance between the exit and entry ramps on both sides of the interstate, thereby relocating the major decision making areas away from both the Burlington Northern Bridge and the North Road Bridge. While this expanded split-diamond interchange configuration changes the location of the access points on the interstate system, it does not increase the total number of access points required on the interstate system. This expanded split-diamond interchange configuration also provides increased potential for economic development within the study area.

NOTE: In addition to the expanded split-diamond interchange, several local road improvements are planned to accommodate the proposed economic development in the vicinity of the interchange. While these improvements are beyond the limits of the AJR study area, they are important factors affecting the geometrics, operation and access control within the limits of the AJR. Therefore, the additional improvements (also noted

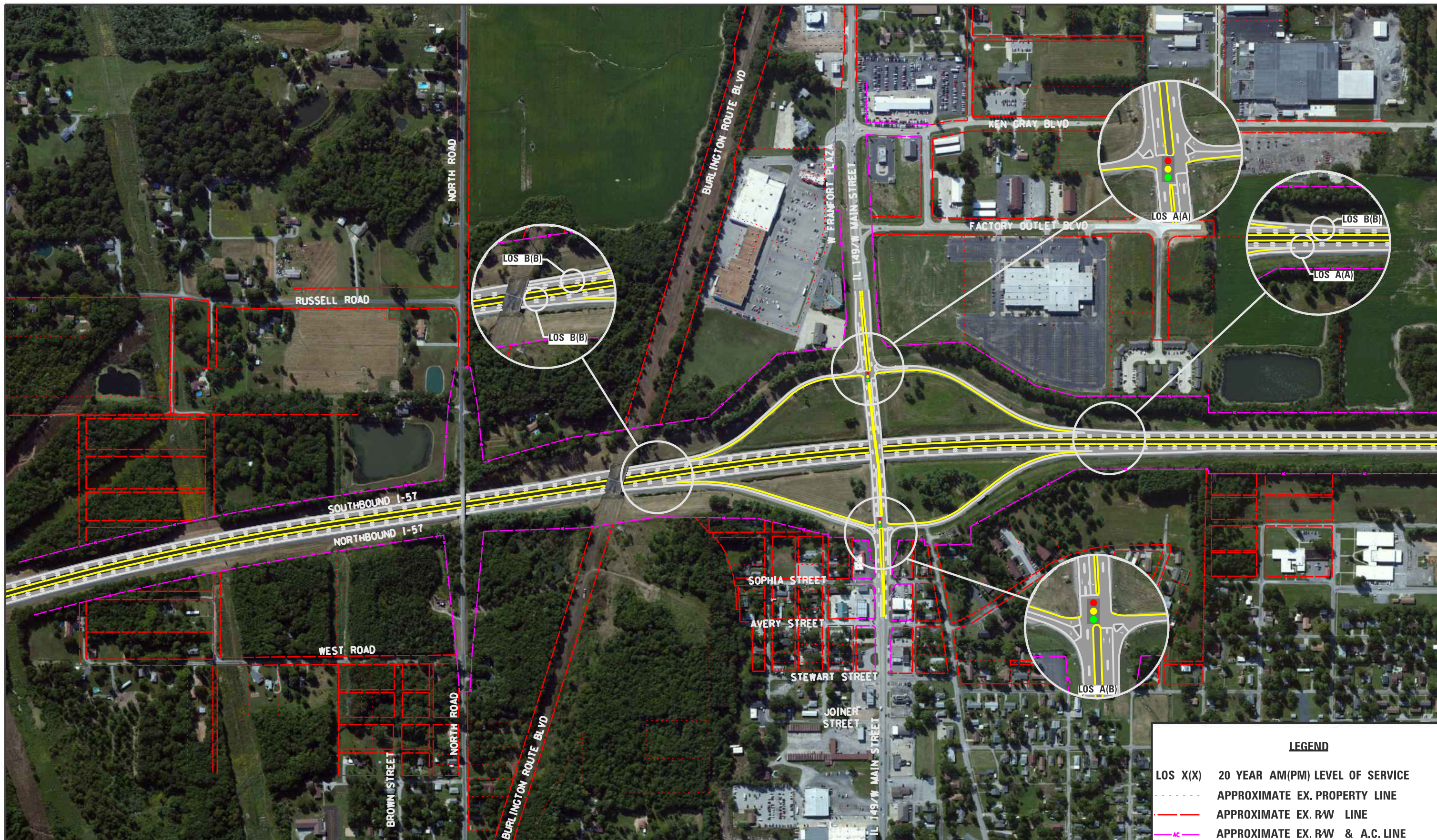
as “Locally-Funded Plan”) are documented in this report for review. The additional improvements will occur gradually over the 20-year life cycle of the interchange project. The project limits for the initial interchange, and the project limits for the additional local projects are shown in Figure 1-11B. For the purpose of this study, all of the additional improvements were assumed to be in place by, or prior to, the design year.

1.3.4 *Alternative No. 4 – Split-Diamond Interchange*

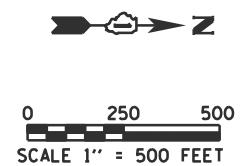
The fourth and final alternative analyzed for this AJR is a proposed Split-Diamond Interchange with one-way northbound and southbound Collector-Distributor (C-D) roads connecting the proposed Burlington Route Boulevard and IL 149, as depicted in Figure 1-12A. This alternative will require the complete removal of North Road bridge for the entrance and exit ramp construction at Burlington Northern bridge. North Road will be terminated with the use of a cul-de-sac on both sides of I-57 within the existing right-of-way. Due to the removal of North Road, Burlington Route Boulevard will experience a higher volume of traffic and will require an additional westbound through lane, which will also require the adjacent shoulder to widen from 6’ to 10’. Due to these changes, the existing Burlington Northern Bridge will require a complete deck reconstruction in order to accommodate the wider proposed roadway width.

The proposed Burlington Route Boulevard will provide a much-needed additional crossing of I-57 in this region. A primary concern is the ability to provide emergency services to residents and businesses located west of the I-57 corridor. This crossing will also provide additional access linking IL 149 and IL 37 without forcing traffic through the center of West Frankfort. This additional access allows for better distribution of traffic throughout the study area, thereby significantly reducing the existing capacity concerns on IL 149. Less congestion will potentially result in a significant reduction in the number of crashes along IL 149. This configuration of the proposed split-diamond interchange will also increase safety along the mainline of I-57 by relocating the major decision making areas away from the Burlington Northern Bridge. While this split-diamond interchange configuration changes the location of the access points on the interstate system, it does not increase the total number of access points required on the interstate system. The removal of the North Road Bridge may generate negative public opinion, but would open more ground with Interstate frontage for economic development and would reduce the overall cost of the project.

NOTE: In addition to the split-diamond interchange, several local road improvements are planned to accommodate the proposed economic development in the vicinity of the interchange. While these improvements are beyond the limits of the AJR study area, they are important factors affecting the geometrics, operation and access control within the limits of the AJR. Therefore, the additional improvements (also noted as “Locally-Funded Plan”) are documented in this report for review. The additional improvements will occur gradually over the 20-year life cycle of the interchange modification project. For the purpose of this study, all of the additional improvements were assumed to be in place by, or prior to, the design year. The project limits for the initial interchange, and the project limits for the additional local projects are shown in Figure 1-12B.

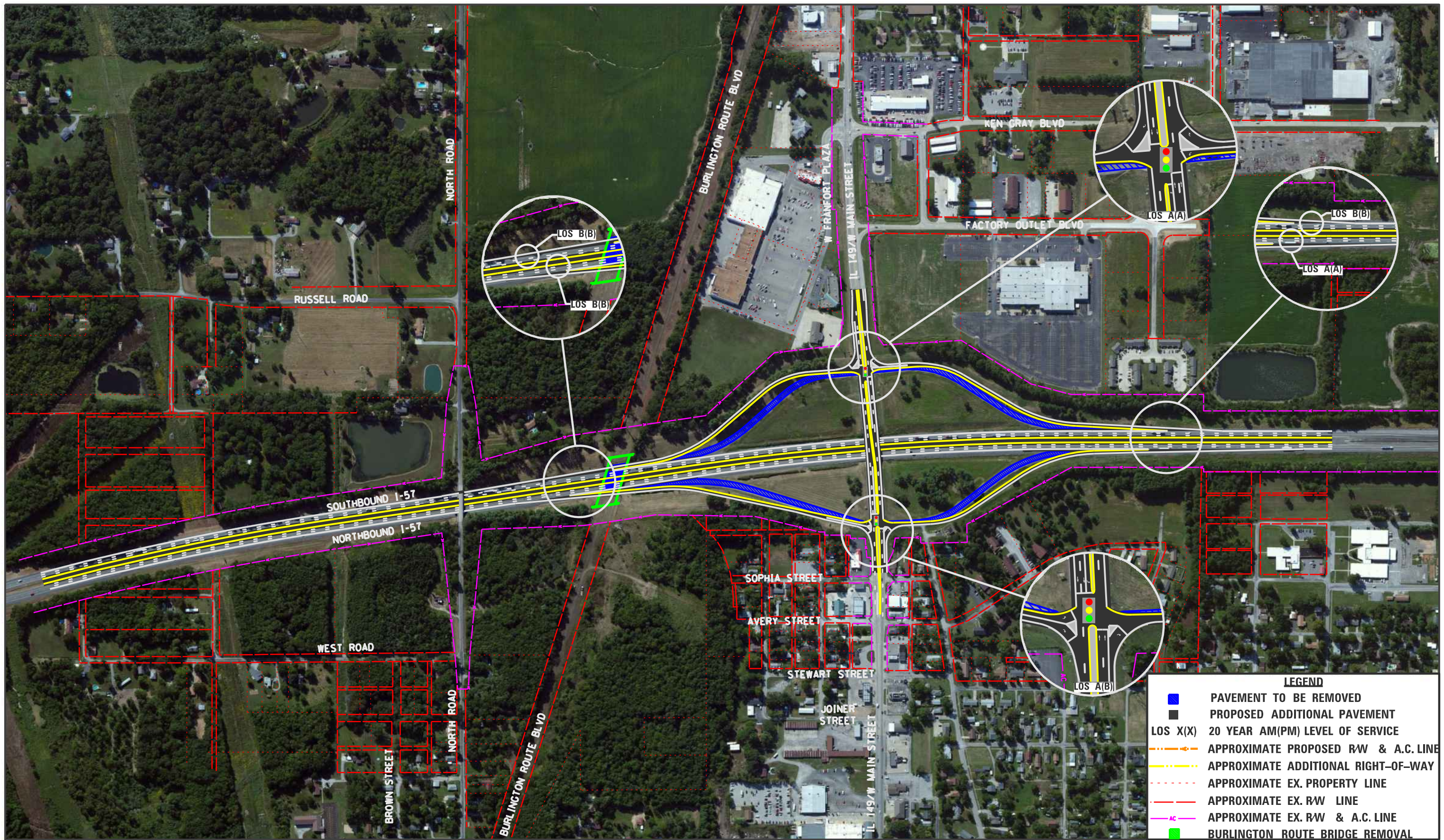


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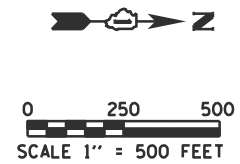


LEGEND	
LOS X(X)	20 YEAR AM(PM) LEVEL OF SERVICE
- - - - -	APPROXIMATE EX. PROPERTY LINE
—————	APPROXIMATE EX. RW LINE
—AC—	APPROXIMATE EX. RW & A.C. LINE

Figure 1-9
Alternative No. 1
No-Build



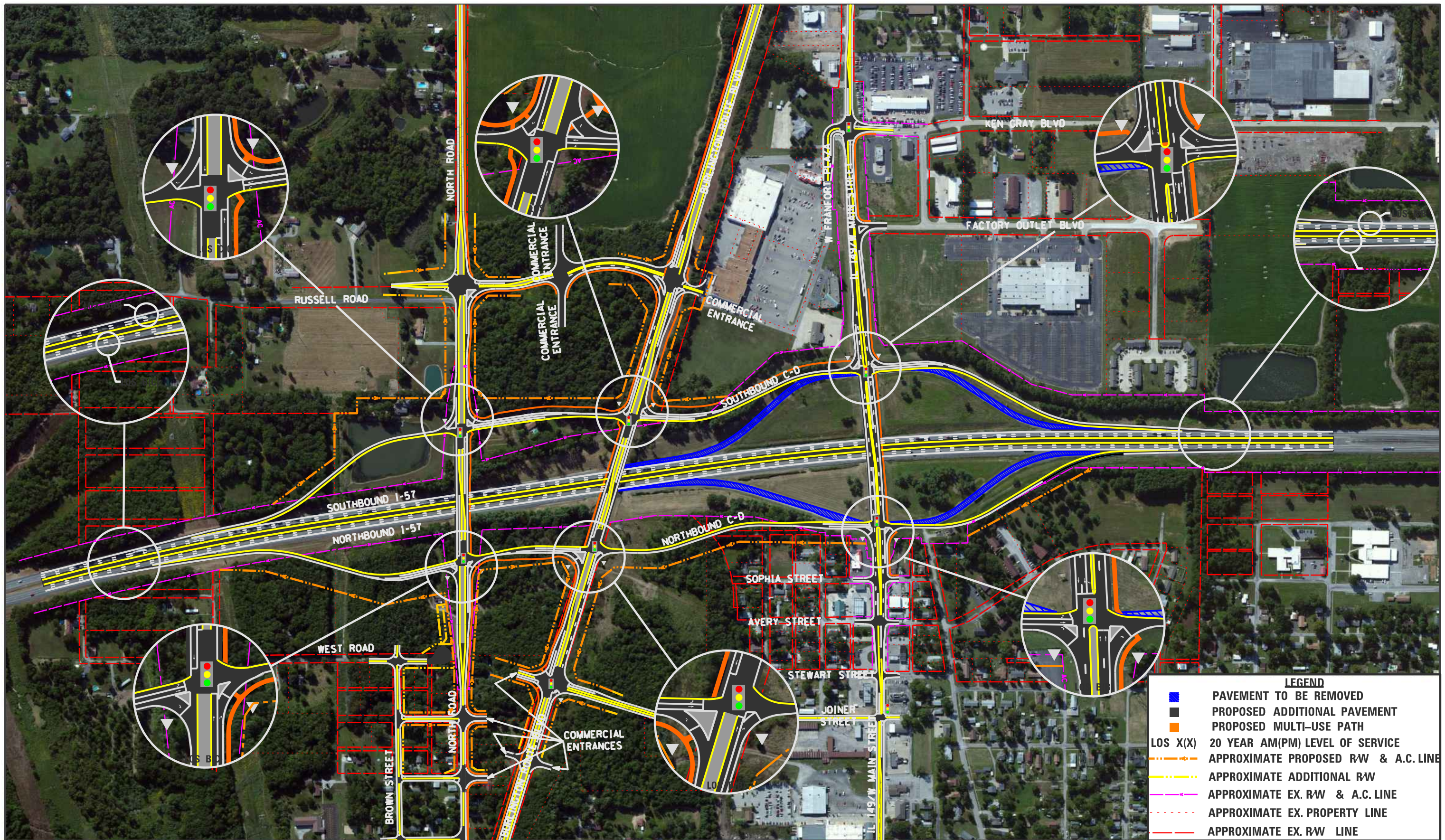
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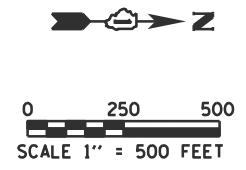
LEGEND

■	PAVEMENT TO BE REMOVED
■	PROPOSED ADDITIONAL PAVEMENT
LOS X(X)	20 YEAR AM(PM) LEVEL OF SERVICE
—	APPROXIMATE PROPOSED RW & A.C. LINE
—	APPROXIMATE ADDITIONAL RIGHT-OF-WAY
- - -	APPROXIMATE EX. PROPERTY LINE
—	APPROXIMATE EX. RW LINE
—	APPROXIMATE EX. RW & A.C. LINE
■	BURLINGTON ROUTE BRIDGE REMOVAL

Figure 1-10
Alternative No. 2
Upgrade Existing Diamond Interchange



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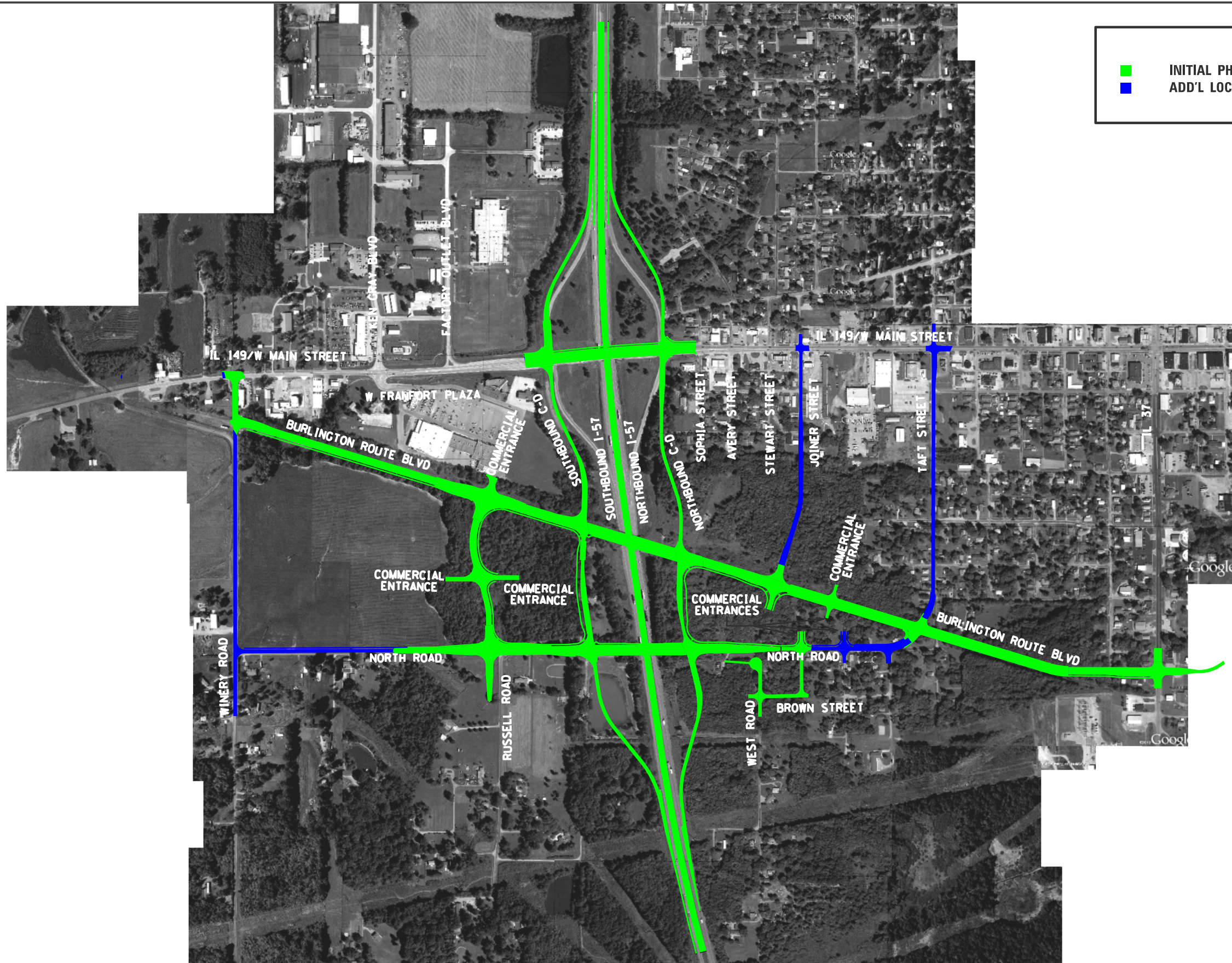


LEGEND

■	PAVEMENT TO BE REMOVED
■	PROPOSED ADDITIONAL PAVEMENT
■	PROPOSED MULTI-USE PATH
LOS X(X)	20 YEAR AM(PM) LEVEL OF SERVICE
—	APPROXIMATE PROPOSED RW & A.C. LINE
—	APPROXIMATE ADDITIONAL RW
—	APPROXIMATE EX. RW & A.C. LINE
—	APPROXIMATE EX. PROPERTY LINE
—	APPROXIMATE EX. RW LINE

Figure 1-11A

Alternative No. 3
Expanded Split Diamond Interchange



LEGEND

■ INITIAL PHASE IMPROVEMENTS

■ ADD'L LOCALLY FUNDED IMPROVEMENTS

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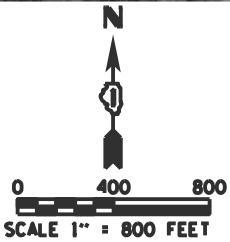
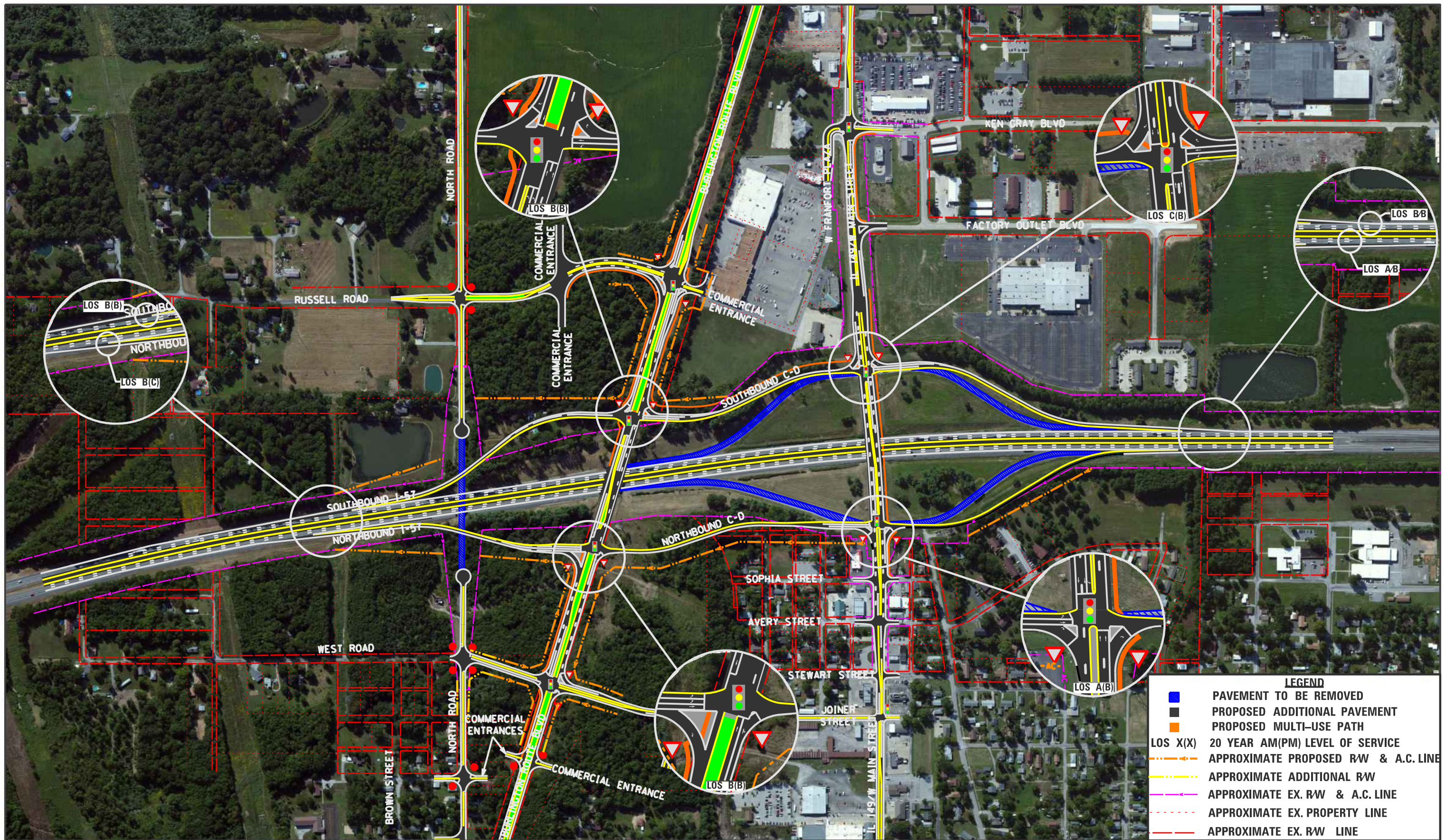


Figure 1-11B
Alternative No. 3
Expanded Split Diamond Interchange
Locally Funded Plan



LEGEND

- PAVEMENT TO BE REMOVED
- PROPOSED ADDITIONAL PAVEMENT
- PROPOSED MULTI-USE PATH
- LOS X(X) 20 YEAR AM(PM) LEVEL OF SERVICE
- APPROXIMATE PROPOSED RW & A.C. LINE
- APPROXIMATE ADDITIONAL RW
- APPROXIMATE EX. RW & A.C. LINE
- - - APPROXIMATE EX. PROPERTY LINE
- - - APPROXIMATE EX. RW LINE

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Access Justification Report

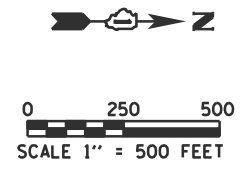
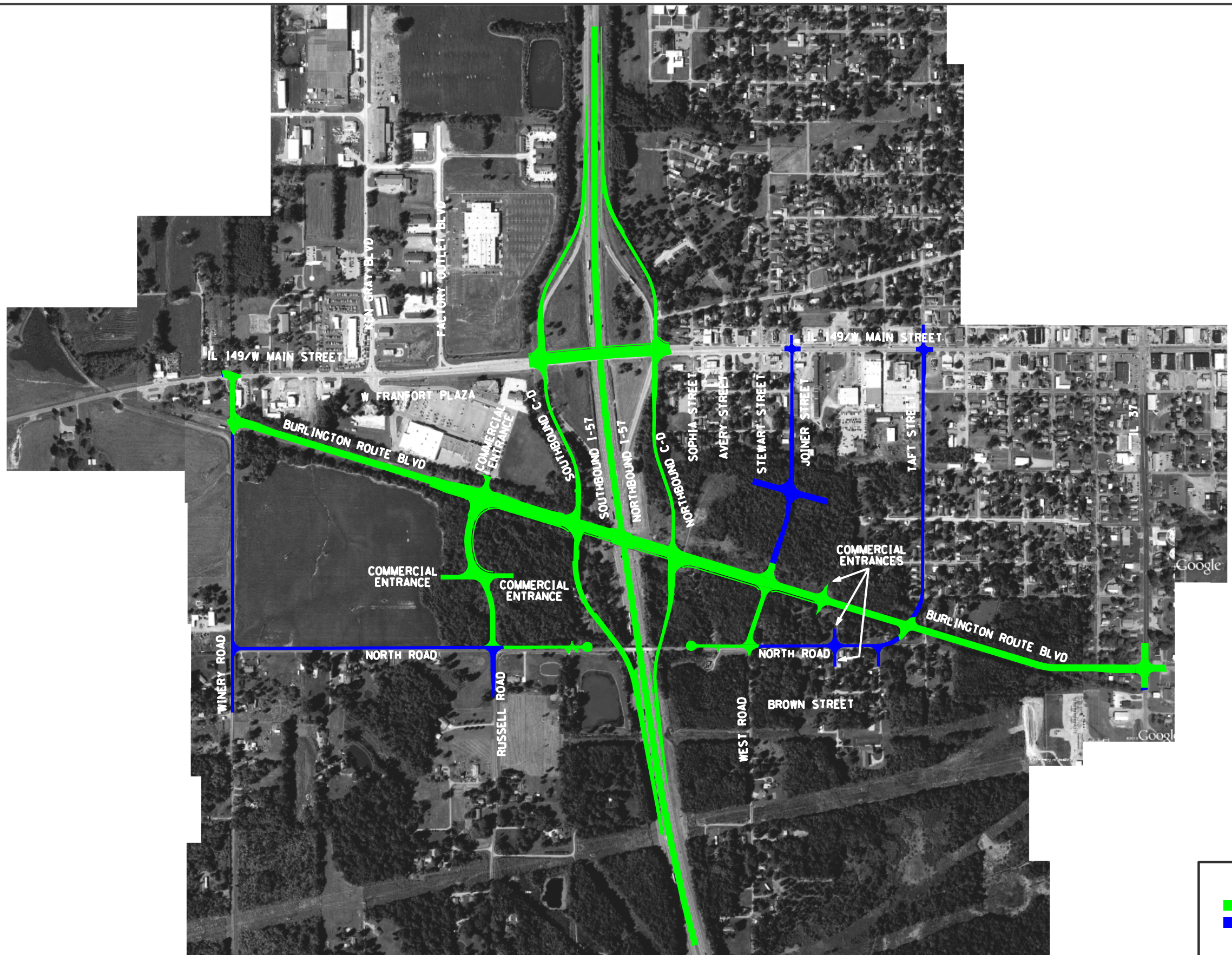
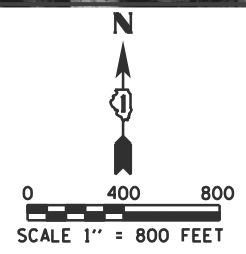


Figure 1-12A
Alternative No. 4
Split Diamond Interchange



I-57 /IL 149 INTERCHANGE MODIFICATION
Access Justification Report

Figure 1-12B
Alternative No. 4
Split Diamond Interchange
Locally Funded Plan



2 PURPOSE AND NEED

The primary purpose of this project is to improve the safety, connectivity, and economic development potential of the I-57 interchange with IL 149 in a way that benefits IDOT, as well as West Frankfort and the general public utilizing the interchange and the surrounding areas. The proposed split diamond interchange modification will help alleviate the capacity problems currently experienced along IL 149 within the project area by allowing traffic to disperse more evenly throughout the region. The completion of the proposed split-diamond interchange also offers West Frankfort an opportunity for new development in the area, providing a potential boost for the local economy. An additional benefit of the project is an improvement to the safety of the project area resulting in a reduced number of crashes, injuries and fatalities that occur in the vicinity of the I-57/IL 149 interchange. These benefits are accomplished with no increase in the number of access points required on the interstate system since the proposed split-diamond interchange simply relocates the existing access points along I-57.

2.1 TRAFFIC SAFETY

The project study area includes a segment of I-57 that is 2.54 miles long; 1.09 miles (43%) of which is currently listed in the “Five Percent Report Locations” for Illinois. Additionally, there are currently no accommodations for pedestrians or bicyclists to safely cross I-57 within the project area, which directly resulted in one pedestrian fatality crash and one bicycle vs. motorcycle crash with two serious/severe injuries. A total of 449 crashes occurred within the study area between 2007 and 2012. Of those crashes, 311 (69%) of them can be attributed to roadway deficiencies that exist within the project area. These deficiencies include capacity problems experienced along IL 149, one of the busiest urban two lane State Routes in the region, and the geometry of the horizontal curve and limited decision sight distance that exists along I-57. A detailed account of the traffic crashes reported in the study area is provided in Section 18 of this report.

2.2 TRAFFIC CAPACITY

Based on the existing traffic volumes and previous discussions with IDOT, IL 149 is one of the busiest state routes in the region. Table 2-1 lists the 2011 AADT volumes, based on the IDOT Getting Around Illinois – Annual Average Daily Traffic Map, for SR 149 and several other state routes in the region bounded by IL 14 to the north, IL 13 to the south, IL 148 to the west and IL 37 to the east. According to Table 2-1, the segment of IL 149 between Taft

Street and IL 37 within the project area boundary has the third highest AADT volumes of the state routes in the region analyzed.

Table 2-1: 2011 AADT Volumes for Similar State Routes in Project Region

Route	2011 AADT	Segment	Community
IL 13	31,800	Between Halfway Road and I-57 Northbound Ramps	Marion
IL 148	19,400	Between Clark Trail and W. Brewster Road/E. Railroad Avenue	Herrin
IL 149	15,500	Between Taft Street and IL 37	West Frankfort
IL 14	14,700	Between I-57 Northbound Ramps and Du Quoin Street	Benton
IL 37	12,500	Between W. Boulevard Street and W. Main Street	Marion
Note: 2011 AADT Volume Data from IDOT Getting Around Illinois Annual Average Daily Traffic Map			

As discussed previously, the proposed project provides a new connection to IL 149 and IL 37 that creates an additional route for commuters to access I-57 from both the east and west sides of the improved interchange. The new connection will alleviate the existing and future congestion on IL 149. As part of this AJR, a detailed capacity analysis was conducted for each of the studied alternatives. The results are provided and discussed in depth in the *Highway Capacity Analysis* section of this report.

2.3 ECONOMIC GROWTH AND DEVELOPMENT

The proposed improvements include the construction of a new roadway, Burlington Route Boulevard, which will provide access to approximately 150 acres of currently undeveloped land. This land is zoned to be a residential, commercial and industrial area according to the current zoning map for West Frankfort. The proposed project will improve access to this undeveloped land allowing the potential for additional economic growth and development in the project study area.

3 COST AND FUNDING

3.1 CONSTRUCTION COST ESTIMATE

This section provides a conceptual cost estimate summary for the existing interchange at IL 149 and I-57 to be reconstructed as a Split-Diamond interchange. Also, a conceptual estimate of the improvements needed to other state and local routes, as part of the overall development is included. Additional detail of the cost estimate is provided in Table 3-1

through Table 3-5 at the end of this section. There are no costs associated with study Alternative No. 1 - No-Build.

Alternative No. 2 – Upgrade of Existing Diamond Interchange includes the removal of the existing I-57 entrance and exit ramps located at IL 149, construction of new standard southbound/northbound entrance and exit ramps at IL 149, reconstruction of IL 149 for 500 feet east and west of the ramp termini, the removal of the Burlington Route Bridge and the addition of a third travel lane in each direction on I-57. The anticipated combined construction cost amount is **\$18.3 M**, with a land acquisition cost of **\$0.09 M**.

Alternative No. 3 – Expanded Split-Diamond Interchange includes the removal of the existing I-57 entrance and exit ramps located at IL 149, construction of new standard southbound exit and northbound entrance ramps at IL 149, collector-distributor roads (from IL 149 to North Road), Burlington Route Boulevard crossroad on the existing railroad bridge, removal and reconstruction of North Road crossroad and bridge, modification and extension of local urban roads, construction of new standard southbound entrance and northbound exit ramps at North Road, and the addition of a third travel lane in each direction on I-57. Due to the addition of a cul-de-sac on West Road south of North Road, a lift station will also require relocation. The anticipated combined construction cost amount is **\$28.25 M**, with a land acquisition cost of **\$3.40 M**.

An additional component of the Expanded Split-Diamond Interchange is the series of local projects associated with the interchange project. These projects are independent of the interchange, will be funded separately, and are identified as the “Locally-Funded Plan”. The construction costs of those projects are listed below per category.

- Local Road Improvements
 - North Road Reconstruction – **\$0.85 M**
 - Taft Street Reconstruction – **\$0.35 M**
 - Joiner Street Reconstruction – **\$0.45 M**
 - Old Winery Road Improvements – **\$0.5 M**
- Intersection Improvements
 - Joiner Street & IL 149 Intersection – **\$0.30 M**
 - Taft Street & IL 149 Intersection – **\$0.30 M**

- North Road & Burlington Route Boulevard Intersection – **\$0.15 M**
- Land Acquisition
 - North Road Improvements – **\$0.025M**
 - Joiner Street Reconstruction – **\$0.050M**
 - Old Winery Road Reconstruction – **\$0.040M**
 - Taft Street Reconstruction – **\$0.075M**

Alternative No. 4 - Split-Diamond Interchange includes the removal of the existing I-57 entrance and exit ramps located at IL 149, construction of new standard southbound exit and northbound entrance ramps at IL 149, collector-distributor roads (from IL 149 to Burlington Route Boulevard), Burlington Route Boulevard crossroad on the existing railroad bridge substructure with a reconstructed concrete deck, removal of North Road crossroad and bridge, construction of new standard southbound entrance and northbound exit ramps at Burlington Route Boulevard, and the addition of a third travel lane in each direction on I-57. The anticipated combined construction cost amount is **\$21.45 M**, with a land acquisition cost of **\$2.40 M**.

An additional component of the Split-Diamond Interchange is the series of local projects associated with the interchange project. These projects are independent of the interchange, will be funded separately, and are identified as the “Locally-Funded Plan”. The construction costs of those projects are listed below per category.

- Local Road Improvements
 - North Road Reconstruction – **\$0.85 M**
 - Taft Street Reconstruction – **\$0.35 M**
 - Joiner Street Reconstruction – **\$0.45 M**
 - Old Winery Road Improvements – **\$0.5 M**
- Intersection Improvements
 - Joiner Street & IL 149 Intersection – **\$0.30 M**
 - Taft Street & IL 149 Intersection – **\$0.30 M**
 - North Road & Burlington Route Boulevard Intersection – **\$0.15 M**

- Land Acquisition
 - North Road Improvements – **\$0.025M**
 - North Road & Russell Road Intersection – **\$0.100M**
 - Joiner Street Reconstruction – **\$0.050M**
 - Old Winery Road Reconstruction – **\$0.040M**
 - Taft Street Reconstruction – **\$0.075M**

Table 3-1: Alternative No. 2 - Upgrade of Existing Diamond Interchange Cost Estimate

Alternative No. 2 - Upgrade of Existing Diamond Interchange Cost Estimate									
DESCRIPTION	TERMINI	TYPICAL SECTION	LENGTH (MILES)	AREA (SF)	COST/MILE	COST/SF	COST	COST USED IN ESTIMATE	
I-57 RECONSTRUCTION	ENTRANCE AND EXIT RAMPS FOR IL ROUTE 149	16'-24' WIDE PAVEMENT WIDTH AND OUTSIDE SHOULDER (6') AND INSIDE SHOULDER (4')	1.7		\$2,200,000		\$3,740,000	\$3,750,000	
	2 NEW SIGNALIZED INTERSECTIONS						\$300,000	\$300,000	
	I-57 INTERCHANGE RECONSTRUCTION LIMITS	NEW MEDIAN*	1.7		\$1,000,000		\$1,700,000	\$1,700,000	
	RECONSTRUCT EXISTING PUMP STATION						\$6,000,000	\$6,000,000	
IL ROUTE 149	500' WEST OF SOUTHBOUND RAMP TO 500' EAST OF NORTHBOUND RAMP. PAVING EXCEPTION AT THE EXISTING BRIDGE.	4 LANE URBAN ROADWAY WITH 18' MED, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE	0.3		\$4,000,000		\$1,200,000	\$1,200,000	
BURLINGTON ROUTE	EXISTING RAILROAD BRIDGE TO BE REMOVED	153' SPAN x 94' WIDE		14382		\$35	\$503,370	\$550,000	
	REPLACE EXISTING BRIDGE WITH EQUIVALENT LOAD CAPACITY PER BDE STANDARDS**	255' SPAN x 94' WIDE		23970		\$200	\$4,794,000	\$4,800,000	
LAND ACQUISITION***	INTERCHANGE (3 PARCELS FOR A TOTAL OF 0.72 ACRES)						\$90,000	\$90,000	
Total								\$18,327,370	\$18,390,000

* TO BE BUILT BY OTHERS

** COST RANGE COULD VARY PENDING FUTURE BRIDGE OWNERSHIP

*** LAND ACQUISITION COST PROVIDED BY IDOT

Table 3-2: Alternative No. 3 – Expanded Split-Diamond Interchange Cost Estimate

ALTERNATIVE No. 3 - EXPANDED SPLIT-DIAMOND INTERCHANGE COST ESTIMATE									
DESCRIPTION	TERMINI	TYPICAL SECTION	LENGTH (MILES)	AREA (SF)	COST/MILE	COST/SF	COST	COST USED IN ESTIMATE	
NORTH ROAD RECONSTRUCTION	FROM RUSSELL ROAD TO ROLLA STREET	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND 10' MULTI-USE PATH	0.59		\$3,250,000		\$1,917,500	\$1,950,000	
	NORTH ROAD BRIDGE REMOVAL	200' SPAN X 24' WIDTH		4800		\$35	\$168,000	\$200,000	
	NEW NORTH BRIDGE	200' SPAN x 77' WIDTH		15400		\$275	\$4,235,000	\$4,250,000	
	SIGNALIZED INTERSECTIONS	4 SIGNALIZED INTERSECTIONS					\$600,000	\$600,000	
BURLINGTON ROUTE BOULEVARD	INTERSECTION WIDENING AT IL ROUTE 37 AND BURLINGTON ROUTE BOULEVARD		0.3		\$1,000,000		\$300,000	\$300,000	
	FROM JOINER STREET TO IL ROUTE 37	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE	0.5		\$2,400,000		\$1,200,000	\$1,200,000	
	FROM RUSSELL ROAD TO NEW CONNECTION OF JOINER STREET	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND 10' MULTI-USE PATH	0.57		\$3,250,000		\$1,852,500	\$1,900,000	
	FROM OLD WINERY ROAD TO RUSSELL ROAD	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND MULTI-USE PATH	0.32		\$3,000,000		\$960,000	\$1,000,000	
	BURLINGTON NORTHERN BRIDGE MODIFICATIONS	160' SPAN x 85' WIDTH		13600		\$25	\$340,000	\$350,000	
	SIGNALIZED INTERSECTIONS	4 SIGNALIZED INTERSECTIONS					\$600,000	\$600,000	
NEW WINERY ROAD AND INTERSECTION AT IL ROUTE 149	FROM BURLINGTON ROUTE TO IL ROUTE 149	2 LANE URBAN ROADWAY	0.08		\$1,400,000		\$112,000	\$150,000	
IL ROUTE 149	300' WEST OF SOUTHBOUND RAMP TO 300' EAST OF NORTHBOUND RAMP. PAVING EXCEPTION AT THE EXISTING BRIDGE.	4 LANE URBAN ROADWAY WITH 18' MED, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE	0.26		\$4,000,000		\$1,040,000	\$1,050,000	
	BRIDGE WIDENING TO ACCOMADATE PATH	208' SPAN X 13' WIDTH		2704		\$140	\$378,560	\$400,000	
	SIGNALIZED INTERSECTIONS	2 SIGNALIZED INTERSECTIONS					\$300,000	\$300,000	
RUSSELL ROAD	300' NORTH AND SOUTH OF RUSSELL ROAD/NORTH INTERSECTION	2 LANE URBAN ROADWAY WITH 18' MEDIAN	0.14		\$1,800,000		\$252,000	\$300,000	
	300' NORTH AND SOUTH OF BURLINGTON ROUTE BOULEVARD/RUSSELL ROAD	2 LANE URBAN ROADWAY WITH 18' MEDIAN	0.11		\$1,800,000		\$198,000	\$200,000	
JOINER STREET	300' NORTH AND SOUTH OF JOINER STREET/BURLINGTON ROUTE BOULEVARD INTERSECTION	2 LANE URBAN ROADWAY WITH TURN BAYS- 48' WIDTH	0.11		\$2,500,000		\$275,000	\$300,000	
URBAN LOCAL ROAD	CONNECTOR BETWEEN NORTH ROAD AND BROWN STREET	2 LANE URBAN ROADWAY	0.08		\$1,400,000		\$112,000	\$150,000	
WEST ROAD	ELIMINATE NORTH AND WEST ROAD INTERSECTION	2 LANE URBAN ROADWAY WITH CUL-DE-SAC	0.09		\$1,400,000		\$126,000	\$150,000	
	LIFT STATION RELOCATION						\$100,000	\$100,000	
BROWN STREET	EXTEND EXISTING ROADWAY TO WEST ROAD	2 LANE URBAN ROADWAY	0.14		\$1,400,000		\$196,000	\$200,000	
I-57 RECONSTRUCTION	ENTRANCE AND EXIT RAMP FOR NORTH ROAD	16'-36' WIDE PAVEMENT WIDTH AND OUTSIDE SHOULDER (6') AND INSIDE SHOULDER (4')	0.83		\$1,900,000		\$1,577,000	\$1,600,000	
	ENTRANCE AND EXIT RAMP FOR IL ROUTE 149	16'-36' WIDE PAVEMENT WIDTH AND OUTSIDE SHOULDER (6') AND INSIDE SHOULDER (4')	0.87		\$1,900,000		\$1,653,000	\$1,700,000	
	CD ROADS FROM NORTH ROAD TO BURLINGTON ROUTE	16'-36' WIDE PAVEMENT WIDTH, OUTSIDE SHOULDER (6'), INSIDE SHOULDER (4'), AND 10' MULTI-USE PATH	0.3		\$2,500,000		\$750,000	\$750,000	
	CD ROADS FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	16'-36' WIDE PAVEMENT WIDTH, OUTSIDE SHOULDER (6'), INSIDE SHOULDER (4'), AND 10' MULTI-USE PATH	0.53		\$2,100,000		\$1,113,000	\$1,150,000	
	I-57 INTERCHANGE RECONSTRUCTION LIMITS	NEW MEDIAN*	1.4		\$1,000,000		\$1,400,000	\$1,400,000	
	RECONSTRUCT EXISTING PUMP STATION AT IL-149 AND NORTHBOUND ENTRANCE RAMP						\$6,000,000	\$6,000,000	
LAND ACQUISITION**	6 RESIDENTIAL RELOCATIONS, 29 RESIDENTIAL PARCELS, AND 8 COMMERCIAL PARCELS FOR A TOTAL OF 48.5 ACRES						\$3,405,000	\$3,400,000	
							TOTAL	\$31,160,560	\$31,650,000

* TO BE BUILT BY OTHERS

** LAND ACQUISITION COST PROVIDED BY IDOT

Table 3-3: Alternative No. 3 – Locally-Funded Plan Cost Estimate

ALTERNATIVE No. 3 -LOCALLY-FUNDED PLAN & LOCALLY FUNDED LAND ACQUISITION COST ESTIMATE								
DESCRIPTION	TERMINI	TYPICAL SECTION	LENGTH (MILES)	AREA (SF)	COST/MILE	COST/SF	COST	COST USED IN ESTIMATE
NORTH ROAD	FROM WEST ROAD TO BURLINGTON ROUTE BOULEVARD	2 LANE URBAN ROADWAY, AND MULTI-USE PATH	0.19		\$2,000,000		\$380,000	\$400,000
	FROM OLD WINERY ROAD TO RUSSELL ROAD	2 LANE URBAN ROADWAY	0.32		\$1,400,000		\$448,000	\$450,000
TAFT STREET RECONSTRUCTION	FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	2 LANE LOCAL ROAD	0.3		\$1,100,000		\$330,000	\$350,000
JOINER STREET RECONSTRUCTION	FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	2 LANE LOCAL ROAD	0.4		\$1,100,000		\$440,000	\$450,000
OLD WINERY ROAD	FROM NORTH ROAD TO BURLINGTON ROUTE BOULEVARD	2 LANE URBAN ROADWAY	0.33		\$1,400,000		\$462,000	\$500,000
INTERSECTION IMPROVEMENTS	INTERSECTION WIDENING AT IL ROUTE 37 AND BURLINGTON ROUTE BOULEVARD		0.3		\$1,000,000		\$300,000	\$300,000
	NEW SIGNALIZED INTERSECTION AT JOINER STREET AND IL ROUTE 149						\$300,000	\$300,000
	NEW SIGNALIZED INTERSECTION AT TAFT STREET AND IL ROUTE 149						\$300,000	\$300,000
	NEW SIGNALIZED INTERSECTION AT NORTH ROAD AND BURLINGTON ROUTE BOULEVARD						\$150,000	\$150,000
LAND ACQUISITION	NORTH ROAD IMPROVEMENTS						\$25,000	\$25,000
	JOINER STREET RECONSTRUCTION						\$50,000	\$50,000
	OLD WINERY ROAD RECONSTRUCTION						\$40,000	\$40,000
	TAFT STREET RECONSTRUCTION						\$75,000	\$75,000
TOTAL							\$3,300,000	\$3,390,000

Table 3-4: Alternative No. 4 - Split-Diamond Interchange Cost Estimate

ALTERNATIVE No. 4 - SPLIT-DIAMOND INTERCHANGE COST ESTIMATE								
DESCRIPTION	TERMINI	TYPICAL SECTION	LENGTH (MILES)	AREA (SF)	COST/MILE	COST/SF	COST	COST USED IN ESTIMATE
NORTH ROAD RECONSTRUCTION	WEST CUL-DE-SAC	2 LANE URBAN ROADWAY	0.07		\$700,000		\$49,000	\$50,000
	EAST CUL-DE-SAC TO 300' EAST OF WEST ROAD	2 LANE URBAN ROADWAY	0.07		\$700,000		\$49,000	\$50,000
	REMOVAL OF EAST AND WEST BRIDGE APPROACHES						\$100,000	\$100,000
	NORTH ROAD BRIDGE REMOVAL	200' SPAN X 24' WIDTH		4800		\$35	\$168,000	\$200,000
BURLINGTON ROUTE BOULEVARD	INTERSECTION WIDENING AT IL ROUTE 37 AND BURLINGTON ROUTE BOULEVARD		0.3		\$1,000,000		\$300,000	\$300,000
	FROM JOINER STREET TO IL ROUTE 37	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE	0.5		\$2,400,000		\$1,200,000	\$1,200,000
	FROM RUSSELL ROAD TO NEW CONNECTION OF JOINER STREET	2-3 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND 10' PEDESTRIAN PATH	0.57		\$3,750,000		\$2,137,500	\$2,150,000
	FROM OLD WINERY ROAD TO RUSSELL ROAD	2 LANE URBAN ROADWAY WITH 30' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND MULTI-USE PATH	0.32		\$3,000,000		\$960,000	\$1,000,000
	BURLINGTON NORTHERN BRIDGE DECK REMOVAL	160' SPAN X 85' WIDTH		14880		\$15	\$223,200	\$250,000
	BURLINGTON NORTHERN BRIDGE DECK RECONSTRUCTION	160' SPAN X 100' WIDTH		16000		\$45	\$720,000	\$750,000
NEW WINERY ROAD AND INTERSECTION AT IL ROUTE 149	SIGNALIZED INTERSECTIONS	4 SIGNALIZED INTERSECTIONS				\$600,000	\$600,000	
FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149		2 LANE URBAN ROADWAY	0.08		\$1,400,000		\$112,000	\$150,000
IL ROUTE 149	300' WEST OF SOUTHBOUND RAMP TO 300' EAST OF NORTHBOUND RAMP. PAVING EXCEPTION AT THE EXISTING BRIDGE.	4 LANE URBAN ROADWAY WITH 18' MED, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE	0.26		\$4,000,000		\$1,040,000	\$1,050,000
	BRIDGE WIDENING TO ACCOMADATE PATH	208' SPAN X 13' WIDTH		2704		\$140	\$378,560	\$400,000
	SIGNALIZED INTERSECTIONS	2 SIGNALIZED INTERSECTIONS					\$300,000	\$300,000
RUSSELL ROAD	300' NORTH AND SOUTH OF BURLINGTON ROUTE BOULEVARD/RUSSELL ROAD	2 LANE URBAN ROADWAY WITH 18' MEDIAN, LEFT AND RIGHT TURN LANES FOR TRUCK ROUTE, AND 10' MULTI-USE PATH	0.11		\$2,200,000		\$242,000	\$250,000
JOINER STREET	300' NORTH AND SOUTH OF JOINER STREET/BURLINGTON ROUTE INTERSECTION	2 LANE URBAN ROADWAY WITH TURN BAYS- 48' WIDTH	0.11		\$2,500,000		\$275,000	\$300,000
WEST ROAD	FROM 300' SOUTH OF JOINER STREET TO NORTH ROAD	3 LANE URBAN ROADWAY	0.06		\$2,100,000		\$126,000	\$150,000
I-57 RECONSTRUCTION	ENTRANCE AND EXIT RAMPS FOR BURLINGTON ROUTE BOULEVARD	16'-48' WIDE PAVEMENT WIDTH AND OUTSIDE SHOULDER (6') AND INSIDE SHOULDER (4')	0.83		\$2,300,000		\$1,909,000	\$1,950,000
	ENTRANCE AND EXIT RAMPS FOR IL ROUTE 149	16'-36' WIDE PAVEMENT WIDTH AND OUTSIDE SHOULDER (6') AND INSIDE SHOULDER (4')	0.87		\$1,900,000		\$1,653,000	\$1,700,000
	CD ROADS FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	16'-36' WIDE PAVEMENT WIDTH, OUTSIDE SHOULDER (6'), INSIDE SHOULDER (4'), AND 10' MULTI-USE PATH	0.53		\$2,100,000		\$1,113,000	\$1,150,000
	I-57 INTERCHANGE RECONSTRUCTION LIMITS	NEW MEDIAN*	1.4		\$1,000,000		\$1,400,000	\$1,400,000
	RECONSTRUCT EXISTING PUMP STATION AT IL-149 AND NORTHBOUND ENTRANCE RAMP						\$6,000,000	\$6,000,000
LAND ACQUISITION**	5 RESIDENTIAL RELOCATIONS, 20 RESIDENTIAL PARCELS, AND 8 COMMERCIAL PARCELS FOR A TOTAL OF 32.9 ACRES						\$2,405,000	\$2,400,000
TOTAL							\$23,460,260	\$23,850,000

* TO BE BUILT BY OTHERS

** LAND ACQUISITION COST PROVIDED BY IDOT

Table 3-5: Alternative No. 4 – Locally-Funded Plan Cost Estimate

ALTERNATIVE No. 4 -LOCALLY-FUNDED PLAN & LOCALLY-FUNDED LAND ACQUISITION COST ESTIMATE								
DESCRIPTION	TERMINI	TYPICAL SECTION	LENGTH (MILES)	AREA (SF)	COST/MILE	COST/SF	COST	COST USED IN ESTIMATE
NORTH ROAD	FROM WEST ROAD TO BURLINGTON ROUTE BOULEVARD	2 LANE URBAN ROADWAY, AND MULTI-USE PATH	0.19		\$2,000,000		\$380,000	\$400,000
	FROM OLD WINERY ROAD TO RUSSELL ROAD	2 LANE URBAN ROADWAY	0.32		\$1,400,000		\$448,000	\$450,000
TAFT STREET RECONSTRUCTION	FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	2 LANE LOCAL ROAD	0.3		\$1,100,000		\$330,000	\$350,000
JOINER STREET RECONSTRUCTION	FROM BURLINGTON ROUTE BOULEVARD TO IL ROUTE 149	2 LANE LOCAL ROAD	0.4		\$1,100,000		\$440,000	\$450,000
OLD WINERY ROAD	FROM NORTH ROAD TO BURLINGTON ROUTE BOULEVARD	2 LANE URBAN ROADWAY	0.33		\$1,400,000		\$462,000	\$500,000
INTERSECTION IMPROVEMENTS	NEW SIGNALIZED INTERSECTION AT JOINER STREET AND IL ROUTE 149						\$300,000	\$300,000
	NEW SIGNALIZED INTERSECTION AT TAFT STREET AND IL ROUTE 149						\$300,000	\$300,000
	NEW SIGNALIZED INTERSECTION AT NORTH ROAD AND BURLINGTON ROUTE BOULEVARD						\$150,000	\$150,000
LAND ACQUISITION	NORTH ROAD IMPROVEMENTS						\$25,000	\$25,000
	NORTH ROAD AND RUSSELL ROAD						\$100,000	\$100,000
	JOINER STREET RECONSTRUCTION						\$50,000	\$50,000
	OLD WINERY ROAD RECONSTRUCTION						\$40,000	\$40,000
	TAFT STREET RECONSTRUCTION						\$75,000	\$75,000
TOTAL							\$3,100,000	\$3,190,000

3.2 PROJECT FUNDING

Typical funding for this type of project is allocated via federal/state infrastructure improvement monies with matching funds from local sources as well as economic development grant programs. Additionally, due to the nature of the specific proposed improvements at this location, funds may also be available from federal programs for safety improvements.

4 BACKGROUND INFORMATION

4.1 PUBLIC INPUT

As mentioned in Section 1.2, the proposed improvements to the I-57 and IL 149 interchange have been a major topic of discussion regionally over the past several years. Although no formal public involvement has been conducted, the project has been discussed and coordinated with the public, IDOT and the FHWA. All meetings and interviews were informal in nature with the intent of conveying general project information. Formal meeting minutes and sign-in sheets were not compiled.

The following is a list of the public groups that have been involved to date regarding the proposed project:

- Property owners gathering
- West Frankfort Chamber of Commerce
- West Frankfort Community Counsel
- Denning Township Board
- West Frankfort Lions Club
- West Frankfort Rotary Club
- Egyptian Building & Construction Trades (AFL-CIO)
- Franklin County Board
- Johnston City 20/20 Committee
- First Christian Church Senior Group
- Southern Illinois Mayors

Local media sources, both television stations and newspapers, have also conducted publicly available interviews, discussions and news articles with the developer regarding the proposed split-diamond interchange configuration. The following is a list of the media sources that have been formally involved in publicizing the project to date:

- WSIL TV 3
- KFVS TV 12
- Southern Illinoisan Newspaper
- The Daily American Newspaper
- Internet Web Site and Facebook Page

The developer has had numerous conversations with various elected and appointed officials for Franklin, Williamson, Jackson, Saline and Jefferson counties, as well as local business people, trades people and local residents alike. The developer also provided a scale model of the proposed project for public viewing that was on display at GL Williams Real Estate for six months.

Formal public involvement according to the Context Sensitive Solutions approach will be conducted in Phase 1 of the project process. The general public and residents of the City of West Frankfort have thus far been supportive of the proposed split-diamond interchange concept. There also is a general consensus among the City of West Frankfort, the developer, IDOT and the FHWA that a proposed split-diamond interchange modification is a viable alternative to consider for the project area.

4.2 NEPA STATUS

A preliminary environmental screening was conducted as part of this report. The screening concluded that there are no major red flags indicated within the project area. A copy of the preliminary Red Flag Survey Report is provided in *Appendix A* of this report.

However, more detailed environmental surveys are necessary. The NEPA policy and procedure will be accomplished as part of the normal project development process and as a condition of the final access approval.

5 CONCERNS

5.1 I-57 SEGMENT & IL 149 CORRIDOR SAFETY

A primary concern within the study area pertains to the safety of the motorists that utilize the I-57 and IL 149 corridors. There are two IDOT Five Percent Report locations immediately north and south of the existing interchange ramps.

Between 2007 and 2012, within the project area, there were approximately 0.40 injuries or deaths per crash, which is approximately 44% higher than the statewide rate of approximately 0.28 injuries or deaths per crash, according to the data provided by IDOT.

Also within the project study area, 27% of the total crashes between 2007 and 2012 involved injury or death, whereas statewide only 20% of total crashes involved injury or death, according to the IDOT Crash Facts Reports for each year between 2007 and 2012.

Based on the traffic crash reports and information provided by IDOT, approximately 79% of injury crashes during the study period within the study area were due to potential roadway deficiencies. These deficiencies primarily relate to the poor sight distances along the horizontal curve in the roadway on I-57, close proximity of the interchange entrance and exit ramps to the existing Burlington Route Bridge and North Road Bridge and ineffective signal timings. A detailed account of the traffic crashes reported in the study area is provided in Section 18 of this report.

Because of the relatively high number of crashes at or near the exit and entrance ramps, decision sight distance (DSD) was used to determine if adequate sight distance is provided for a driver to perceive and react to changes in speed, path, and direction at each ramp. Table 5-1 provides the estimated available sight distances for each ramp location along I-57. The IDOT BDE Manual Section 31-3.02 lists the minimum decision sight distance for 70 MPH on a rural road as 1,105 feet. A detailed analysis of the crashes in the project area is provided in the *Operational and Safety Analysis* section of this report (Report Section 18).

Table 5-1: Estimated Sight Distances & Obstructions

Location	Estimated Available Sight Distance (feet)	Obstruction(s)
NB Exit Ramp	900	Burlington Bridge East Abutment, North Road bridge pier
NB Entrance Ramp	1,050	IL 149 bridge
SB Exit Ramp	Over 2,640	N/A
SB Entrance Ramp	1,300	IL 149 bridge, berm between entrance ramp and I-57 travel lanes.

Note: Distances based on field observations and Google Earth measurements and street views.

IDOT is proceeding with plans to add median lanes to address capacity issues along this segment of I-57. The construction of these lanes may require the modification of mainline entry/egress points for the ramps linking I-57 and IL 149. Within the context of a project that only addresses the widening of I-57, the Burlington Bridge would have to be removed for the reconstructed ramps south of IL 149 to meet the required standard geometric criteria. Burlington bridge removal is also required to meet DSD criteria for the northbound exit ramp.

In contrast, combining the widening of I-57 with the reconfiguration of the existing IL 149 interchange to an expanded split-diamond interchange (Alternative #3) that includes access to and from North Road provides an overall safer roadway network for motorists without increasing the total number of access points required on the interstate system. Providing traffic access across the Burlington Bridge and North Road Bridge (Alternative #3 only) will reduce traffic volumes along IL 149 near the interchange and will provide an important additional link for emergency vehicles to access properties located on the west side of I-57.

In addition to safety, traffic operations on IL 149 are also a concern. IL 149 is currently one of the busiest regional state highways, as documented in Table 2-1. The 2011 Annual Average Daily Traffic (AADT) volumes within the project study area along IL 149 were obtained from the IDOT Traffic Count Database System (TCDS). The TCDS data showed that the peak hour volumes along IL 149 were approximately 8.5% of the AADT. The 2012 Annual Average Daily Traffic (AADT) volumes within the project study area along IL 149 were calculated using the peak-hour traffic volume counts conducted for this report and the same 8.5% of the AADT from 2011 TCDS data. The 2012 AADT volumes along IL 149 range from 7,770 vehicles per day (vpd) up to 16,900 vpd.

5.2 COORDINATION BETWEEN ADJACENT DEVELOPMENT, CITY OF WEST FRANKFORT AND IDOT PROJECTS

The developer and the City of West Frankfort have coordinated with IDOT and FHWA from the very beginning of the planning process for this project. There are current plans to widen the portion of I-57 that runs through the project study area from two to three lanes in each direction. These plans were taken into account for all future conditions scenarios.

Current plans for improvements to the intersection of IL 149 and IL 37 were provided by IDOT and taken into consideration for the analysis of all future conditions scenarios. There are currently no other local projects within or in the immediate vicinity of the project study area. All roadway connections and access drives for the proposed future development will be planned in accordance with IDOT access control guidelines.

There are currently preliminary plans to make improvements to the Benton interchange (approximately 7 miles to the north) that will upgrade it to a split-diamond interchange from its existing configuration as a standard diamond interchange connecting I-57 and IL 14. IDOT did not require the Benton interchange to be included in the analysis for the purposes of this AJR. No improvements are currently contemplated for the Johnston City interchange (approximately 5.5 miles to the south).

5.3 MOTORIST GUIDANCE

As with any change in the configuration of a roadway, changes will need to be made to the existing signs in order to guide and assist drivers from the exits off of the interstate, through the new split-diamond interchange configuration, and then back onto the interstate as needed. The existing signs provided along the interstate and the ramps are shown in Figure 9-1 in the *Signage Plans* section of this report. Additional signing along all routes will help ensure driver familiarity with the new configuration of the interchange as well as inform visitors and less frequent users of the routes to be taken after completion. Figures 9-2 through 9-5, in the *Signage Plans* section of this report provide a preliminary general layout plan for each of the proposed split-diamond interchange configurations. Final signage plans will be coordinated and approved by IDOT and FHWA in the final plan development stage.

No major signage changes are required for either the No-Build or the Upgrade to Existing Diamond interchange alternatives. Therefore, signage plans for those alternatives are not required.

6 COMMUNITIES

The proposed split-diamond interchange modification will primarily serve the City of West Frankfort, adjacent to the east end of the existing interchange. However, several communities in the surrounding area will likely utilize the proposed future development within the project study area as well. A list of these communities, their 2012 population, and distance to the proposed interchange (in miles) is provided in Table 6-1.

Table 6-1: Communities Served by Proposed Interchange and Future Development

Community	2012 Population	Distance
City of West Frankfort	8,139	1.25
Village of West City	661	6.67
City of Benton	7,070	6.96
Johnston City	3,531	5.38
City of Marion	17,315	11.53
Village of Thompsonville	541	10.12
City of Zeigler	1,786	5.75
City of Herrin	12,696	7.88
City of Christopher	2,369	7.79

7 CONNECTIONS

The nearest interchange to the north is Exit 71 for West City and Benton approximately seven (7) miles to the north along I-57. This interchange is proposed to be improved to include a collector-distributor system connecting I-57 to IL 14 and Petroff Road.

The nearest interchange to the south is Exit 59 for Johnston City just over five and a half (5.5) miles to the south along I-57. The Johnston City interchange is a conventional diamond interchange connecting I-57 to W Broadway Boulevard/Herrin Road/CR 2.

Due to the significant distance provided between the adjacent interchanges, the proposed project is not expected to impact their function.

8 DESIGN EXCEPTIONS

Below are Level 1 and Level 2 IDOT Bureau of Design & Environment (BDE) design criteria that have been identified as substandard at the level of analysis performed for this report:

Level 1

No Level 1 design exceptions were identified for this report.

Level 2

The access control intersection separation requirements in BDE Manual Fig 35-2.8 are not maintained between the IL 149/Northbound C-D/NB on ramp intersection and the existing IL 149/Sophia Street (235 ft.) intersection. This is applicable to all proposed interchange modification alternatives. The proposed distance between the northbound C-D and Sophia Street is an increase of 15 feet from the existing conditions, improving the existing access separation. The existing right-in / right-out configuration of Sophia Street will not change.

9 TRAFFIC SIGNALS / SIGNING

As part of the proposed split-diamond interchange scenarios, several new traffic signals will be required as discussed below and a signage plan will be required. Additionally, some existing signals will require modification.

The No-Build and Upgrade of Existing Diamond Interchange alternatives do not require significant signal or signage changes; therefore, discussion of signal/signage revisions for those alternatives is not required.

9.1 EXISTING SIGNAL TIMING PLAN UPDATES

The following is a list of the existing signalized intersections within the project study area that will remain in place and operational:

- IL 149 & Ken Gray Blvd/West Frankfort Plaza;
- IL 149 & I-57 southbound ramps;
- IL 149 & I-57 northbound ramps; and
- IL 149 & IL 37.

Based on the crash report data provided, a significant number of crashes occur at intersections with drivers attempting to make left turns during the permitted portion of the

protected plus permitted left-turn phase within the study area. It has been shown that protected only left-turn movements result in fewer accidents than permitted left-turn movements. Therefore, as part of the analysis for the future Design Year Build conditions scenarios, many of the existing protected plus permitted left-turn phases were converted to protected *only* left-turn phases, with no significant adverse impact on design year level of service.

With either of the proposed split-diamond interchange modification alternatives, the existing signal timings will also need to be updated and coordinated to efficiently move traffic along the roadway network through the project area as development and traffic volumes increase in the future. Timings will need to be updated for all signals, and the signals will need to be interconnected and coordinated on the interchange ramps and along IL 149.

9.2 NEW SIGNALS ON BURLINGTON ROUTE BOULEVARD AND NORTH ROAD

Based on peak hour warrants for the projected development traffic, there are several intersections along the proposed Burlington Route Boulevard that will require the installation of signals once development has begun and traffic volumes warrant the need for traffic signals. These intersections include the following:

- Burlington Route Blvd & proposed southbound C-D roads;
- Burlington Route Blvd & proposed northbound C-D roads;
- Burlington Route Blvd & the first intersection to the west of the southbound C-D road (Russell Road);
- Burlington Route Blvd & the first intersection to the east of the northbound C-D road (Joiner Street);
- Burlington Route Blvd & the realigned segments of North Road and Taft Street;
- Burlington Route Blvd & IL 37 at Cleveland Street;
- North Road & proposed southbound C-D road (Alternative No. 3 only); and
- North Road & proposed northbound C-D road (Alternative No. 3 only).

Confirmation of the need for signalization will be based on 12-hour counts collected before the new signals are installed. Signals will also need to be interconnected at the intersections of the C-D roads along both proposed split-diamond interchanges, Burlington Route Boulevard and North Road.

All of the signals involving the C-D roads will be required once traffic volumes warrant signalization as a result of the proposed split-diamond interchange modification configurations and increased development in the project area. The remaining signals are part of the supplemental local roadway network improvements, and will be installed as development occurs.

All new intersections will be stop-controlled until signal installation is warranted. Stop control will be 2-way at all intersections except the Burlington Route intersections with the NB and SB CD roads in Alternative #3. Those intersections will operate under all-way stop control.

9.3 NEW SIGNALS ON IL 149

As part of this AJR, the existing corridor along IL 149 was analyzed. Based on the existing and predicted operations as two-way stop controlled intersections, peak hour warrants for the projected development traffic, and the number of crashes that occurred during the study period from 2007 to 2012, three intersections along IL 149 will require the installation of traffic signals once development has begun and traffic volumes warrant the need for signalization. These intersections include the following:

- IL 149 & proposed New Winery Road (realigned segment of Winery Road);
- IL 149 & Joiner Street; and
- IL 149 & Taft Street.

Confirmation of the need for signalization will be based on 12-hour counts collected before the new signals are installed.

9.4 SIGNAGE PLANS

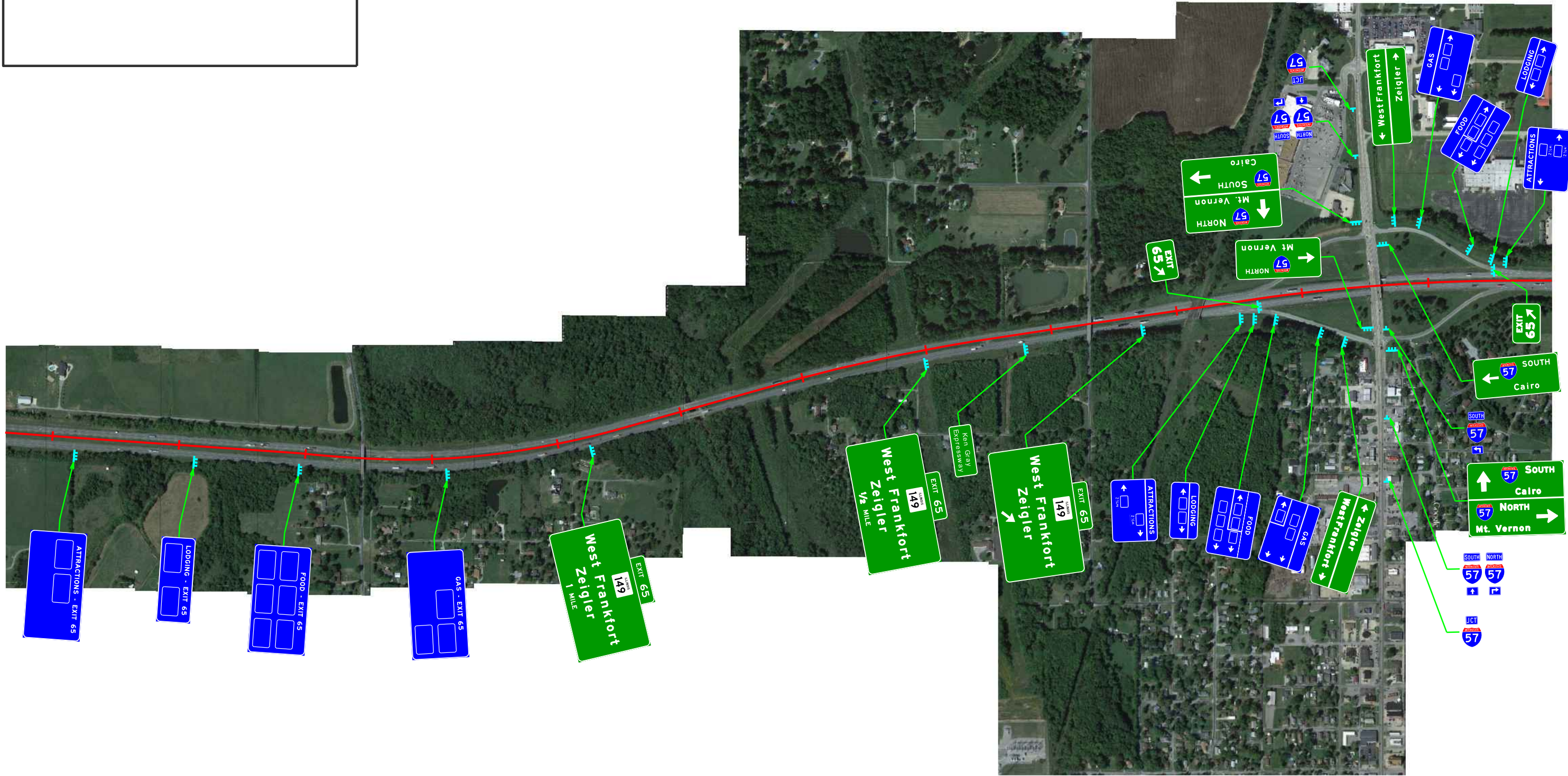
Figure 9-1 shows the existing signage plan along the mainline of the interstate and along the existing ramps. Due to the new split-diamond interchange configuration within the project area, as well as the new connections to IL 149 and IL 37 that the proposed project provides, extensive signing will be required. Preliminary signage plans are shown for each split-

diamond alternative in Figures 9-2 through 9-5. The proposed signage plan will guide drivers from the exits off of the interstate, through the new split-diamond interchange configuration, and then back onto the interstate as needed within the proposed project area. Additional signing along all routes to assist drivers with navigating the new configuration of the interchange, and will inform visitors and less frequent users of the appropriate travel patterns. Turn prohibition signage will be provided to reduce the potential for wrong-way driving on the collector-distributor roads and access ramps. The use of LED turn prohibition signs may also help to emphasize prohibited turning movements for the new interchange configuration. Final signage plans will be coordinated and approved by IDOT and FHWA in the final plan development stage. Signage on the local roadways will be installed locally as additional development occurs.

LEGEND

⊥ EXISTING SHEET SIGN

≡≡≡ EXISTING GROUND MOUNTED PANEL SIGN



I-57 / IL 149 INTERCHANGE MODIFICATION
Access Justification Report

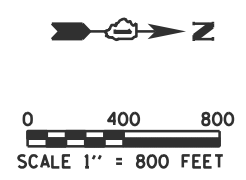
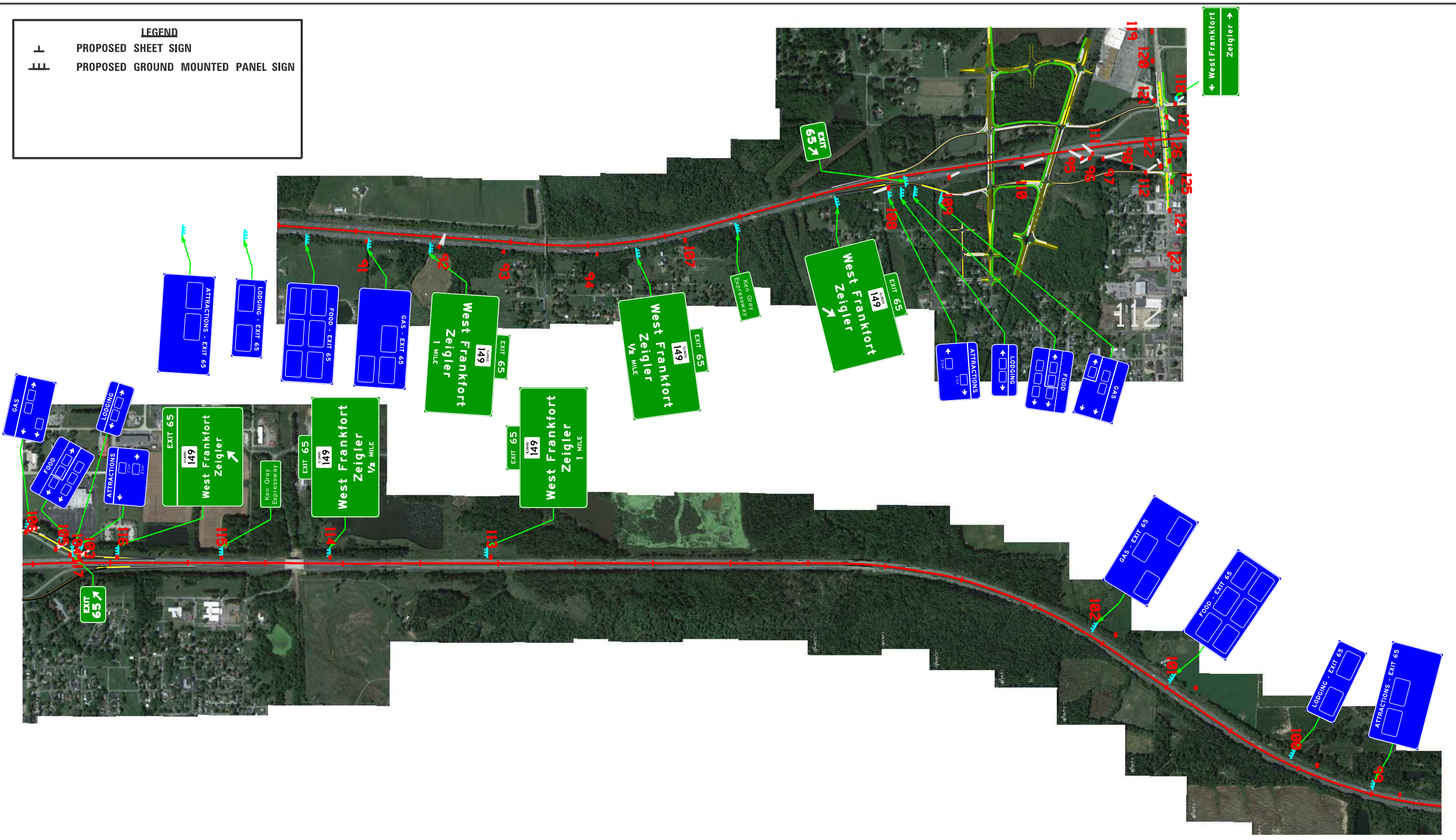


Figure 9-1
Existing Interchange
Signage Plan

LEGEND

┆ PROPOSED SHEET SIGN

┆┆ PROPOSED GROUND MOUNTED PANEL SIGN



I-57 /IL 149 INTERCHANGE MODIFICATION
Access Justification Report

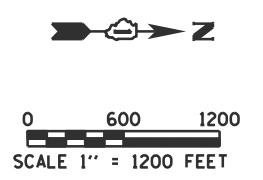


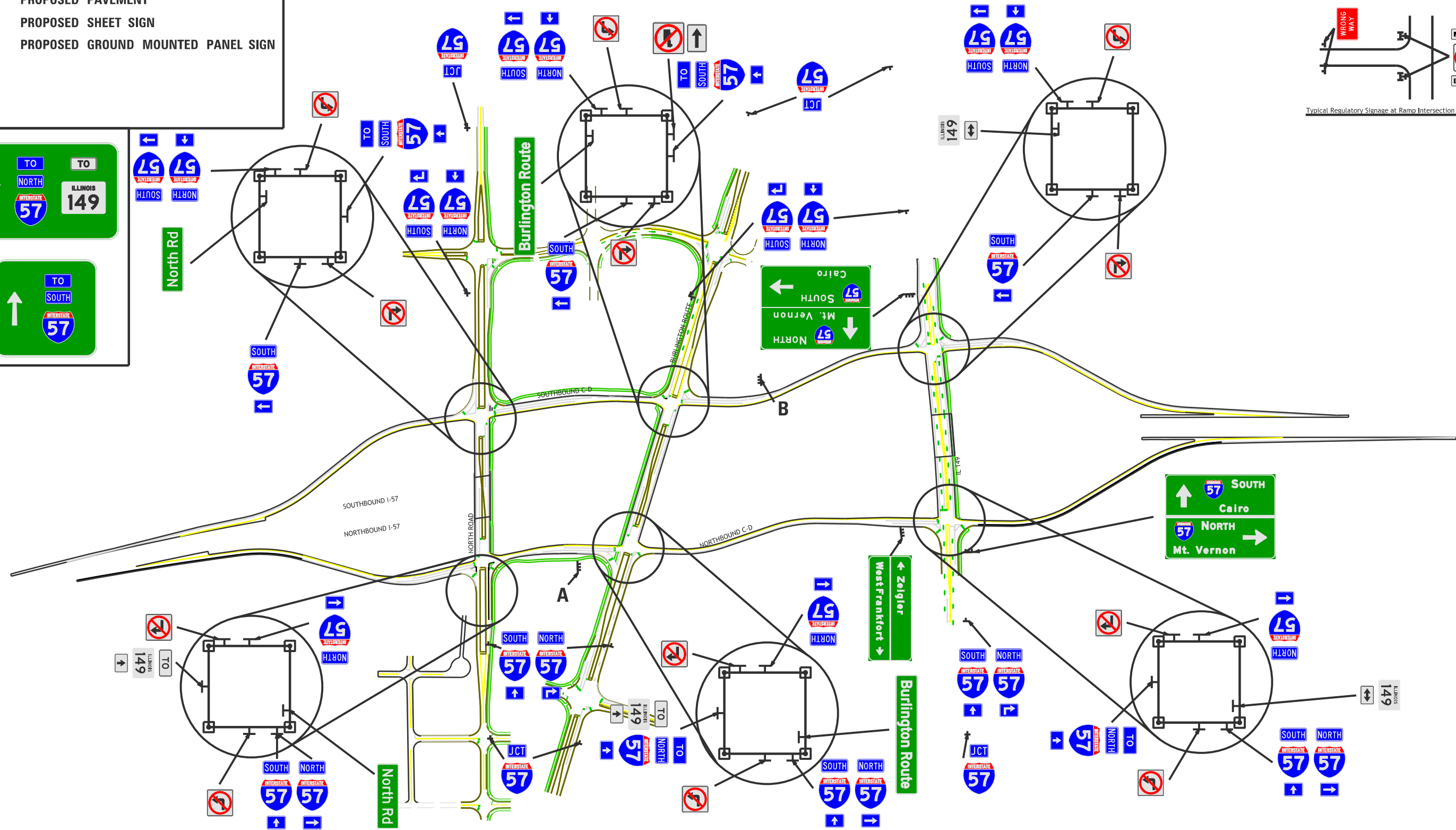
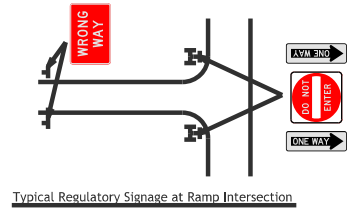
Figure 9-2
Alternative No. 3 – Expanded Split Diamond Interchange
Preliminary Proposed Advanced Signage Plan

LEGEND

- PROPOSED PAVEMENT
- ⊥ PROPOSED SHEET SIGN
- ▬ PROPOSED GROUND MOUNTED PANEL SIGN

A

B



I-57 / IL 149 INTERCHANGE MODIFICATION
Access Justification Report

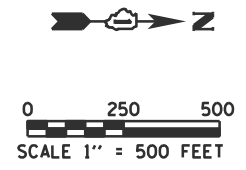


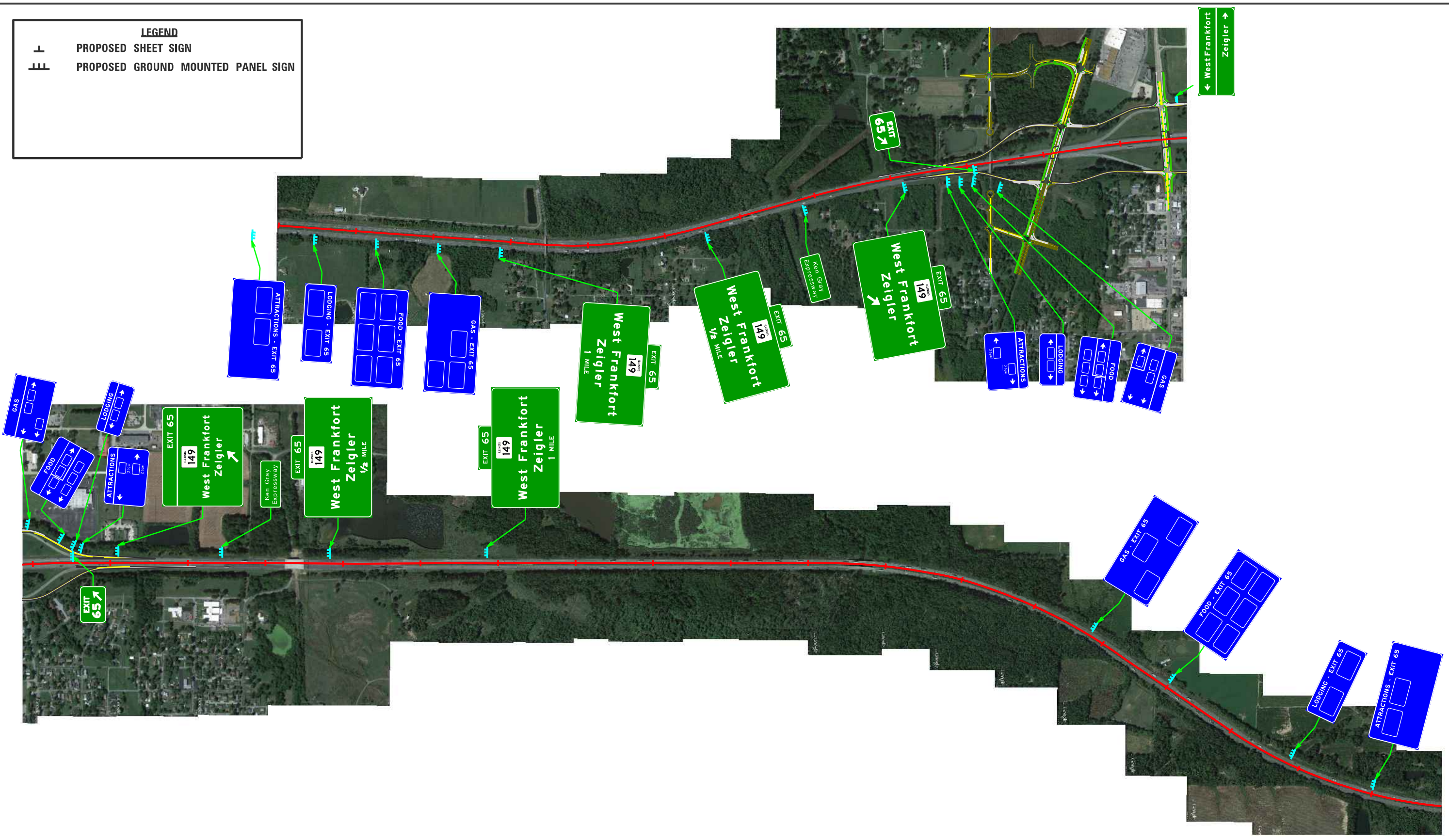


Figure 9-3
Alternative No. 3 – Expanded Split Diamond Interchange
Preliminary Proposed Signage Plan

LEGEND

 PROPOSED SHEET SIGN

 PROPOSED GROUND MOUNTED PANEL SIGN

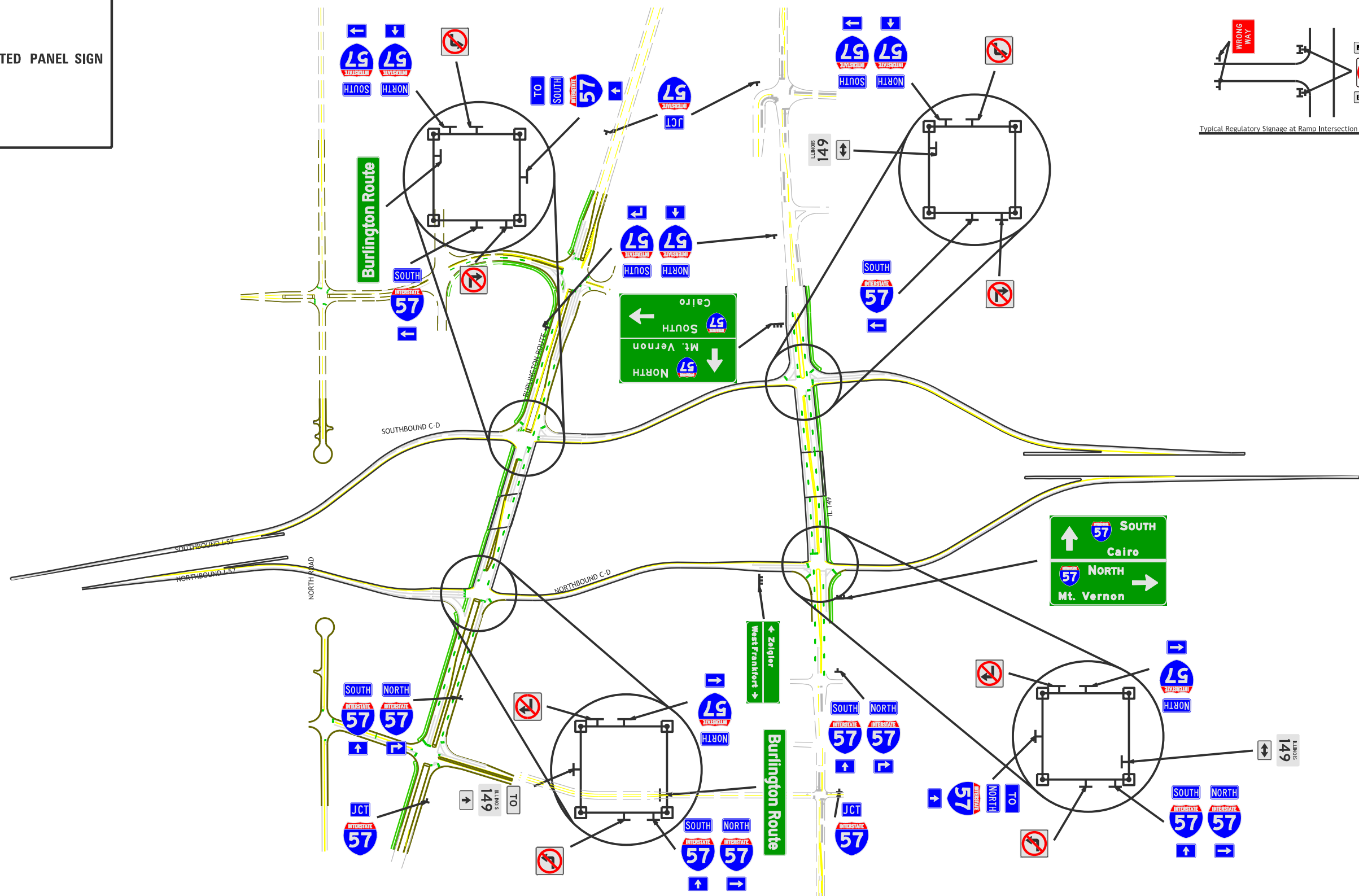


I-57 /IL 149 INTERCHANGE MODIFICATION
Access Justification Report

Figure 9-4
Alternative No. 4 – Split Diamond Interchange
Preliminary Proposed Advanced Signage Plan

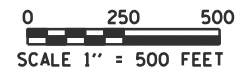
LEGEND

- PROPOSED PAVEMENT
- PROPOSED SHEET SIGN
- PROPOSED GROUND MOUNTED PANEL SIGN



I-57 / IL 149 INTERCHANGE MODIFICATION
Access Justification Report

Figure 9-5
Alternative No. 4 – Split Diamond Interchange
Preliminary Proposed Signage Plan



10 LANE BALANCE

The portion of I-57 that is included in the study area is currently a four lane (2 lanes per travel direction) full access controlled facility. In accordance with IDOT and AASHTO requirements, the existing lane balance on I-57 will be maintained with both proposed split-diamond interchange modification configurations. Lane balance will still be provided after the planned future widening improvements for the mainline of I-57 are completed. Lane balance is also provided in the No-Build and Upgrade to Existing Diamond Interchange alternatives.

11 EXISTING FACILITIES

FHWA Policy states: “The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).”

In addition to the FHWA policy, the IDOT BDE manual explains: “The intent of this requirement is to demonstrate that an access point is needed for regional traffic needs and not to solve local system needs or problems. The facility should not be allowed to become part of the local circulation system, but be maintained as the main regional and interstate highway it was intended to be.

In the case of adding a new interchange or new ramp(s), evaluate or consider whether existing or possible future roads or streets generally parallel to the Interstate facility that could be used as a connection to existing adjacent interchange ramps in lieu of adding a new interchange or ramps.”

The proposed split-diamond interchange modification alternatives are feasible options that allow for the relocation of the merge and diverge points of the entry and exit ramps to provide better sight distances for drivers through the study area. The proposed designs also utilize the existing roadway network as much as possible in order to optimize local traffic flow, including traffic on IL 149. This allows the interchange facility to be maintained as the main regional and interstate highway it was intended to be, while enhancing the local roadway network to encourage less traffic on the interstate system. However, without the

proposed split-diamond interchange plan and design layouts, safety and operations along both I-57 and IL 149 will continue to be major points of concern in the future.

12 TRANSPORTATION SYSTEM MANAGEMENT

FHWA Policy states: “The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).”

The intent of this requirement is to ensure that all reasonable alternatives, including improvements to the existing local roads and streets in lieu of new access, have been fully considered.

For all options, HOV facilities, mass transit and ramp metering options were not investigated based on the demographic and traffic volume characteristics of the study area.

12.1 NO-BUILD

While the No-Build alternative for the I-57 and IL 149 interchange functions at acceptable levels of service during both the existing and future design peak hours, the existing safety concerns will not be mitigated without the proposed split-diamond interchange improvements.

12.2 UPGRADE EXISTING INTERCHANGE

Upgrading the existing diamond interchange to meet the current design standards would require removing the existing Burlington Northern Bridge across I-57. Removal of this bridge prevents enhancement of regional connectivity, creating a larger dependence on the interstate system. Also, the merge and diverge areas of the updated ramps would still be located in a portion of the horizontal curve that inhibits drivers’ sight distance. Therefore, the current safety concerns are not fully mitigated via an upgrade to the existing diamond interchange configuration.

12.3 SPLIT-DIAMOND INTERCHANGE ALTERNATIVES

Both proposed split-diamond interchange modification alternatives make excellent usage of the existing railroad bed alignment to provide an additional connection to IL 37 and IL 149

via the Burlington Route Boulevard. This new connection will improve operations along IL 149. Both proposed split-diamond interchange modification alternatives relocate the merge and diverge areas of the ramps to provide improved sight distances for drivers along I-57. Alternative No. 3 increases the spacing between the merge and diverge areas of the ramps to approximately 5,700 feet and allows both the Burlington Route Bridge. Alternative No. 4 increases the spacing between the merge and diverge areas of the ramps to approximately 4,800 feet.

12.4 PEDESTRIAN/BICYCLE FACILITIES

Both split-diamond interchange modification configurations also afford the opportunity to incorporate local pedestrian/bicycle facilities into the project. These facilities will be a major benefit to pedestrian/bicycle connectivity on both sides of the interstate, with connections to the City's pedestrian/bicycle routes and the City Park east of the interstate, and connections to the shopping areas west of the interstate. Alternative No. 3 includes a proposed ten (10) foot wide, bidirectional concrete path for pedestrian/bicycle use along the Burlington Route, North Road and the collector-distributor roads that connect them. Alternative No. 4 also includes a proposed ten (10) foot wide, bidirectional concrete path for pedestrian/bicycle use along the Burlington Route.

Placing a pedestrian/bicycle facility on the Burlington Route allows for a safe, practical design that separates pedestrians and bicycles from the travel way on a facility geared more toward multi-modal accessibility. Additionally, the flat grade of the Burlington Route due to its previous function as a railroad bed allows pedestrians and bicyclists to negotiate the terrain easily.

In addition to pedestrian/bicycle accommodations on the Burlington route, pedestrian/bicycle accommodation will also be included on the IL 149 bridge in conjunction with the improvements to the adjacent signalized intersections. The existing structure provides 65' of bridge roadway width, with two 12' travel lanes in each direction, with a 1 foot buffer between the lane widths and adjoining sidewalk and median, this only provides a width of 4 feet for the raised sidewalk which is not adequate. Options will be explored during the phase I engineering studies to include bicycles and pedestrians access across the IL 149 structure over Interstate 57.

13 ACCESS CONNECTIONS AND DESIGN

FHWA Policy states: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”

The intent of this requirement is that, except in the most extreme circumstances, all interchanges should provide for all basic movements. Partial interchanges usually have undesirable operational characteristics. If circumstances exist where a partial interchange is considered appropriate, then commitments to the FHWA, possibly even purchase of necessary right-of-way during the initial project stage for future completion, must be made by IDOT. Special purpose access for HOV's, for transit vehicles, or for park and ride lots should be treated as special cases and the movements to be provided decided on a case-by-case basis.

The proposed expanded split-diamond interchange modification, Alternative No. 3, provides for all movements to and from I-57, along IL 149, North Road and the proposed Burlington Route Boulevard. The proposed split-diamond interchange allows traffic to disperse through the study area in a more uniform manner than currently allowed by the existing interchange geometry and connection with I-57 and IL 149. The proposed C-D roads provide for one-way traffic flow, which allows for optimal traffic progression through the interchange along both sides of I-57. The C-D system has been designed to maintain IDOT access control standards, while still allowing for optimal economic development and land utilization on both sides of I-57 within the project study area.

The proposed split-diamond interchange modification, Alternative No. 4, provides for all movements to and from I-57, along IL 149 and the proposed Burlington Route Boulevard, but terminates and removes the North Road connection across I-57 within the study area. The proposed split-diamond interchange allows traffic to disperse through the study area in a more uniform manner than currently allowed by the existing interchange geometry and connection with I-57 and IL 149. The proposed C-D roads provide for one-way traffic flow, which allows for optimal traffic progression through the interchange along both sides of I-57. However, the termination and removal of the North Road Bridge reduces the connectivity of the proposed roadway network. The C-D system has been designed to

maintain IDOT access control standards, while still allowing for potential economic development and land utilization on both sides of I-57 within the project study area.

A minimum 600-foot distance between the C-D and the adjacent local road intersections is provided for each split-diamond alternative based on the rural interchange classification anticipated for the 20-year conditions. The 600-foot access for rural interchanges is based on Figure 35-2.B in the IDOT BDE Manual.

14 TRANSPORTATION LAND USE PLANS

FHWA Policy states: “The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Plan (STIP or TIP) and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and transportation conformity requirements of 40 CFR parts 51 and 93.”

The intent of this requirement is to cause sufficient review and coordination so as not to have piecemeal consideration of added access and to avoid as much as practical future conflict with other, possibly more needed, access. The request should include a discussion as to how the current proposal fits into the overall plans for the area and, if it is an addition to the current plans for the area, how it fits in and affects the current plans. Added access requests do not have to be included in official transportation plans or approved by MPOs or similar organizations prior to submittal. All coordination may be completed after access approval and as part of the normal project development process. The expectation here is that any proposal is considered in view of currently known plans for transportation facilities and/or land use planning. This is especially important where several new interchanges are anticipated.

The proposed project is currently the only interchange planned in the immediate area surrounding the study area. The proposed project is consistent with the existing and proposed land use and zoning maps for the City of West Frankfort. Coordination with the City of West Frankfort has taken place throughout the project’s development. All proposed 20-year local development in the vicinity of the interchange has been documented and incorporated into the geometric/operational analysis within the study area in this report.

During the process of the NEPA documentation/final AJR development process, coordination with IDOT for inclusion in the statewide TIP will occur.

15 COMPREHENSIVE INTERSTATE NETWORK STUDY

FHWA Policy states: “In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).”

The intent of this requirement is to analyze and consider all proposed changes in access for an area at the same time. See Section 37- 1.03(d) of the IDOT BDE Manual for guidance regarding adjacent interchange spacing that trigger the need for FHWA approval. If a new or revised interchange is being proposed and another new or revised adjacent interchange is being planned and programmed by IDOT then analyze both changes together.

Based on initial meeting discussions with IDOT and FHWA, a comprehensive network study of the adjacent interchanges is not required for the proposed project at this time. No additional interchange locations have been identified through any short-term or long-term plans. However, the local roadway network along IL 149 was taken into consideration and analyzed for this AJR in order to ensure no unfavorable impact would result from the construction of the proposed project. The proposed Benton interchange improvements (next interchange 7 miles to the north) do not impact the I-57/IL 149 interchange, and there are no improvements contemplated at the Johnston City interchange located 5.5 miles to the south. IDOT has indicated analysis of adjacent interchanges is not required for this AJR.

16 COORDINATION WITH TRANSPORTATION SYSTEM IMPROVEMENTS

FHWA Policy states: “When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).” It is recognized that

more and more private involvement in transportation improvements will be happening in the future.

It is incumbent upon IDOT to ensure that the highway facilities are developed in an orderly and coordinated manner to serve the public. Therefore, when private development is clearly the driving force behind the need for access, it is only reasonable that IDOT, the City and the developer work closely together in order to develop the access to achieve mutual benefits with minimal adverse impact on travelers. Stage construction could be used where extensive private development is not expected to be completed for several years. The developer might be required to have certain parts of the local circulation system ready before ramps can be constructed or opened to traffic. In some heavily congested areas, the developer might be required to provide ride-sharing incentives or even assist in providing transit facilities. The intent is therefore to accomplish any coordination that might be possible, even if it is only to know what each is doing and when.

This coordination and cooperation is appropriate where a developer has agreed to fund or perhaps even construct access at the same time the IDOT is planning or is already in the process of improving that particular section of the route. It is only reasonable that these activities be coordinated to ensure compatibility.

The developer and the City of West Frankfort have coordinated with IDOT and FHWA from the very beginning of the planning process for this project. There are already plans to widen the portion of I-57 that runs through the project study area from two to three lanes in each direction. These plans were taken into account for the future conditions scenarios; however, the proposed interchange modification, as well as the mainline and all ramp components function above the minimum acceptable level of service regardless of whether or not the mainline is widened from two to three lanes in the future.

Newly constructed local roadways that are part of the proposed future development plans will be designed and constructed based on the access control guidelines provided by IDOT. All elements of the proposed local roadway design and construction will also be coordinated with IDOT to ensure conformity to the design and access control standards. The anticipated 20-year local development improvements have been documented and included in Section 3.1 of this report to ensure the future development operational and geometric considerations have been incorporated into the preferred split-diamond interchange modification alternative.

17 STATUS OF PLANNING AND NEPA

FHWA Policy states: “The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.”

The intent of this requirement is to confirm and report information relative to the status of the planning and NEPA processes, with regard to the access request (e.g., anticipated schedule dates, public hearing dates, public support or opposition, recent activities, future activities).

A preliminary environmental screening was conducted as part of this report. The screening concluded that there are no major red flags indicated within the project area. A copy of the preliminary Red Flag Survey Report is provided in *Appendix A* of this report.

However, more detailed environmental surveys are necessary. The NEPA policy and procedure will be accomplished as part of the normal project development process and as a condition of the final access approval. The level of environmental processing has yet to be determined. If approved, the project will conform to IDOT/FHWA planning requirements.

18 OPERATIONAL AND SAFETY ANALYSIS

FHWA Policy states: “An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on each side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and other roads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each

request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).”

The intent of this requirement is to ensure that sufficient operational analyses are made to determine the impact of the revised or new access on the Interstate operation. For consistency, it is anticipated that the current Highway Capacity Manual analysis procedures will be used. At a minimum, the operational impact on the mainline between the proposed new/revised access and the adjacent existing interchanges on either side should be analyzed. The analysis should be extended as far along the mainline and include as many existing interchanges as is necessary to establish the extent and scope of the impacts. This could be critical in urban areas with many relatively closely spaced interchanges (i.e., interchanges spaced at less than 1 mile (1.6 km) apart).

According to the IDOT BDE Manual Chapter 37, Section 2.01 Interchange Spacing, the minimum distance between adjacent interchanges should not be less than 1 mile (1.5 km) in urban areas, 2 miles (3 km) in suburban areas, and 3 miles (5 km) in rural areas.

The nearest interchange to the north is Exit 71 for West City and Benton approximately seven (7) miles to the north along I-57. The nearest interchange to the south is Exit 59 for Johnston City just over five and a half (5.5) miles to the south along I-57. Based on the distances provided between the adjacent interchanges exceeding the minimum distances required, the proposed project is not expected to impact their function. Therefore, IDOT has indicated the analysis of adjacent interchanges is not required for this report.

18.1 SUMMARY OF CRASH HISTORY

As discussed previously, the safety of the public utilizing the roadway network within the study area and the current safety problems resulting from existing roadway deficiencies are recognized as a substantial reason for the proposed interchange modification, with the potential for economic development enhancements as another substantial benefit for both the City of West Frankfort and the state of Illinois. Figure 18-1 shows the IDOT “Five Percent Report Locations” within the project study area. The locations in the IDOT Five Percent Report account for more than five percent of all fatal or serious injury crashes in the five years prior to the report year. To rank the locations for the report, a number of factors including crash frequency, rate and severity are considered.

Figure 18-2 shows the location of all of the crashes that occurred within the project area between 2007 and 2012. Due to multiple crashes occurring at several of the same locations, intersections or mile markers, many of the individual crash icons are hidden from display.

Table 18-1 shows the total number of crashes that occurred at each intersection and segment in the study area between 2007 and 2012, based on the crash data provided by IDOT. The analysis intersections and segments are depicted in Figure 18-3. Approximately 27% of all crashes that occurred within the project area resulted in injury or death, approximately 35% higher than the statewide average of 20% of all crashes that occurred resulting in injury or death based on the data available from the IDOT Crash Facts Report for each year of the study period between 2007 and 2012. Additionally, 7% of all vehicles involved in crashes along I-57 within the study area were commercial vehicles, based on the vehicle types reported in the crash reports provided.

Figure 18-1: Five Percent Report Locations within Project Area

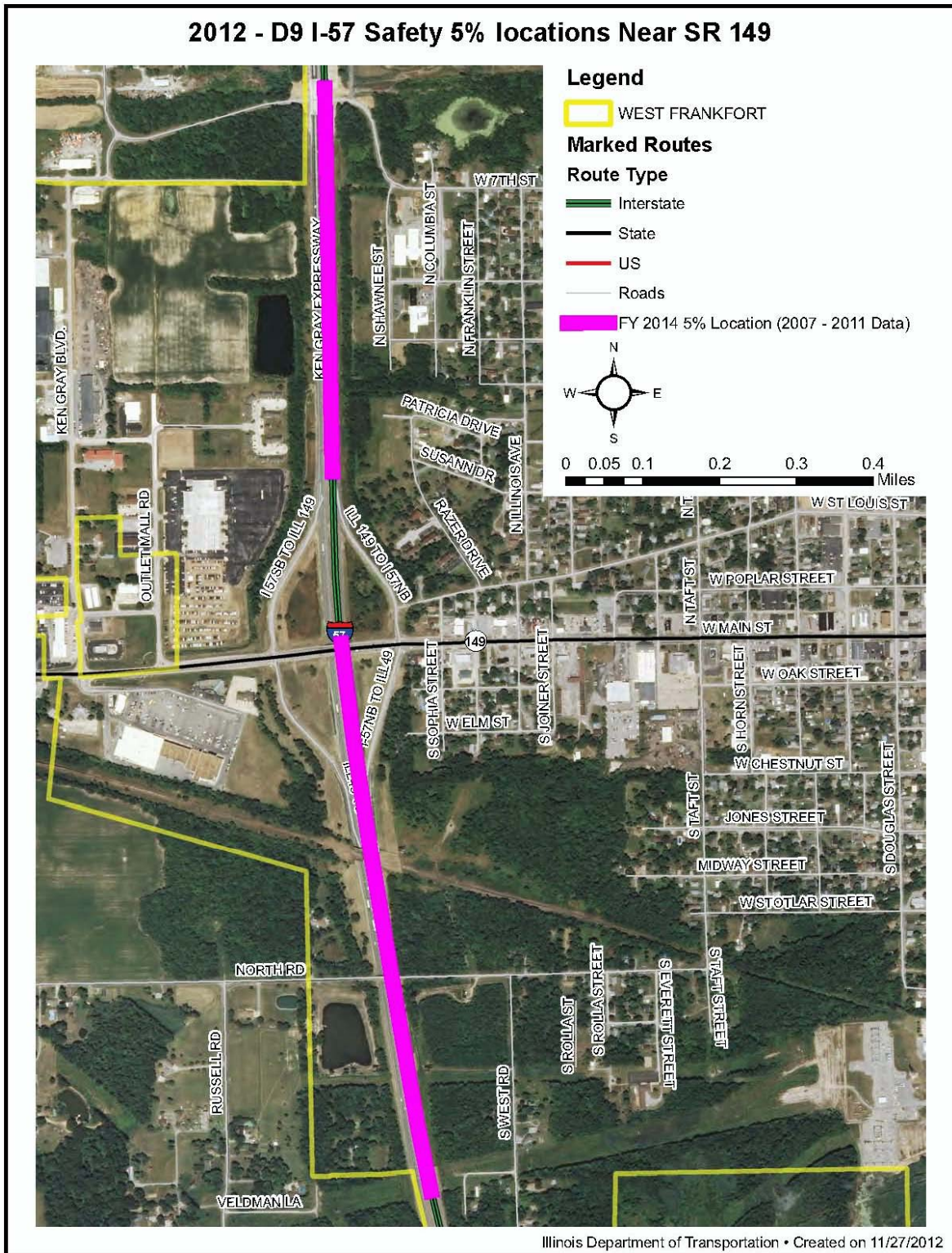


Figure 18-2: Location of All Crashes within Project Study Area

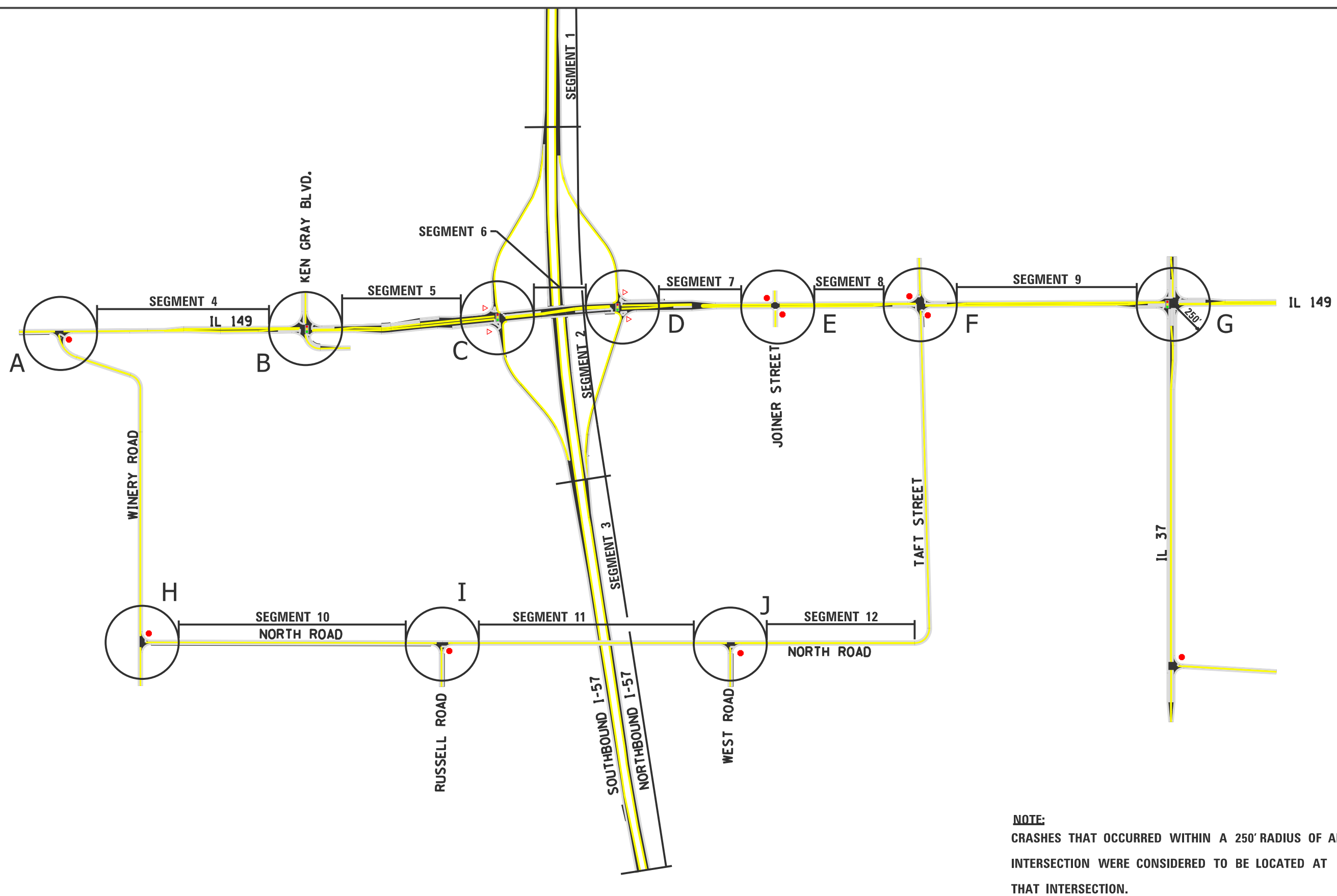


Table 18-1: Summary of Total Crashes by Intersection & Segment

Area	Total Crashes	Crash Frequency*	Number of Injury/Fatal Crashes	Percent of Crashes Involving Injury/Death
Intersection Crashes				
A - IL 149 & Winery Rd	4	0.7	4	100%
B - IL 149 & Ken Gray Blvd	32	5.3	8	25%
C - IL 149 & I-57 SB Ramps	31	5.2	12	39%
D - IL 149 & I-57 NB Ramps	42	7.0	13	31%
E - IL 149 & Joiner St	18	3.0	3	17%
F - IL 149 & Taft St	10	1.7	4	40%
G - IL 149 & IL 37	69	11.5	21	30%
H - North Rd & Winery Rd	1	0.2	0	0%
I - North Rd & Russell Rd	0	0.0	0	0%
J - North Rd & West Rd	3	0.5	1	33%
Segment Crashes				
Segment 1: NB & SB I-57 North of IL 149 (Exit 65)	75	12.5	20	27%
Segment 2: NB & SB I-57 Between Ramps of IL 149 (Exit 65)	14	2.3	2	14%
Segment 3: NB & SB I-57 South of IL 149 (Exit 65)	60	10.0	15	25%
Segment 4: IL 149 Between Winery Rd & Ken Gray Blvd	9	1.5	2	22%
Segment 5: IL 149 Between Ken Gray Blvd & I-57 SB Ramps	5	0.8	1	20%
Segment 6: IL 149 Between I-57 SB & NB Ramps	1	0.2	0	0%
Segment 7: IL 149 Between I-57 NB Ramps & Joiner St	9	1.5	1	11%
Segment 8: IL 149 Between Joiner Street & Taft St	4	0.7	1	25%
Segment 9: IL 149 Between Taft St & IL 37	56	9.3	12	21%
Segment 10: North Rd between Winery Rd & Russell Rd	1	0.2	0	0%
Segment 11: North Rd between Russell Rd & West Rd	2	0.3	1	50%
Segment 12: North Rd between West Rd & Taft St	3	0.5	0	0%
Totals	449	74.8	121	27%

Notes: *Crash Frequency based on number of crashes per year.

See Figure 18-3 for illustration of the Crash Analysis Roadway Segments and Intersections listed above.



I-57 / IL 149 INTERCHANGE MODIFICATION
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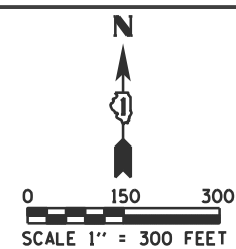


Figure 18-3
Crash Analysis
Roadway Segments and Intersections

Table 18-2 shows the total number of crashes and injuries by type within the study area that occurred between 2007 and 2012. Based on the data provided in Table 18-2, approximately 0.40 injuries occurred per crash within the study area from January 2007 to December 2012, which is approximately 44% higher than the statewide average of 0.28 injuries per crash according to data from the IDOT Crash Facts Report for each year between 2007 and 2012. Complete crash data is provided in *Appendix B* of this report.

Table 18-2: Summary of All Crashes and Injuries by Type within Study Area

Crash Type	No. of Crashes	Percent of Total	No. of Injury Crashes	No. of Fatalities	No. of "A" Injuries	No. of "B" Injuries	No. of "C" Injuries	Total No. of Injuries + Deaths
Angle	32	7%	7	0	1	5	4	10
Animal	50	11%	2	0	4	2	0	6
Fixed Object	36	8%	10	0	3	6	2	11
Head On	1	0%	1	2	2	1	0	5
Other Non-Collision	6	1%	1	0	0	0	3	3
Other Object	5	1%	1	0	0	1	0	1
Overturned	11	2%	6	0	2	5	2	9
Parked Motor Vehicle	5	1%	1	0	1	0	0	1
Pedalcyclist	1	0%	1	0	1	1	0	2
Pedestrian	1	0%	1	1	0	0	0	1
Rear End	161	36%	56	3	7	27	44	81
Sideswipe Opposite Direction	1	0%	0	0	0	0	0	0
Sideswipe Same Direction	34	8%	6	0	1	6	1	8
Turning	105	23%	28	0	9	19	14	42
Totals	449	100%	121	6	31	73	70	180

In order to determine the safety related need for improvements to the interchange and study area, the percentage of overall crashes related to roadway deficiencies was determined. For the purposes of this report, based on the details of the narratives for the crash reports provided by IDOT and the individual circumstances of each incident, any crash that could potentially be attributed to geometric or capacity concerns (i.e. sight distance obstruction, run-off-road, congestion, etc.) within the study area, particularly along I-57 or IL 149, was considered to be related to roadway deficiencies. As shown in Table 18-3, of the 449 crashes that occurred as shown in Table 18-2, 311 (69%) were related to a roadway deficiency. Table 18-3 also shows that 94 of the crashes due to roadway deficiencies involved injuries. Therefore, 78% of the 121 total injury crashes within the project area can be attributed to roadway deficiencies. Crashes involving impaired drivers and/or animals were not deemed related to roadway deficiencies and were not included in Table 18-3.

Table 18-3: Crashes & Injuries Resulting from Roadway Deficiencies by Crash Type within study area (2007-2012)

Crash Type	No. of Crashes	Percent of Total*	No. of Injury Crashes	No. of Fatalities	No. of "A" Injuries	No. of "B" Injuries	No. of "C" Injuries	Total No. of Injuries +Deaths
Angle	20	4%	4	0	1	2	1	4
Animal	0	0%	0	0	0	0	0	0
Fixed Object	14	3%	6	0	1	5	1	7
Head On	0	0%	0	0	0	0	0	0
Other Non-Collision	4	1%	1	0	0	0	3	3
Other Object	2	0%	0	0	0	0	0	0
Overtaken	5	1%	3	0	2	0	1	3
Parked Motor Vehicle	3	1%	1	0	1	0	0	1
Pedalcyclist	1	0%	1	0	1	1	0	2
Pedestrian	1	0%	1	1	0	0	0	1
Rear End	139	31%	47	3	7	25	38	73
Sideswipe Opposite Direction	0	0%	0	0	0	0	0	0
Sideswipe Same Direction	32	7%	5	0	1	4	1	6
Turning	90	20%	26	0	8	19	13	40
Totals	311	69%	94	4	22	56	58	140

*Note: Percent of total overall crashes (449 overall crashes per Table 18-2).

The Proposed interchange will assist in mitigation of crashes related to roadway deficiencies by improving ramp geometry, eliminating the existing northbound exit ramp sight distance concern and removing the sight distance obstruction caused by the North Road bridge piers (Alternative #4). For a discussion of the existing geometric and sight distance concerns, see report section 5.1.

During the study period from 2007 to 2012, four (4) crashes resulted in at least one fatality (total of six (6) fatalities). Those fatal crashes also included eight (8) severe or serious injuries within the project study boundary. Three (3) of these crashes were attributed to roadway deficiencies and resulted in four (4) fatalities and five (5) severe or serious injuries. The crashes were attributed to roadway deficiencies due to visibility/sight distance concerns and lack of appropriate pedestrian accommodations. The following paragraphs describe the details of the four fatal crashes in the project area.

On November of 2008, at 7:46 PM, a Tractor Trailer truck was northbound on I-57 and was unable to reduce its speed and struck the vehicle it was following (Unit 2) in the rear. Unit 2 then left the west side of the roadway, crossed the grass median and entered the southbound travel lanes. Unit 2 was then struck by two other vehicles traveling southbound on I-57. It was raining and the road surface was wet at the time of the crash. The crash resulted in one (1) fatality and three (3) severe or serious injuries. The crash report cited that the tractor trailer was traveling too fast for conditions and failure to reduce speed. This crash could potentially be attributed to the lack of sight distance in the vicinity of the northbound IL-149 exit ramp further compounded by poor weather conditions.

On July 2010, at 2:01 PM, three Tractor Trailer Trucks were northbound on I-57, possibly speeding and unable to see traffic stopped ahead, struck a queue of vehicles that were stopped due to a construction work zone. A chain reaction included seven (7) vehicles total. An explosion and fire erupted upon impact of the vehicles. The weather was clear, road surface was dry and it was daylight at the time of the crash. The crash resulted in two (2) fatalities and two (2) severe or serious injuries. The crash report cited failure to reduce speed (approaching a construction work zone) to avoid the crash and following too closely.

On December 2011, at 3:34 AM, a pedestrian was hit by two (2) vehicles, one right after another, between Factory Outlet Blvd and the I-57 southbound ramps on IL 149. It was raining, the road surface was wet and it was after dark at the time of the crash. The crash resulted in one (1) fatality. No pedestrian facilities were present on IL-149 at the time of the crash but will be incorporated into the proposed improvements at the interchange.

The fourth fatal crash, not directly attributed to roadway deficiencies, occurred in September of 2008. At 5:03 pm, the driver of a vehicle traveling southbound on I-57 fell asleep at the wheel and crossed the median into the northbound travel lanes. After crossing the median, the southbound vehicle struck two (2) northbound vehicles, pushing all three units into the right northbound ditch. The weather was clear, road surface was dry and it was daylight at the time of the crash. The crash resulted in one (1) fatality and three (3) severe or serious injuries.

Table 18-4 shows the number of crashes, injuries and fatalities along the study portion of I-57 that are directly related to the horizontal curve and limited decision sight distance deficiencies.

Table 18-4: Number of Crashes and Injuries Related to Roadway Deficiencies on I-57 by Crash Type

Type of Crash	Total Number of Crashes	% of Crashes	Total # of A Injuries	Total # of B Injuries	Total # of C Injuries	Total # of Fatalities
Angle	3	3.75%	1	1	0	0
Fixed Object	10	12.50%	1	4	0	0
Other Non-Collision	4	5.00%	0	0	3	0
Other Object	2	2.50%	0	0	0	0
Overtaken	5	6.25%	2	0	1	0
Parked Motor Vehicle	2	2.50%	0	0	0	0
Rear End	31	38.75%	4	6	1	3
Sideswipe Same Direction	22	27.50%	1	4	0	0
Turning	1	1.25%	0	0	0	0
Grand Total	80	100.00%	9	15	5	3

Based on the data in Table 18-4, 31 Rear End type crashes and 22 Sideswipe Same Direction type crashes occurred due to horizontal curve and sight distance deficiencies. Of these crashes, 14 Rear End and 20 Sideswipe Same Direction crashes occurred within the vicinity of the ramps, with four of the Sideswipe Same Direction crashes occurring directly on the on- and off-ramps. These types of crashes are generally associated with poor sight distances not allowing drivers the time required to react appropriately to roadway and traffic conditions in front of them. The proposed split-diamond interchange modification configurations would potentially eliminate a large portion of the total number of crashes that occurred along I-57 due to roadway deficiencies. The split-diamond interchange modification alternatives provide significantly better sight distances for drivers both

entering and exiting the freeway by relocating the access points, without requiring any increase in the number of access points along the freeway itself.

Table 18-5 shows the number of crashes, injuries and fatalities along the study portion of IL 149 that are directly related to traffic congestion and roadway deficiencies including insufficient capacity. Both of the proposed split-diamond interchange modification alternatives, combined with the addition of the Burlington Route connections to IL 149 and IL 37, would significantly reduce the number of vehicles traveling on IL 149. Safety benefits would likely be increased for Alternative #4 compared to Alternative #3 due to the reduced number of conflict points resulting from fewer intersections, as Alternative #3 contains an additional intersection (and associated conflict points) along the C-D road in each direction. Also, Alternative #4 eliminates the three North Road bridge piers, thus significantly reducing the potential for fixed object crashes in the vicinity of North Road.

Based on the information provided in Table 18-4 and Table 18-5, both of the proposed split-diamond interchange modification alternatives have the potential to significantly reduce the number of crashes that occur throughout the study area along both I-57 and IL 149. Hence, the safety of the roadway network is improved and additional connections through the area are also provided, allowing for greater ease of access to the proposed future development within the study area. Elimination of existing sight distance and fixed object concerns associated with the proximity of the existing IL 149 off-ramp to the Burlington route bridge piers, and elimination of the existing North Road bridge piers (Alternative #4) combine to offer significant improvements to the motoring public.

Table 18-5: Number of Crashes, Injuries & Fatalities Along IL 149 Related to Traffic Congestion and Roadway Deficiencies

Type of Crash Crash Related to	Total Number of Crashes	% of Crashes	Total # of A Injuries	Total # of B Injuries	Total # of C Injuries	Total # of Fatalities
Angle	17	8.10%	0	1	1	0
Congestion	1	0.48%	0	0	0	0
Roadway Deficiency	16	7.62%	0	1	1	0
Parked Motor Vehicle	1	0.48%	1	0	0	0
Roadway Deficiency	1	0.48%	1	0	0	0
Rear End	103	49.05%	3	15	33	0
Congestion	36	17.14%	1	4	14	0
Roadway Deficiency	67	31.90%	2	11	19	0
Sideswipe Same Direction	8	3.81%	0	0	1	0
Congestion	4	1.90%	0	0	1	0
Roadway Deficiency	4	1.90%	0	0	0	0
Turning	80	38.10%	7	14	12	0
Congestion	2	0.95%	0	0	0	0
Roadway Deficiency	78	37.14%	7	14	12	0
Pedestrian	1	0.48%	0	0	0	1
Roadway Deficiency	1	0.48%	0	0	0	1
Grand Total	210	100.00%	11	30	47	1

18.2 SUMMARY OF OPERATIONAL ANALYSIS

Both of the proposed split-diamond interchange modification alternatives are anticipated to improve the overall safety of the I-57 mainline traffic flow because the new layouts provide better horizontal alignment and sight distances within the major decision making areas of the interchange as well as the mainline travel lanes of the interstate.

The operational analysis of the proposed interchange modification configurations is based on a design year that is 20 years after the date when the construction of the interchange project is scheduled to be complete and open to the traveling public. Traffic volumes were provided by IDOT, supplemented with peak hour turning movement counts as needed. Since traffic growth has been stagnant between 2012 and 2016, and since this report includes aggressive development and trip generation (see Appendix C), IDOT is comfortable that the traffic projections provided in this report are sufficient in accommodating traffic

through the year 2036. Analysis of the study area was performed for each of the following scenarios:

- Existing Conditions Scenario – The existing 2012 conditions were analyzed with the current geometric configurations throughout the network of the project area with the 2012 AM/PM peak hour traffic volumes.
- 2032 No-Build Scenario – The existing conditions with the current geometric configurations throughout the network of the project area were analyzed with the projected 2032 AM/PM peak hour traffic volumes, without any additional traffic from the proposed development. It is assumed that the operational LOS for the upgraded diamond interchange modification (Study Alternative No. 2) scenario analysis would result in the same LOS as this 2032 No-Build Scenario because the overall roadway network does not change, and therefore does not impact the operation of the study intersections.
- 2032 Build Scenario – Alternative No. 3 – The proposed expanded split-diamond interchange modification with one-way northbound and southbound Collector-Distributor (C-D) roads connecting North Road, the proposed Burlington Route Boulevard and IL 149 was analyzed with the projected 2032 AM/PM peak hour traffic volumes and the additional traffic generated by the proposed future development. This scenario also accounts for traffic that will likely be redistributed as a result of the new connections provided to the local roadway network from I-57.
- 2032 Build Scenario – Alternative No. 4 – The proposed split-diamond interchange modification with one-way northbound and southbound Collector-Distributor (C-D) roads connecting the proposed Burlington Route Boulevard and IL 149 was analyzed with the projected 2032 AM/PM peak hour traffic volumes and the additional traffic generated by the proposed future development. This scenario also accounts for traffic that will likely be redistributed as a result of the new connections provided to the local roadway network from I-57 as well as the removal and termination of the North Road Bridge connection.

Figures and tables showing the peak hour traffic volumes and the LOS analysis results at each intersection, freeway ramp junction and freeway segment for the various scenarios described above are provided in the *Highway Capacity Analysis* section of this report. Levels of service for the two 2032 Build Scenarios are acceptable for all intersections,

freeway segments, and ramp junctions based on the LOS results as detailed in the *Highway Capacity Analysis* section of this report and based on the two proposed interchange modification configurations as depicted in the *Interchange Location Map* section of this report.

The new trips generated by the proposed local development in the vicinity of the I-57/IL 149 interchange were assigned to the roadway network based on the existing traffic distribution patterns, the proposed roadway configuration including the Burlington Route, and the local population distribution. It was assumed that 50% of the trips generated would approach the development from I-57, 40% of the trips would approach from the east and the remaining 10% of the trips would approach from the west. The exceptions to the 50%/40%/10% distribution assumption are the proposed Travel/Truck Center, Distribution Center, and the proposed RV Park. These were assumed to have 100% traffic approaching from I-57. It was also assumed that a significant amount of truck traffic would primarily utilize the proposed roadway network to access the Travel/Truck Center, Distribution Center, and the proposed RV Park during off peak hours and would not negatively affect turning maneuvers and required storage from the southbound C-D road to the Burlington Route west of the interstate.

All trip generation and distribution tables for the proposed development adjacent to the interchange and trip distribution maps are included in Appendix C and D of this report.

19 INTERCHANGE LOCATION MAP

The required Interchange Location Maps are provided in Figure 19-1 through Figure 19-20 and include a dimensioned, detailed drawing of the design elements of the existing and proposed change conditions for each of the four (4) alternatives analyzed. Alternative No. 1 is the No-Build option, Alternative No. 2 is the Upgrade Existing Diamond Interchange option, Alternative No. 3 is the Expanded Split-Diamond Interchange option including the reconstruction of the North Road Bridge, and Alternative No. 4 is the Split-Diamond Interchange option including the removal of the North Road Bridge. Design elements include, as applicable:

- Project limits,
- adjacent interchange(s),
- Ramp to be added,

- Ramp to be removed,
- Relocation of ramp gore,
- Configuration,
- Travel lanes and shoulder widths,
- Ramp radii,
- Ramp grades,
- Acceleration lane lengths,
- Deceleration lane lengths,
- Taper lengths,
- Auxiliary lane lengths, (See Table 19-1 through 19-3 for Alternative No. 3 and Table 19-4 through 19-6 for Alternative No. 4)
- Taper or parallel type exit ramps,
- Truck climbing lane(s),
- auxiliary/operational lane(s), and
- Collector/distributor road(s)
- Design exception information is provided in section 8 of this report.

Although not shown on the interchange maps, an additional intersection configuration option to consider for some of the intersections within the study area is the roundabout option. Roundabouts will operate efficiently from a traffic operations standpoint, but due to the impacts of the roundabout footprint on access control requirements, and due to limited local driver familiarity with roundabouts, utilization of roundabouts in combination with the unique interchange configuration may not be the best application on the C-D/interchange ramp system. However, within the lower-volume local roadway network adjacent to the interchange, roundabout design could be investigated at certain intersections based on right-of-way and operational concerns.

Table 19-1: Alternative No. 3 – Auxiliary Lane Lengths for IL 149 Corridor – 2032 Design Year

IL 149 Corridor	Turn Lane	Synchro 95th Q Length		IDOT Required Storage Length		Max Storage Length (Ft)	Storage Length Provided (Ft)
		AM Storage Length (Ft)	PM Storage Length (Ft)	AM Storage Length (Ft)	PM Storage Length (Ft)		
IL 149 & New Winery Road	WB Left	36	21	33	24	36	115
IL 149 & Ken Gray Blvd.	EB Left	19	7	52	23	52	150
	WB Left	107	92	262	286	286	155
	NB Right	17	252	171	298	298	160
	SB Left	62	103	107	147	147	215
IL 149 & I-57 SB Off-ramp & SB C-D	EB Right	0	3	77	40	77	200
	WB Left	180	20	200	18	200	220
	SB Left	15	23	10	19	23	300
	SB Right	15	26	72	79	79	300
IL 149 & I-57 NB Onramp & NB C-D	EB Left	71	34	104	66	104	260
	WB Right	8	0	51	14	51	200
	NB Left	44	79	45	92	92	225
	NB Right	0	0	2	7	7	225
IL 149 & Joiner Street	EB Left	22	5	16	4	22	115
	WB Left	56	76	99	103	103	200
	NB App	32	53	87	85	87	N/A
	SB App	12	12	7	6	12	N/A
IL 149 & Taft Street	EB Left	34	33	31	37	37	200
	WB Left	96	159	130	140	159	225
	NB Right	46	32	140	124	140	115
	SB App	52	60	81	74	81	N/A
IL 149 & IL 37	EB Left	56	114	118	179	179	115
	EB Right	6	17	46	64	64	200
	WB Left	45	51	84	80	84	180
	NB Left	44	63	58	72	72	115
	SB Left	66	69	98	82	98	125

Note: Synchro 8 with HCM 2010 methods utilized

Table 19-2: Alternative No. 3 – Auxiliary Lane Lengths for Burlington Route Corridor – 2032 Design Year

Burlington Route Corridor	Turn Lane	Synchro 95th Q Length		IDOT Required Storage Length		Max Storage Length (Ft)	Storage Length Provided (Ft)
		AM Storage Length (Ft)	PM Storage Length (Ft)	AM Storage Length (Ft)	PM Storage Length (Ft)		
Russell Road & Burlington	EB Left	12	12	7	8	16	150
	EB Right	0	28	73	75	75	150
	WB Left	93	132	252	260	260	250
	WB Right	5	7	43	50	50	115
	NB Right	0	0	0	0	0	Free Flow
	SB App	51	54	53	46	53	115
SB C-D & Burlington	EB Right	15	13	148	176	176	Length of link
	WB Left	78	59	78	70	78	250
	SB Left	25	22	138	121	138	300
	SB Right	2	0	69	66	69	300
NB C-D & Burlington	EB Left	63	57	59	71	71	200
	WB Right	0	11	99	96	99	Length of link
	NB Left	20	21	178	166	178	250
	NB Right	0	0	86	69	86	250
Joiner Street & Burlington	EB Left	52	98	144	130	144	200
	EB Right	0	14	81	58	81	125
	WB Left	30	28	28	19	30	250
	NB Left	57	50	72	52	72	Length of link
	SB Right	14	34	139	130	139	150
Taft Street & Burlington	EB Left	42	35	32	66	66	200
	WB Left	97	81	123	196	196	200
	NB Right	0	15	121	257	257	150
	SB Right	0	0	40	55	55	115
SR 37 & Burlington / Cleveland	EB Left	38	81	103	167	167	200
	EB Right	0	1	94	139	139	200
	WB App	90	71	93	69	93	N/A
	NB Left	177	199	153	202	202	200
	SB Left	10	9	8	4	10	115

Note: Synchro 8 with HCM 2010 methods utilized

Table 19-3: Alternative No. 3 – Auxiliary Lane Lengths for North Road Corridor – 2032 Design Year

North Road Corridor	Turn Lane	Synchro 95th Q Length		IDOT Required Storage Length		Max Storage Length (Ft)	Storage Length Provided (Ft)
		AM Storage Length (Ft)	PM Storage Length (Ft)	AM Storage Length (Ft)	PM Storage Length (Ft)		
SB C-D & North Rd & I-57 SB Onramp	EB Right	15	122	79	89	122	175
	WB Left	226	194	257	230	257	250
	SB Left	5	11	12	16	16	400
	SB Right	1	1	72	62	72	400
NB C-D & North Rd & I-57 NB Off-ramp	EB Left	26	51	41	44	51	250
	WB Right	0	0	12	15	15	250
	NB Left	52	59	75	74	75	300
	NB Right	48	55	252	299	299	300

Note: Synchro 8 with HCM 2010 methods utilized

Table 19-4: Alternative No. 4 – Auxiliary Lane Lengths for IL 149 Corridor – 2032 Design Year

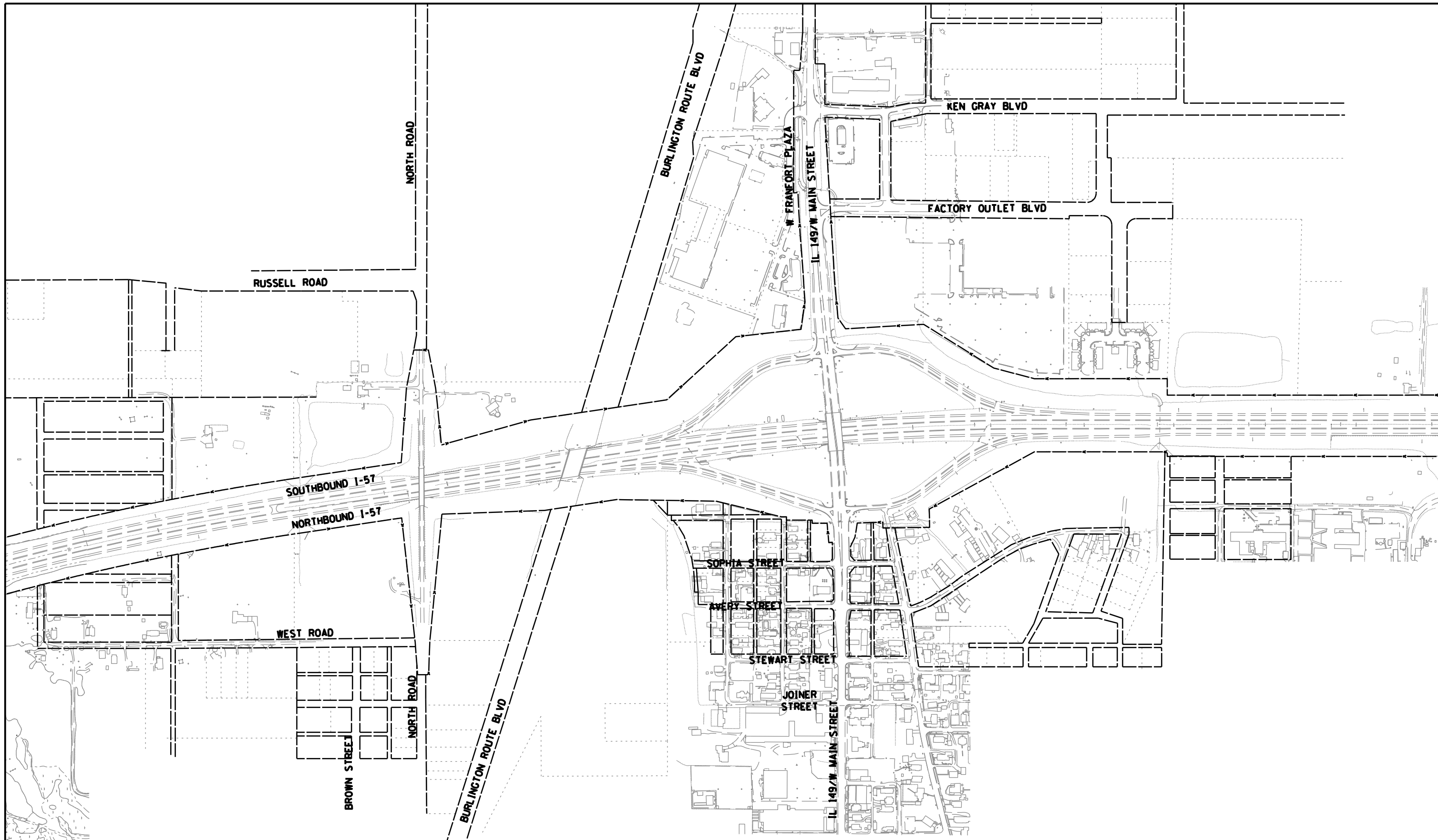
IL 149 Corridor	Turn Lane	Synchro 95th Q Length		IDOT Required Storage Length		Max Storage Length (Ft)	Storage Length Provided (Ft)
		AM Storage Length (Ft)	PM Storage Length (Ft)	AM Storage Length (Ft)	PM Storage Length (Ft)		
IL 149 & New Winery Road	WB Left	36	21	33	24	36	115
IL 149 & Ken Gray Blvd.	EB Left	19	7	52	23	52	150
	WB Left	107	92	262	286	286	155
	NB Right	17	252	171	298	298	160
	SB Left	62	103	107	147	147	215
IL 149 & I-57 SB Off-ramp & SB C-D	EB Right	0	3	77	40	77	200
	WB Left	180	20	200	18	200	220
	SB Left	15	23	10	19	23	250
	SB Right	15	26	72	79	79	250
IL 149 & I-57 NB Onramp & NB C-D	EB Left	71	34	104	66	104	260
	WB Right	8	0	51	14	51	200
	NB Left	44	79	45	92	92	225
	NB Right	0	0	2	7	7	225
IL 149 & Joiner Street	EB Left	22	5	16	4	22	115
	WB Left	56	76	99	103	103	200
	NB App	32	53	87	85	87	N/A
	SB App	12	12	7	6	12	N/A
IL 149 & Taft Street	EB Left	34	33	31	37	37	200
	WB Left	96	159	130	140	159	225
	NB Right	46	32	140	124	140	115
	SB App	52	60	81	74	81	N/A
IL 149 & IL 37	EB Left	56	114	118	179	179	115
	EB Right	6	17	46	64	64	200
	WB Left	45	51	84	80	84	180
	NB Left	44	63	58	72	72	115
	SB Left	66	69	98	82	98	125

Note: Synchro 8 with HCM 2010 methods utilized

Table 19-5: Alternative No. 4 – Auxiliary Lane Lengths for Burlington Route Corridor – 2032 Design Year

Burlington Route Corridor	Turn Lane	Synchro 95th Q Length		IDOT Required Storage Length		Max Storage Length (Ft)	Storage Length Provided (Ft)
		AM Storage Length (Ft)	PM Storage Length (Ft)	AM Storage Length (Ft)	PM Storage Length (Ft)		
Russell Road & Burlington	EB Left	12	18	7	8	16	150
	EB Right	0	8	73	75	75	150
	WB Left	69	160	252	260	260	280 (Dual Left)
	WB Right	7	15	43	50	50	115
	NB Right	0	0	0	0	0	Free Flow
	SB App	49	60	53	46	53	115
SB C-D & Burlington & I-57 SB On-Ramp	EB Right	15	13	148	176	176	Length of link
	WB Left	78	59	78	70	78	200 (Dual Left)
	SB Left	25	22	138	121	138	300
	SB Right	2	0	69	66	69	300
NB C-D & Burlington & I-57 NB Off-Ramp	EB Left	63	57	59	71	71	200
	WB Right	0	11	99	96	99	Length of link
	NB Left	20	21	178	166	178	250 (Dual Left)
	NB Right	0	0	86	69	86	250
Joiner Street & Burlington	EB Left	52	98	144	130	144	225
	EB Right	0	14	81	58	81	125
	WB Left	30	28	28	19	30	N/A
	NB Left	57	50	72	52	72	175
	SB Right	14	34	139	130	139	220
Taft Street & Burlington	EB Left	54	97	32	66	66	200
	WB Left	42	38	123	196	196	200
	NB Right	0	5	121	257	257	150
	SB Right	73	66	40	55	55	115
SR 37 & Burlington / Cleveland	EB Left	9	44	103	167	167	200
	EB Right	0	19	94	139	139	200
	WB App	90	39	93	69	93	N/A
	NB Left	177	179	153	202	202	200
	SB Left	10	11	8	4	10	115

Note: Synchro 8 with HCM 2010 methods utilized



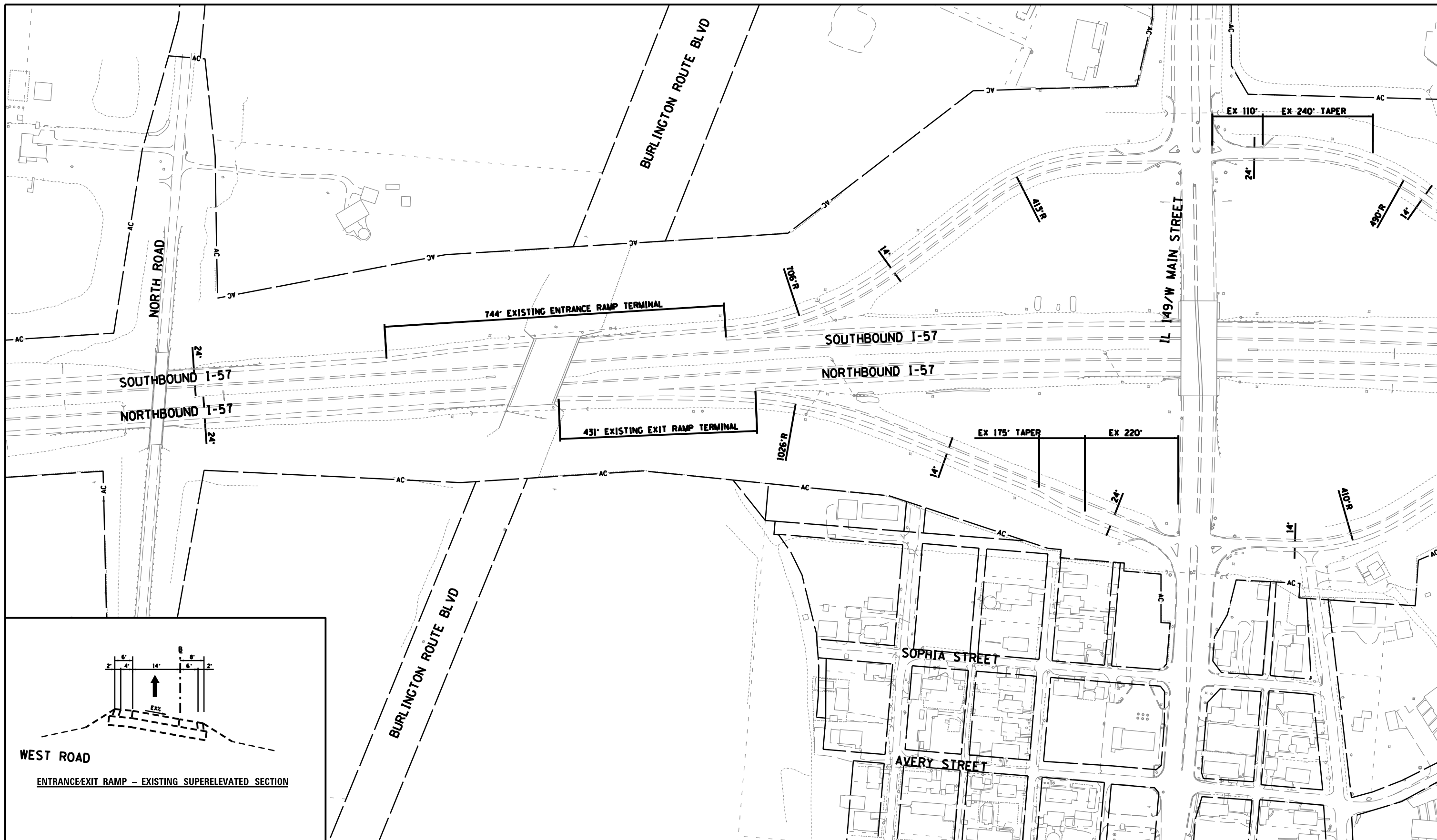
I-57 /IL 149 INTERCHANGE MODIFICATION
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0 250 500
 SCALE 1" = 500 FEET

Figure 19-1

Interchange Location Map
Alternative No. 1 – No-Build
Overview



I-57 /IL 149 INTERCHANGE MODIFICATION
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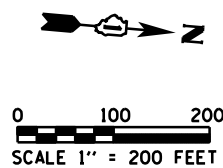
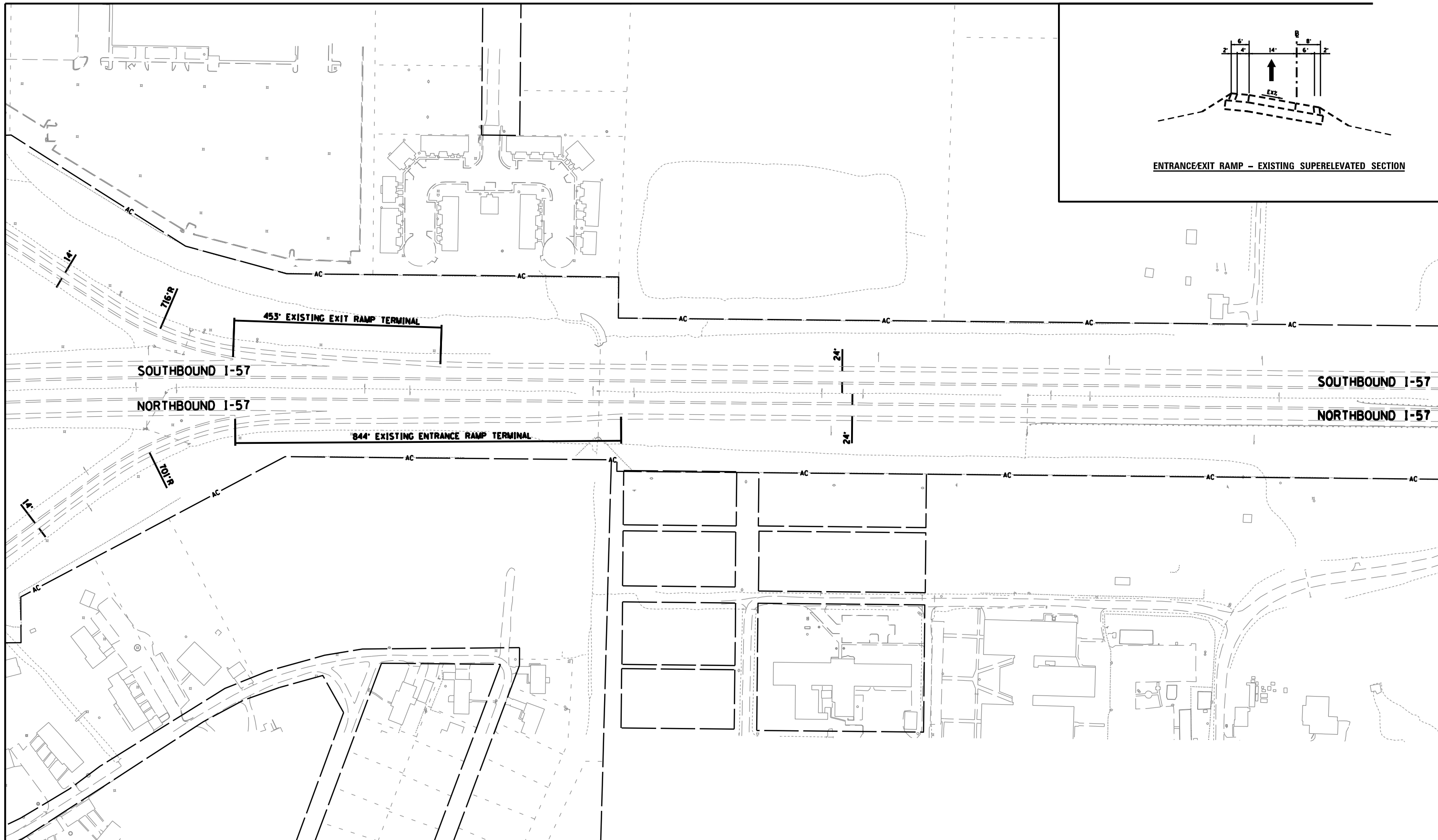


Figure 19-2
Interchange Location Map
Alternative No. 1 – No-Build
I-57 NB Exit Ramp, I-57 SB Entry Ramp & Intersections at IL 149



I-57 /IL 149 INTERCHANGE MODIFICATION
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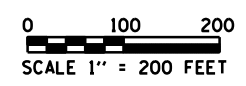
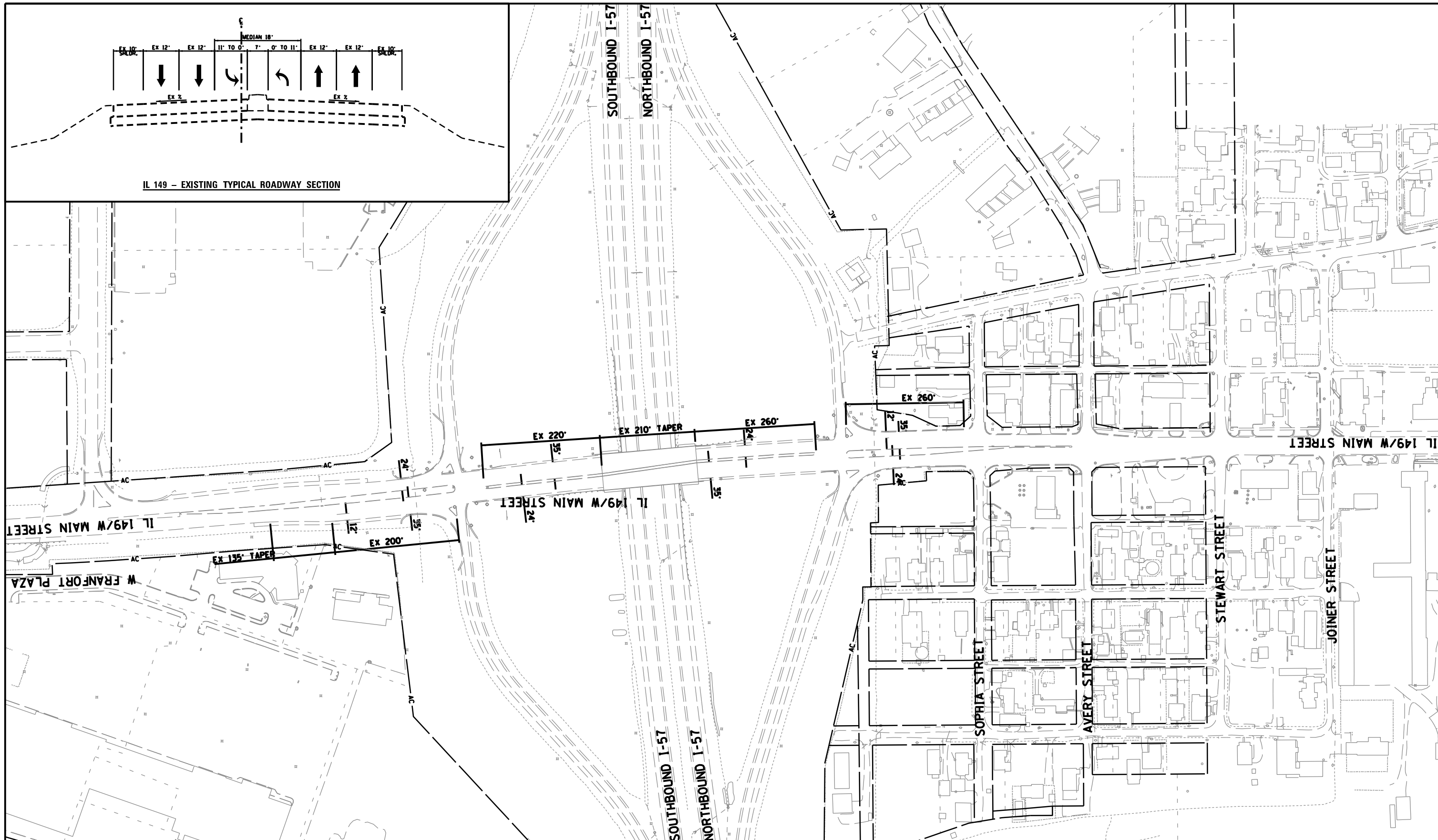


Figure 19-3
Interchange Location Map
Alternative No. 1 – No-Build
I-57 NB Entry Ramp & I-57 SB Exit Ramp Terminals



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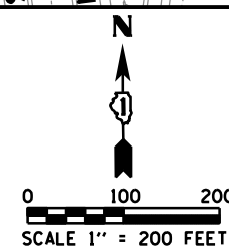
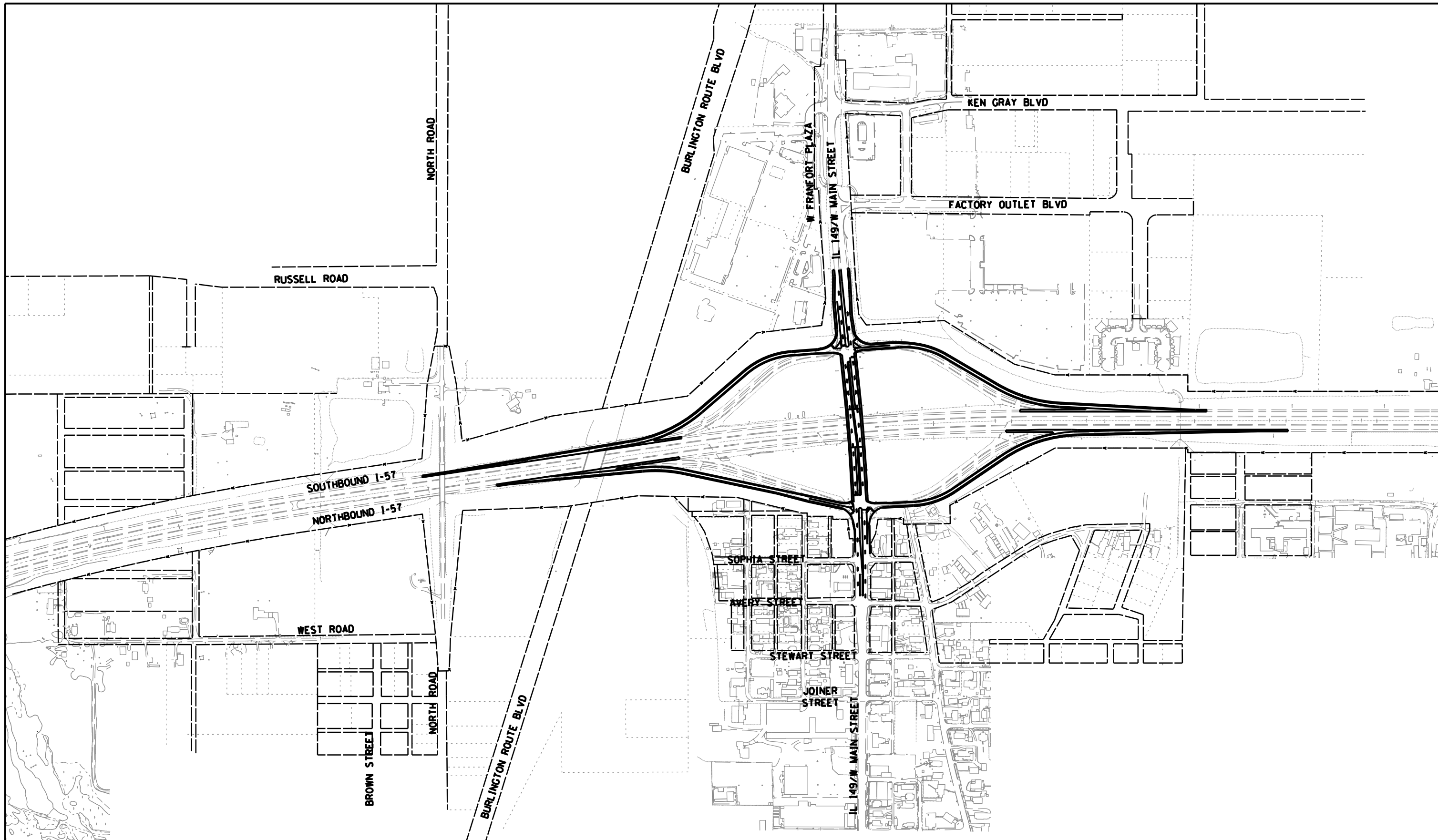


Figure 19-4
Interchange Location Map
Alternative No. 1 – No-Build
IL 149 from West of I-57 SB Ramps to East of I-57 NB Ramps

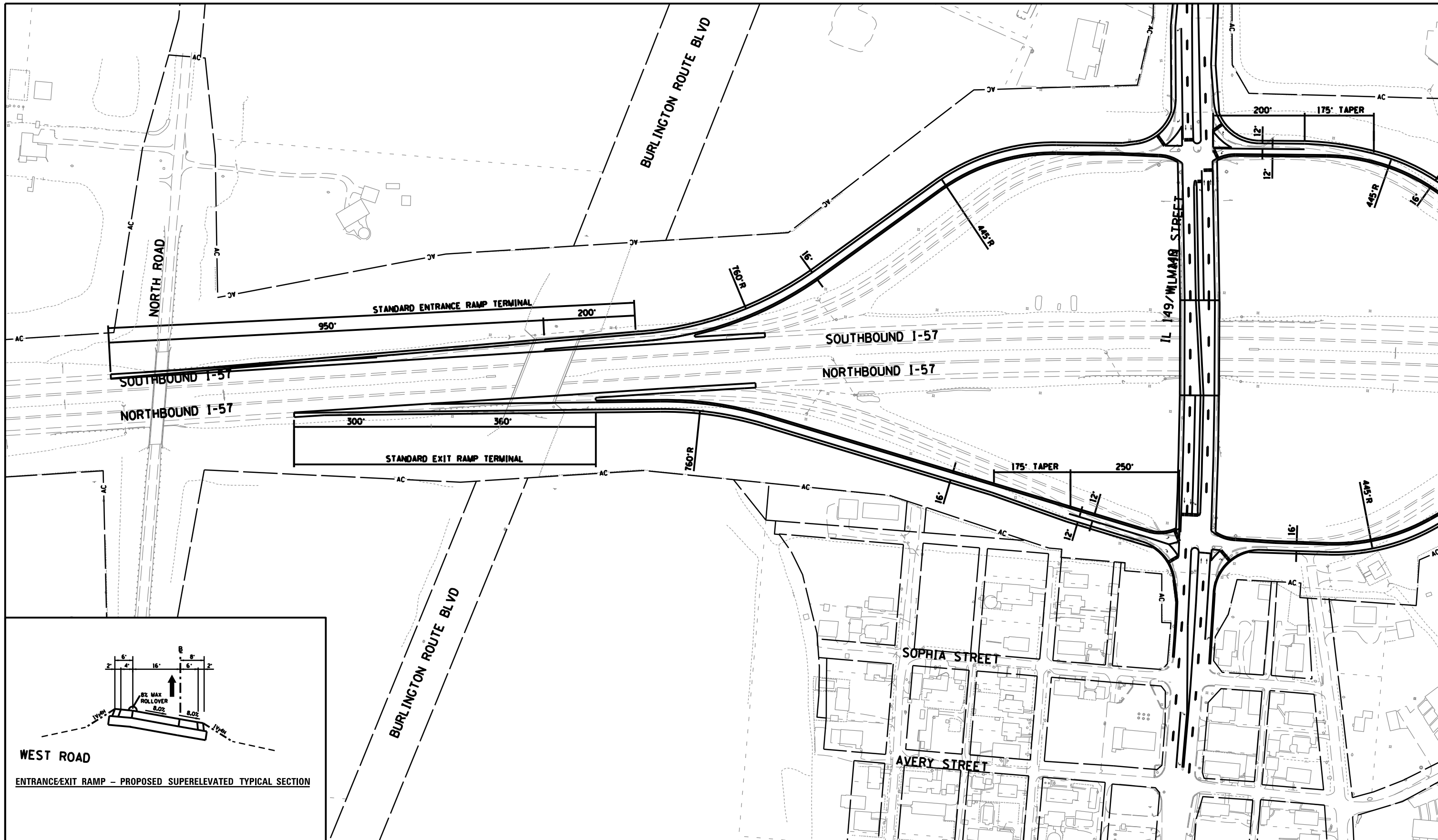


I-57 /IL 149 INTERCHANGE MODIFICATION
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0 250 500
 SCALE 1" = 500 FEET

Figure 19-5
Interchange Location Map
Alternative No. 2 – Upgrade of Existing Diamond Interchange
Overview



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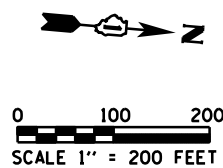
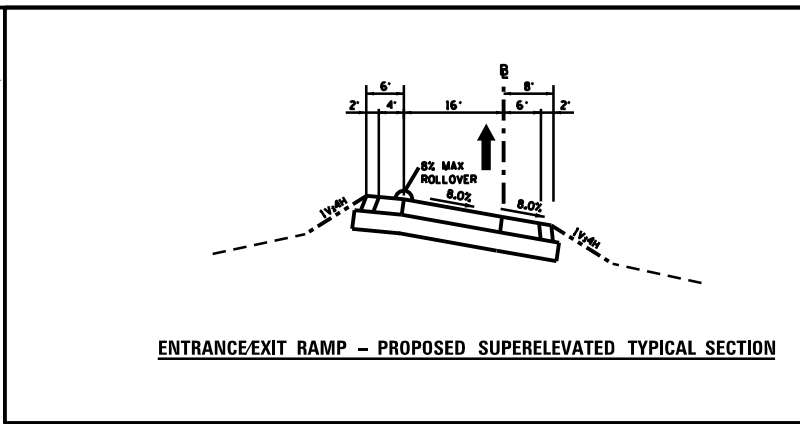
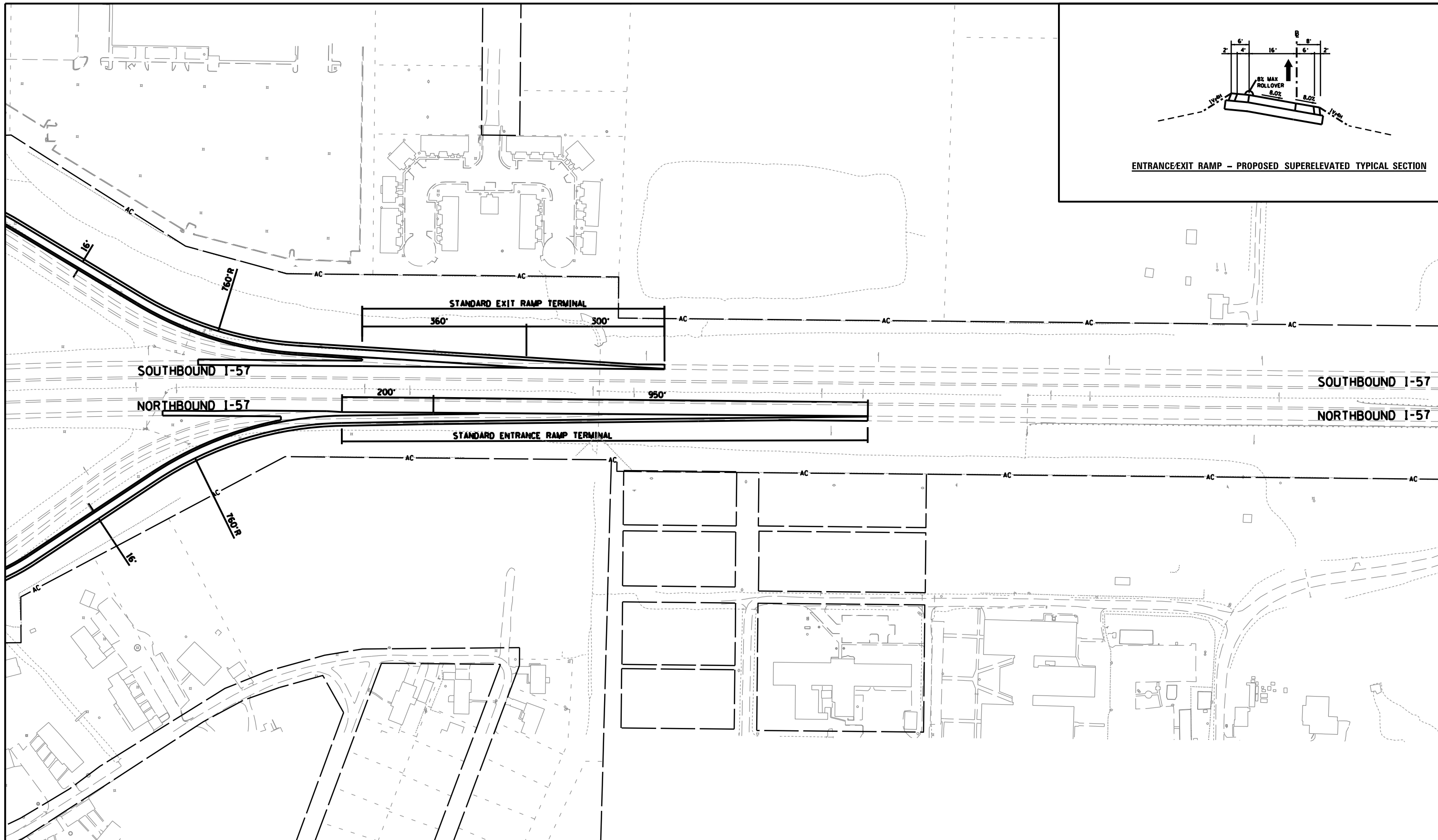
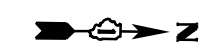


Figure 19-6
Interchange Location Map
Alternative No. 2 - Upgrade of Existing Diamond Interchange
I-57 NB Exit Ramp, I-57 SB Entry Ramp & Intersections at IL 149

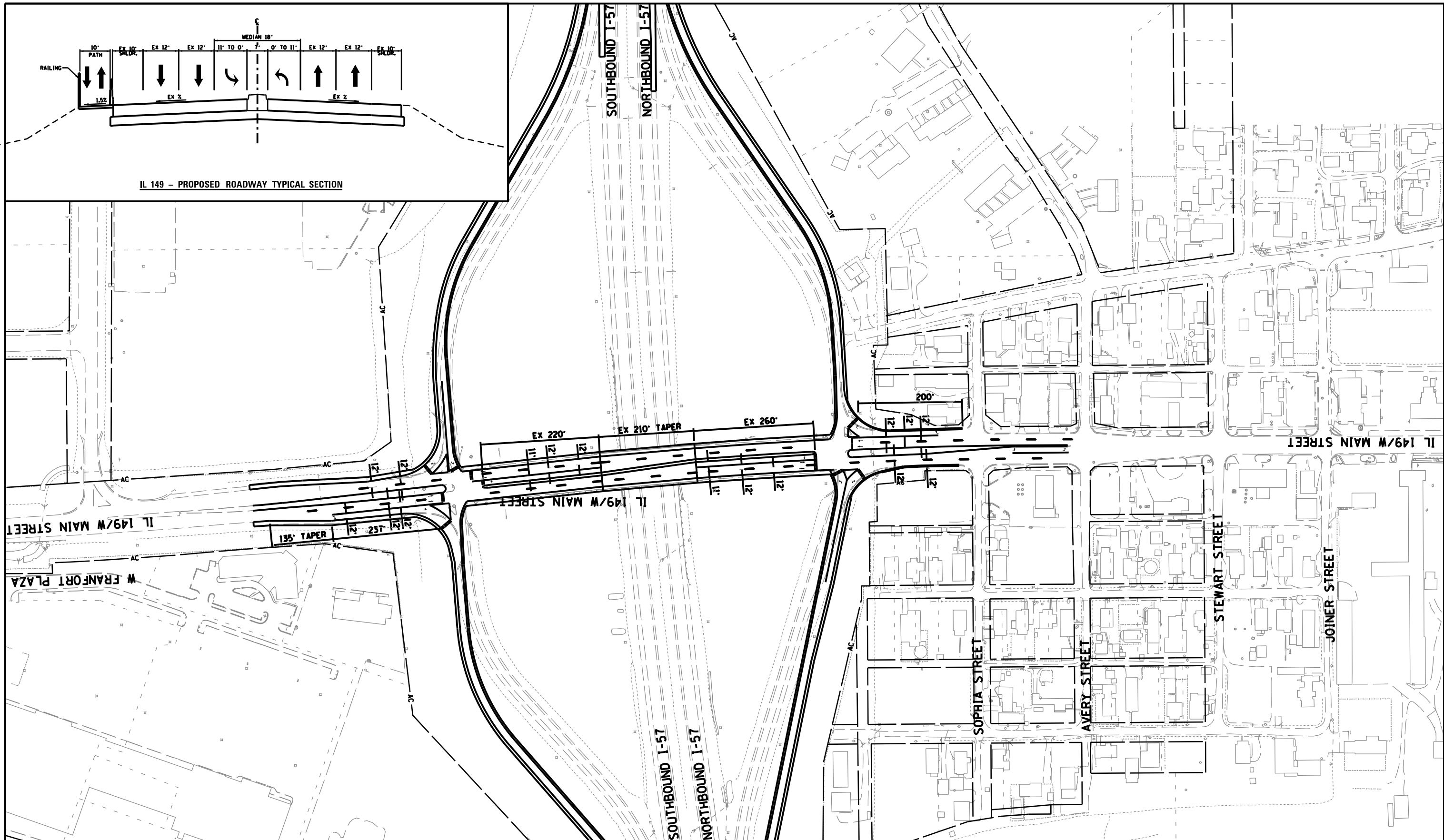


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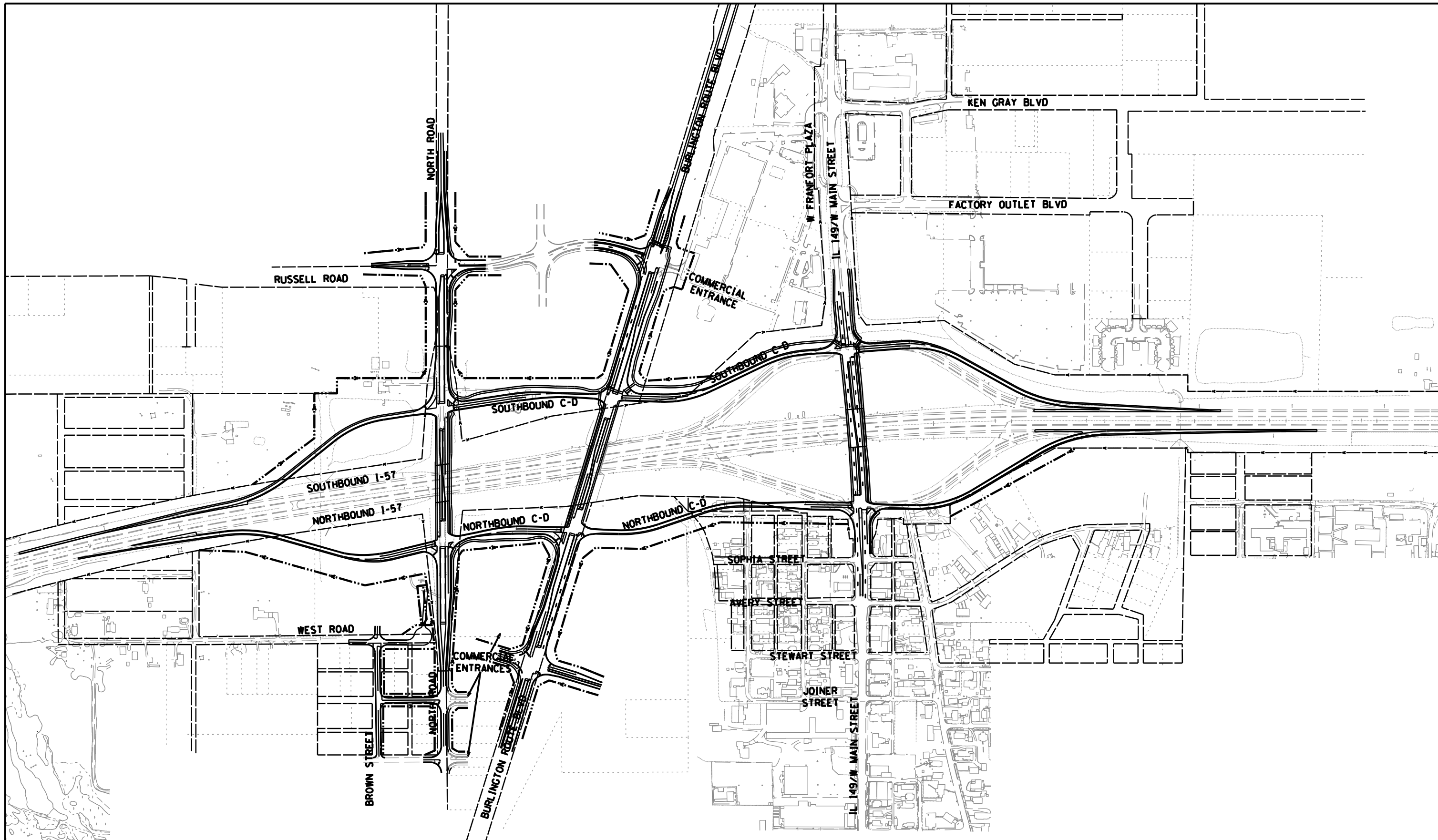
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Figure 19-7
Interchange Location Map
Alternative No. 2 - Upgrade Existing Diamond Interchange
I-57 NB Entry Ramp & I-57 SB Exit Ramp Terminals



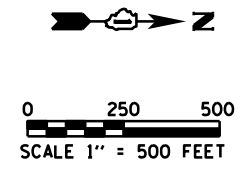
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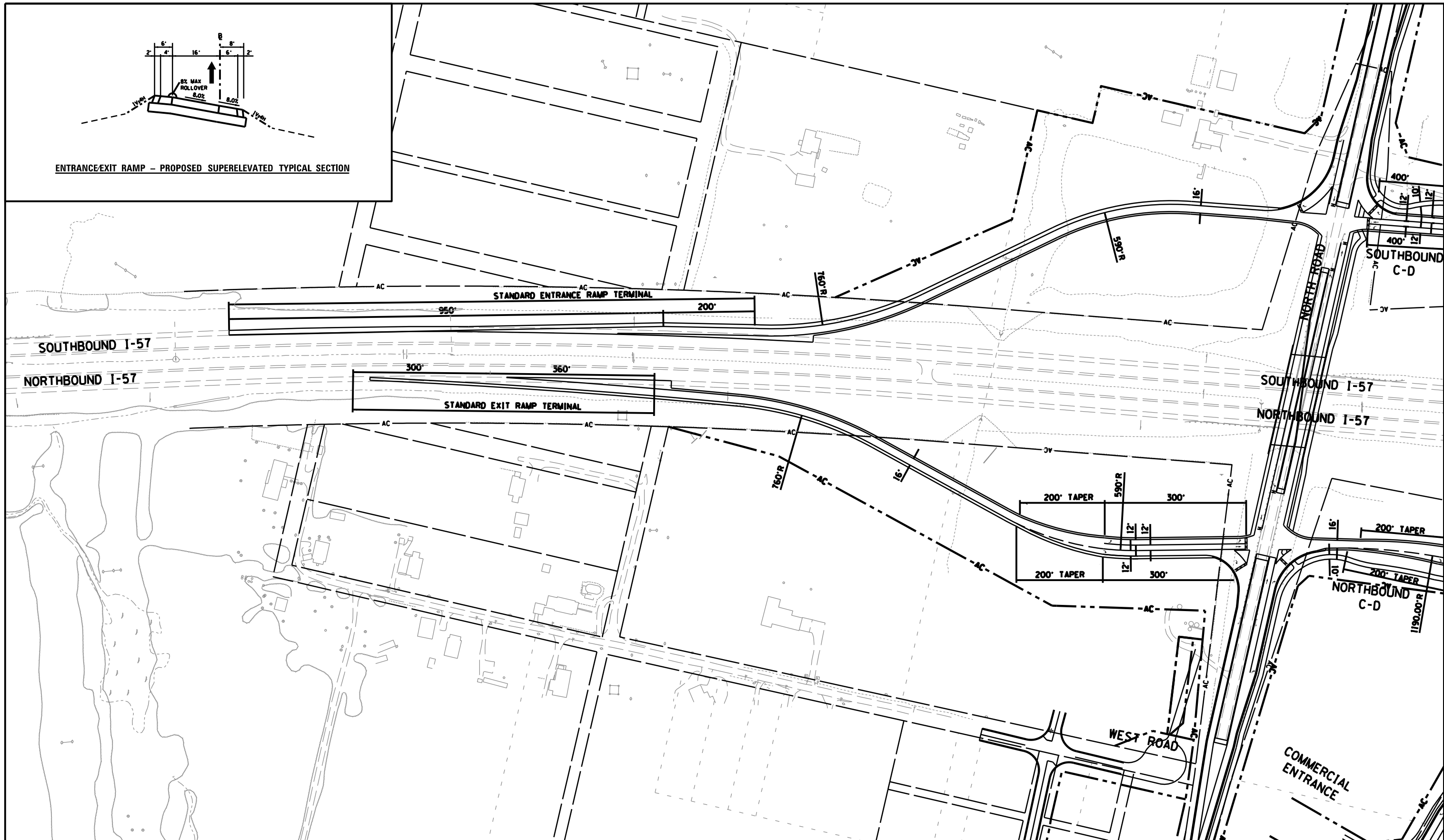
Figure 19-8
Interchange Location Map
Alternative No. 2 – Upgrade Existing Diamond Interchange
IL 149 from West of I-57 SB Ramps to East of I-57 NB Ramps



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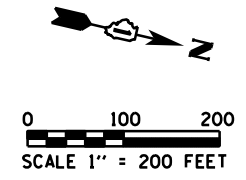
Figure 19-9
Interchange Location Map
Alternative No. 3 – Proposed Expanded Split Diamond Interchange
Overview

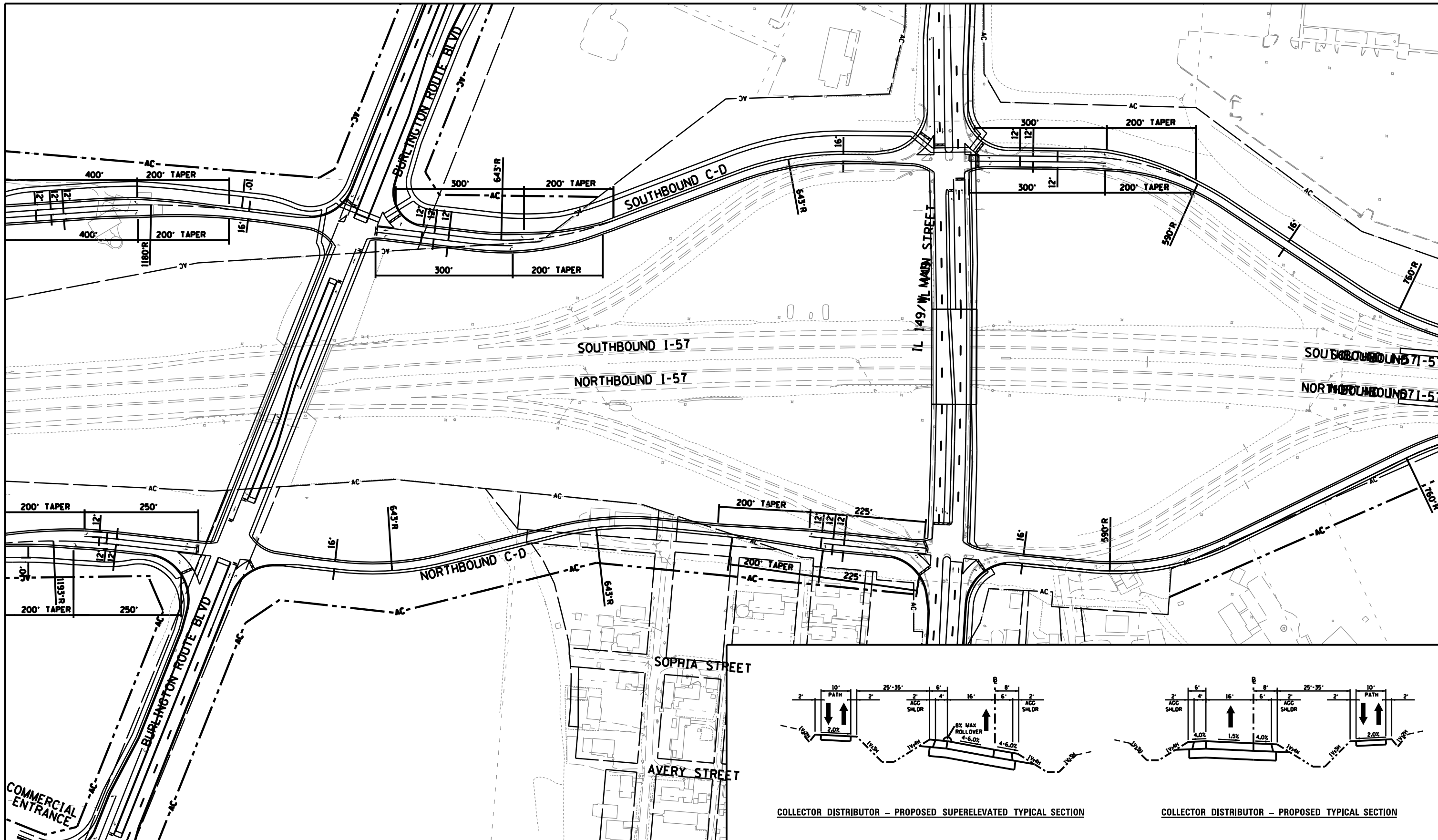




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Figure 19-10
Interchange Location Map
Alternative No. 3 – Proposed Expanded Split Diamond Interchange
I-57 NB Exit Ramp, I-57 SB Entry Ramp & Intersections at North Road





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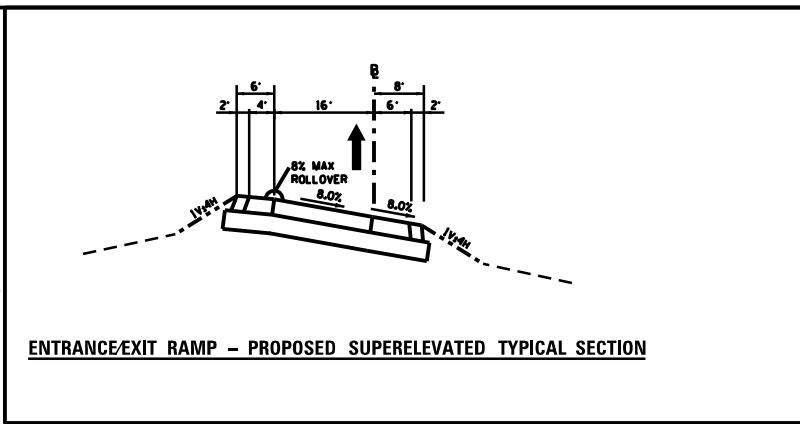
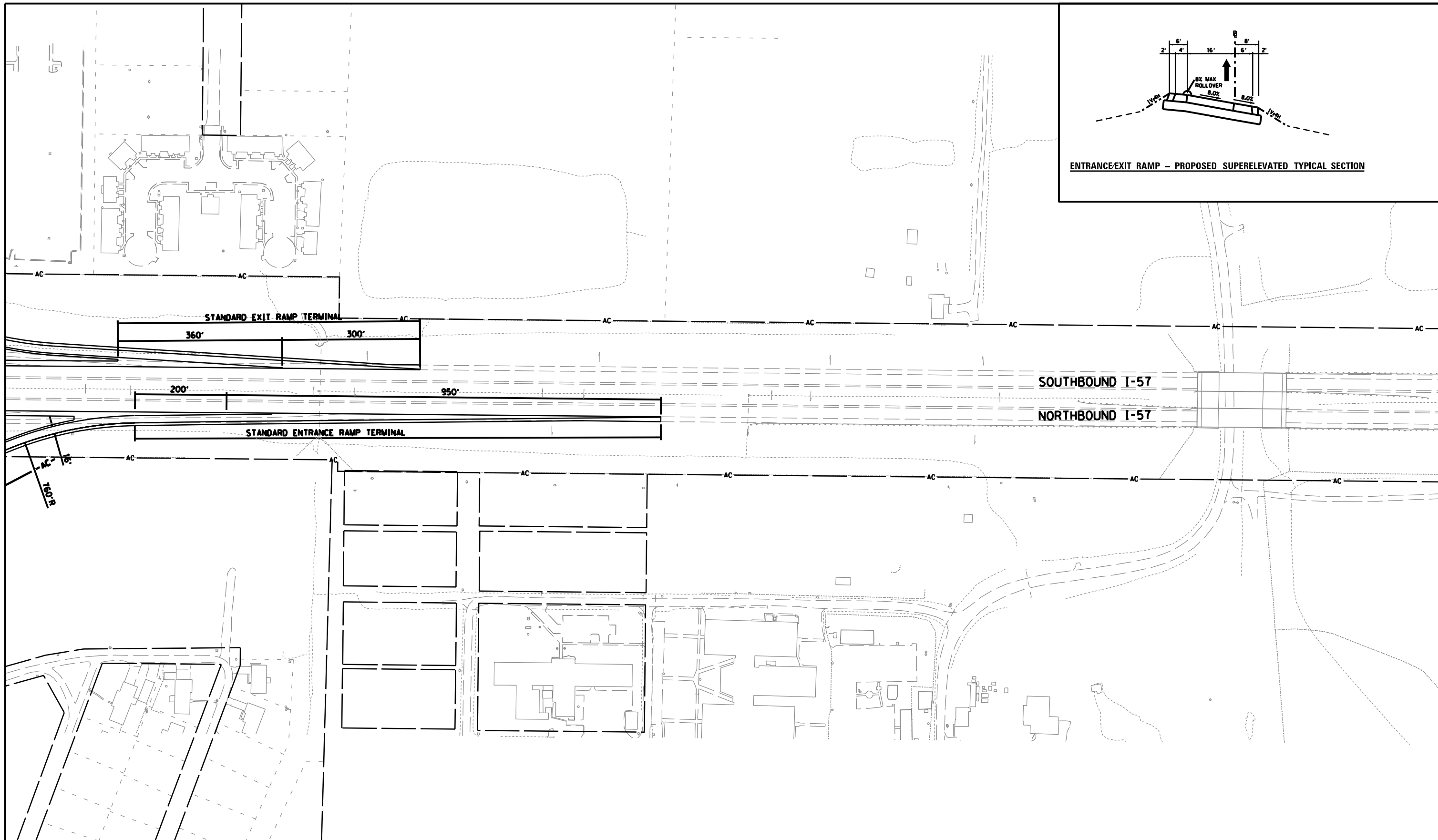
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 SCALE 1" = 200 FEET

Figure 19-11

Interchange Location Map

Alternative No. 3 – Proposed Expanded Split Diamond Interchange

NB & SB Collector Distributor Roads & Intersections at Burlington Route & IL 149



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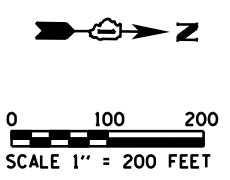
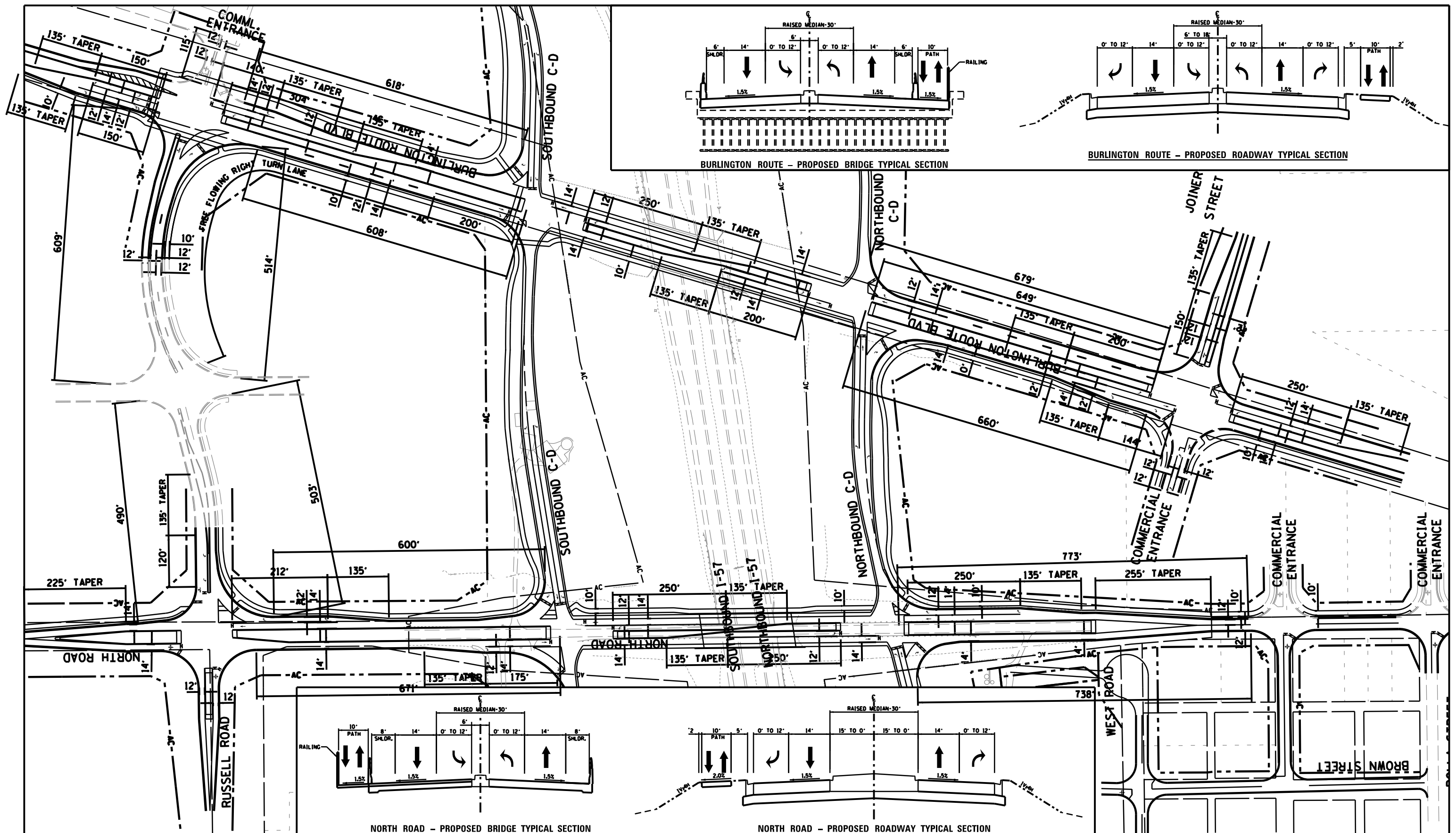
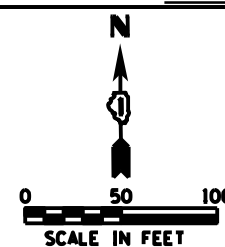


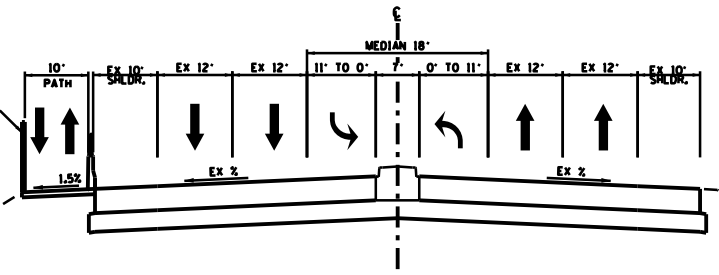
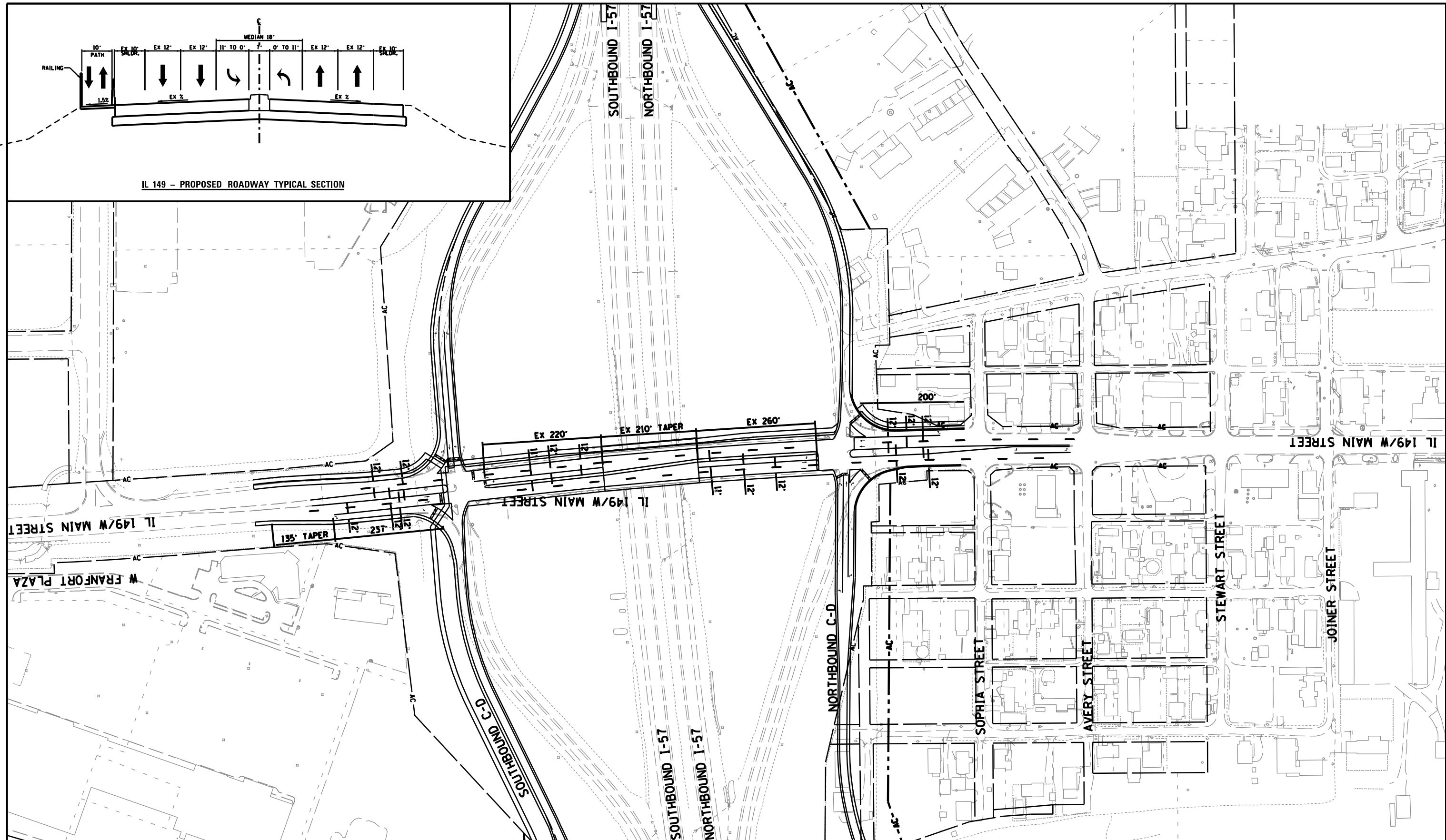
Figure 19-12
Interchange Location Map
Alternative No. 3 – Proposed Expanded Split Diamond Interchange
I-57 NB Entry Ramp & I-57 SB Exit Ramp Terminals



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Figure 19-13
Interchange Location Map
Alternative No. 3 - Proposed Expanded Split Diamond Interchange
North Road & Burlington Route



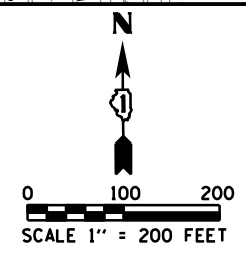


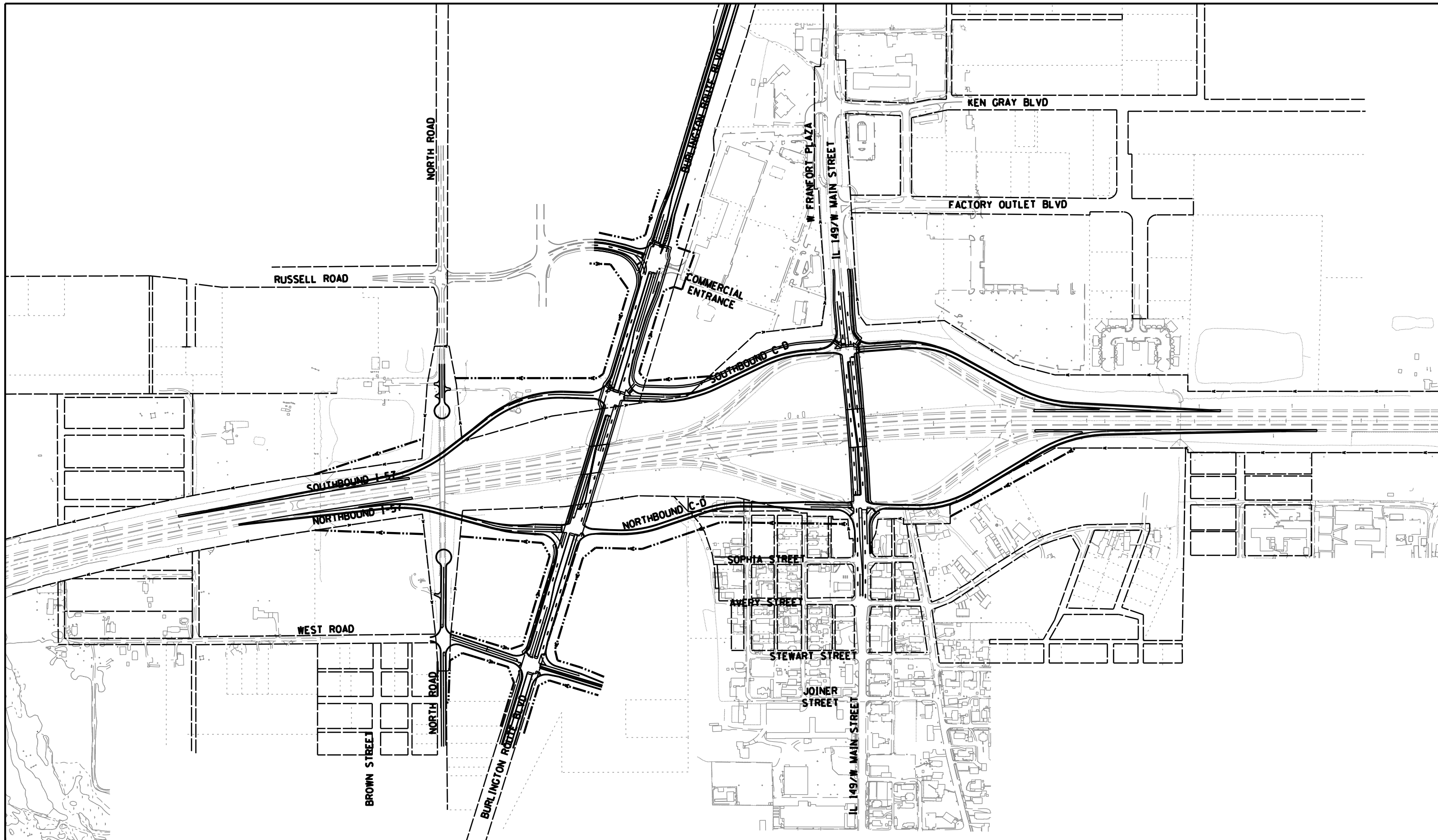
IL 149 - PROPOSED ROADWAY TYPICAL SECTION

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Figure 19-14

Interchange Location Map
Alternative No. 3 - Proposed Expanded Split Diamond Interchange
IL 149 from West of I-57 SB Ramps to East of I-57 NB Ramps





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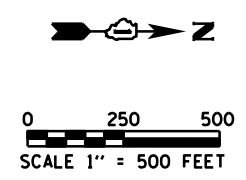
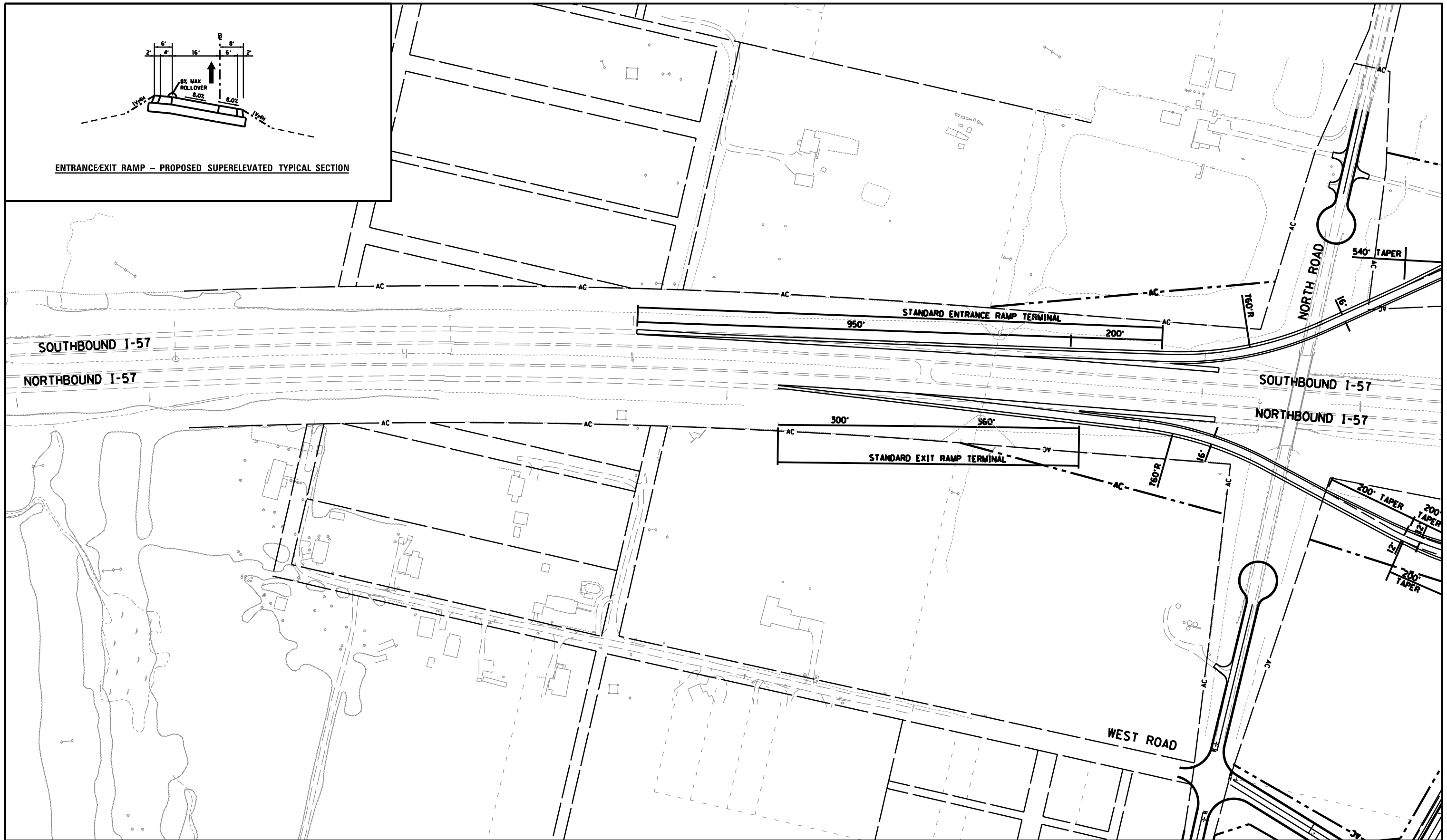


Figure 19-15
Interchange Location Map
Alternative No. 4 – Proposed Split Diamond Interchange
Overview



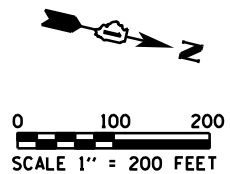
**I-57 / IL 149 INTERCHANGE MODIFICATION
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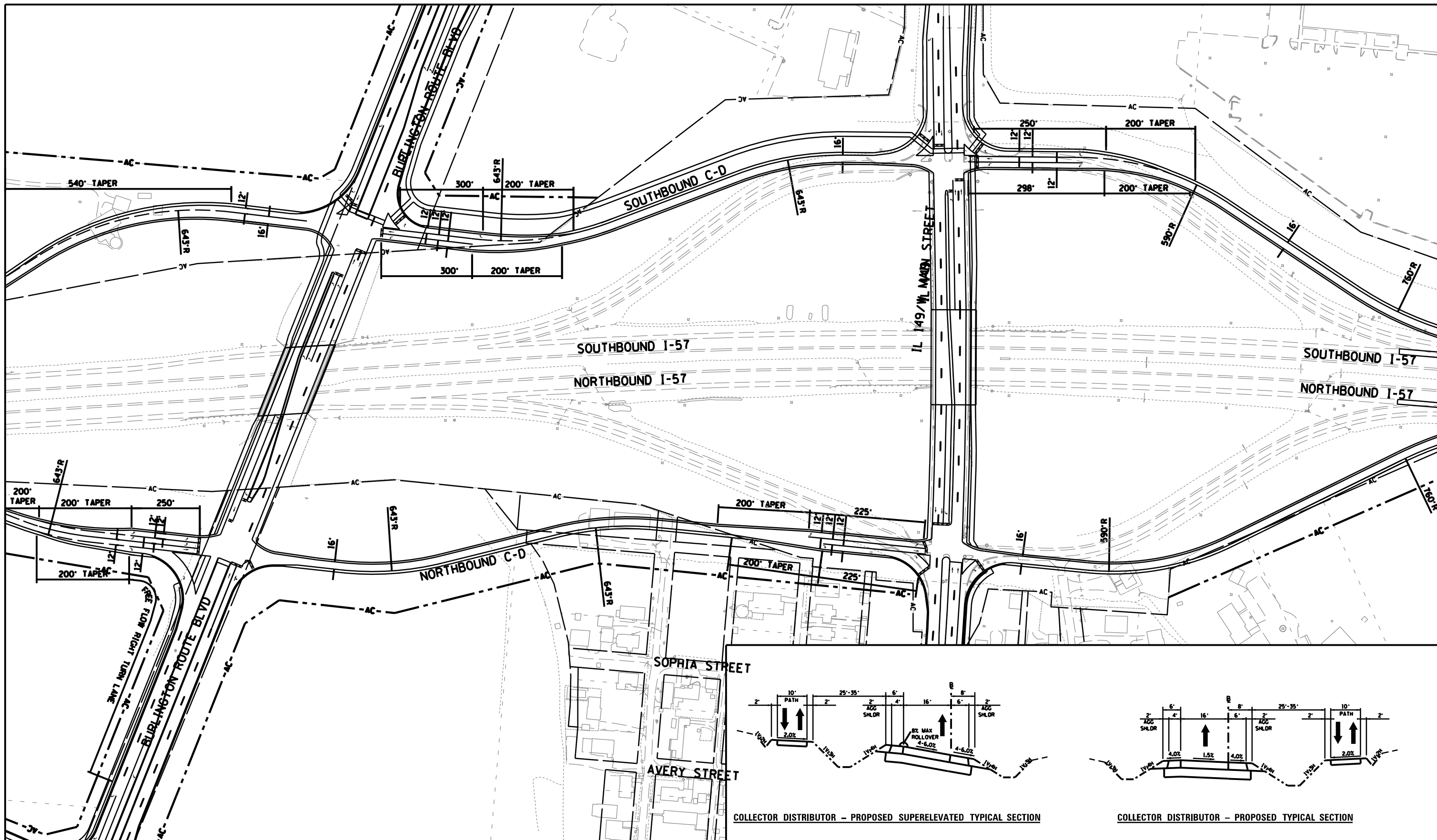
Figure 19-16

Interchange Location Map

Alternative No. 4 – Proposed Split Diamond Interchange

I-57 NB Exit Ramp & I-57 SB Entry Ramp Terminals & Cul-De-Sacs at North Road





I-57 / IL 149 INTERCHANGE MODIFICATION
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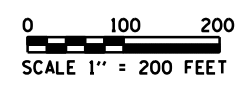
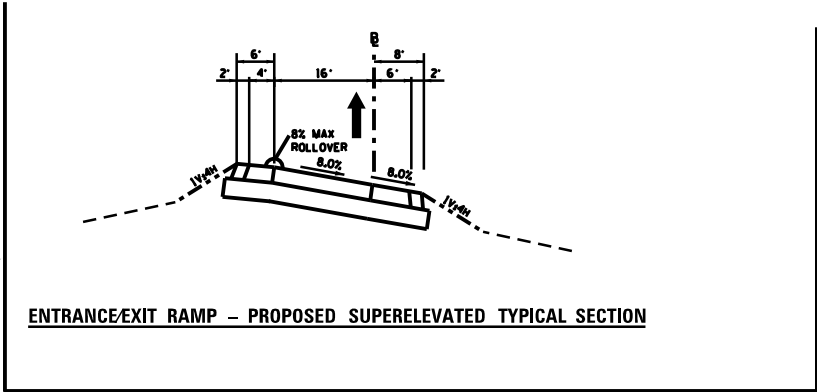
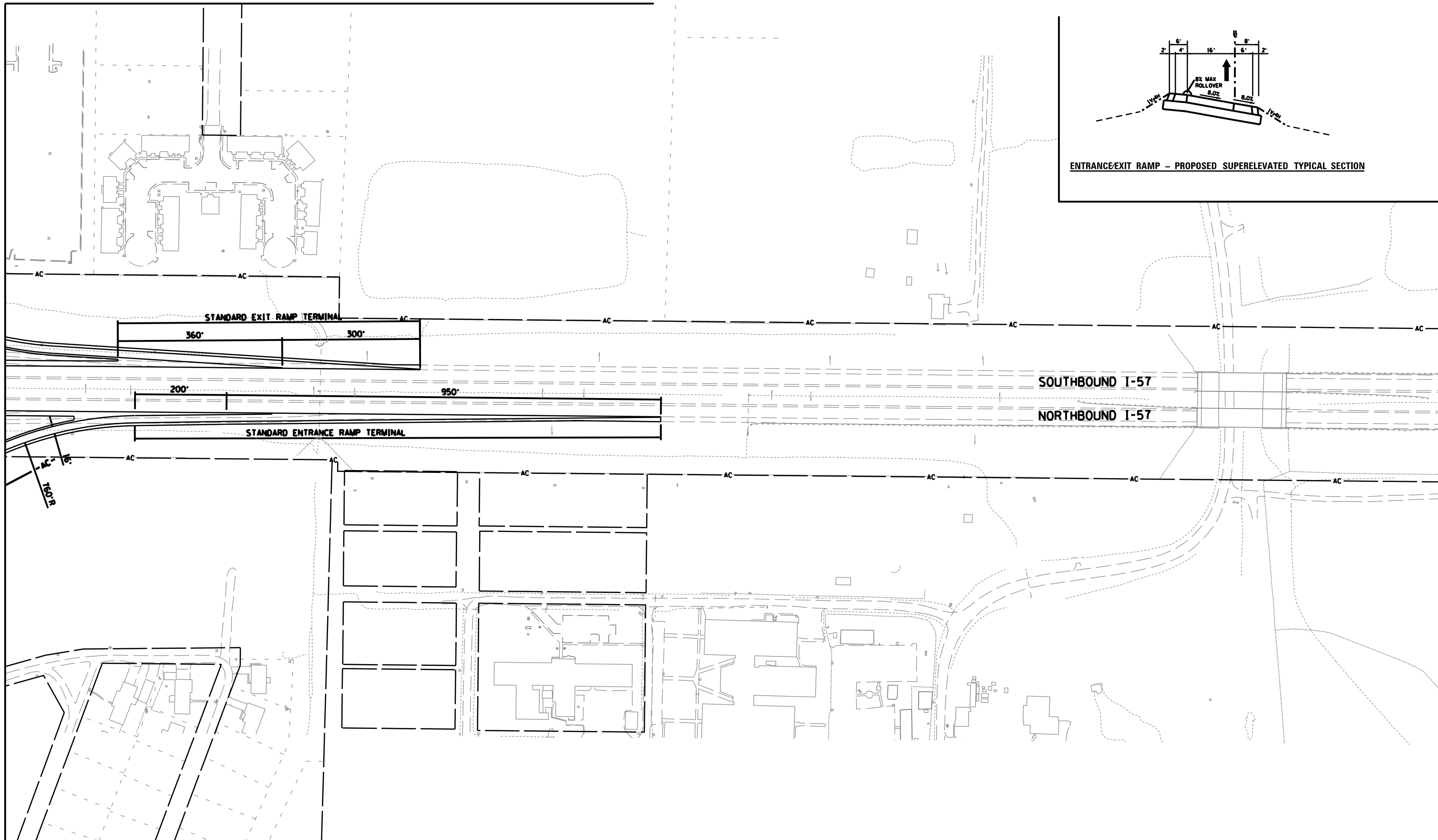


Figure 19-17

Interchange Location Map

Alternative No. 4 – Proposed Split Diamond Interchange

NB & SB Collector Distributor Roads & Intersections at Burlington Route & IL 149



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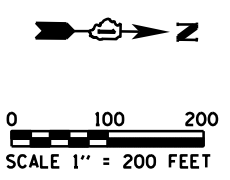
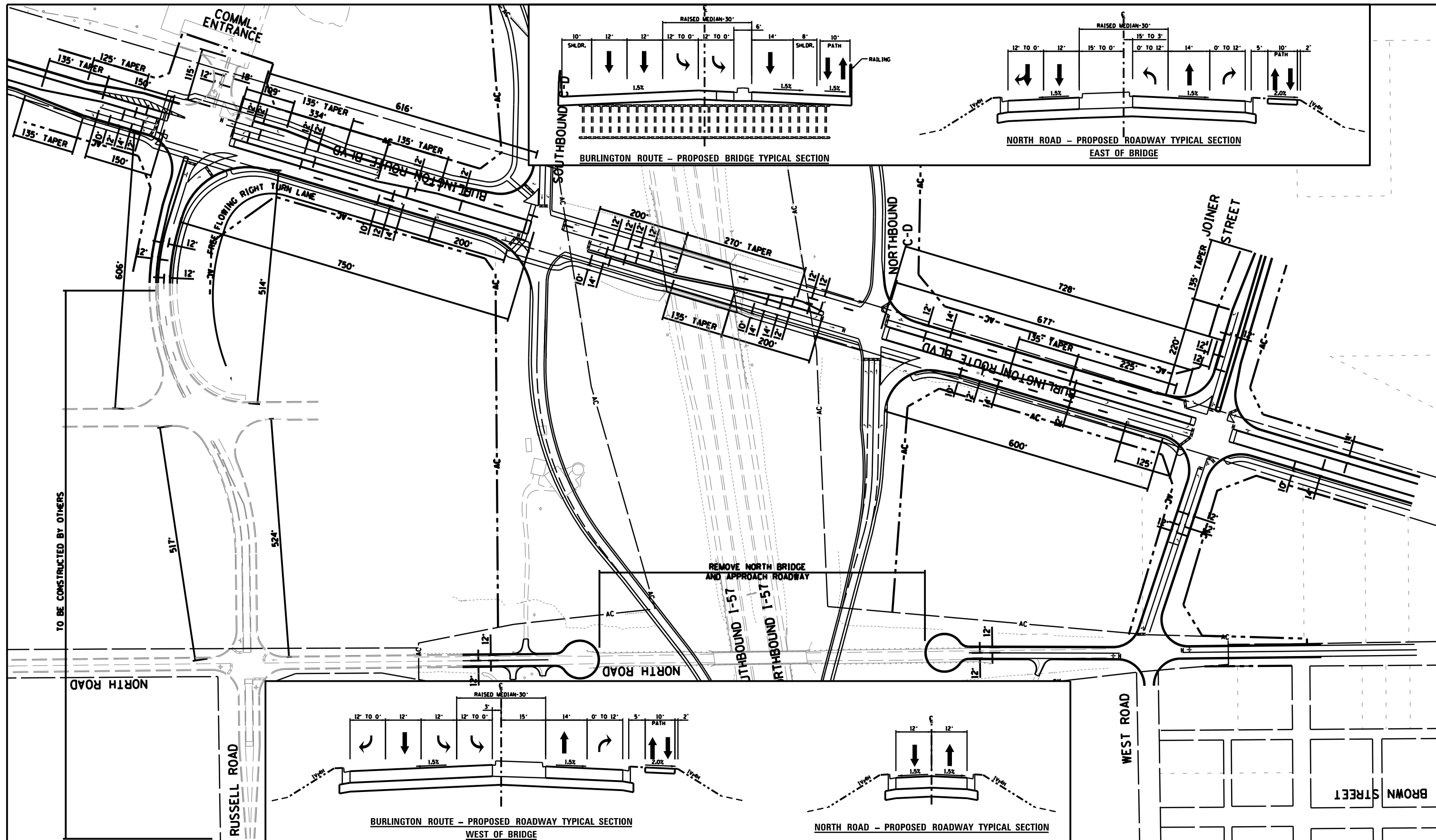
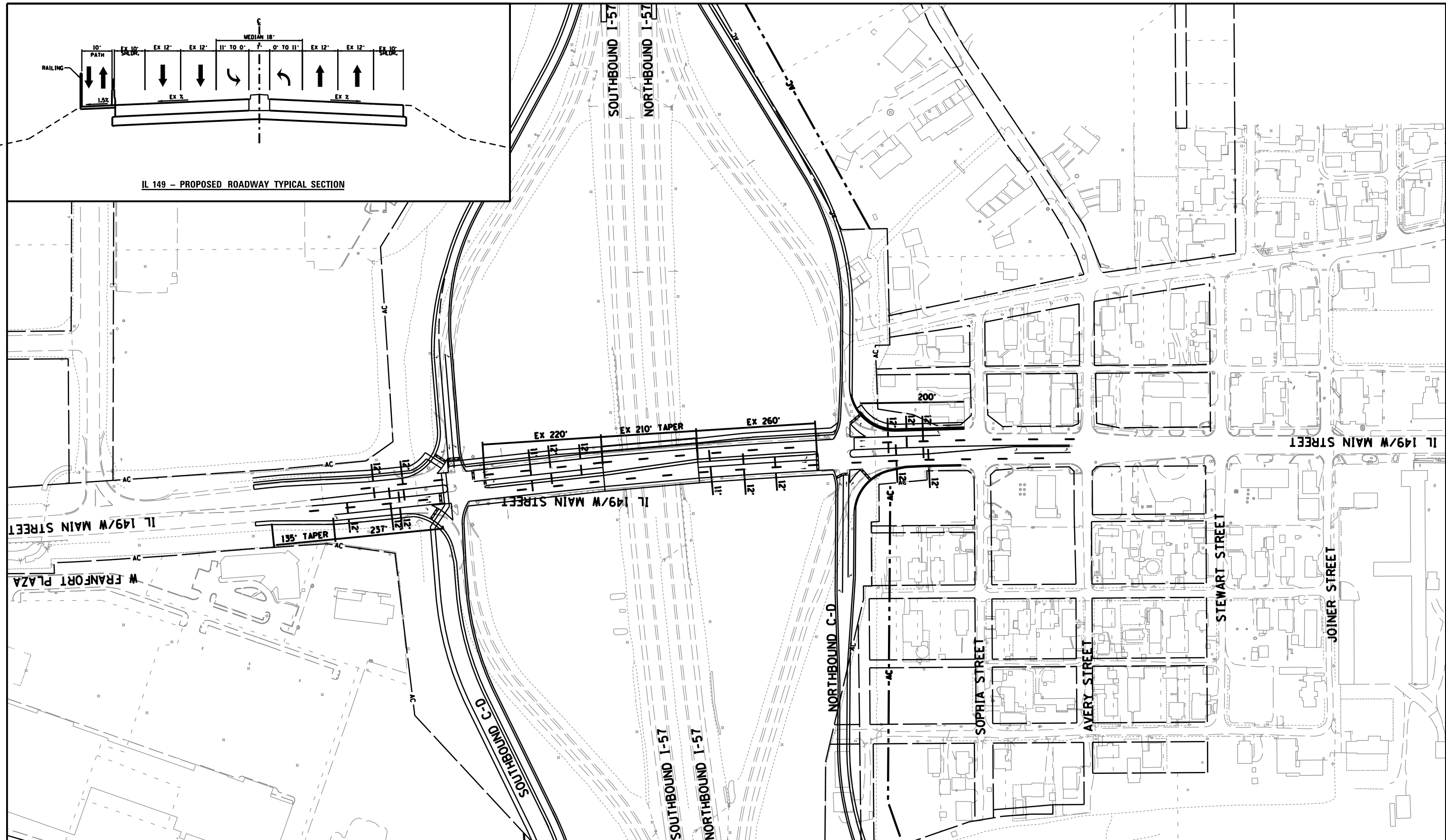


Figure 19-18
Interchange Location Map
Alternative No. 4 - Proposed Split Diamond Interchange
I-57 NB Entry Ramp & I-57 SB Exit Ramp Terminals



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Figure 19-19
Interchange Location Map
Alternative No. 4 – Proposed Split Diamond Interchange
North Road & Burlington Route



IL 149 - PROPOSED ROADWAY TYPICAL SECTION

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Figure 19-20
Interchange Location Map
Alternative No. 4 - Proposed Split Diamond Interchange
IL 149 from West of I-57 SB Ramps to East of I-57 NB Ramps

20 HIGHWAY CAPACITY ANALYSIS

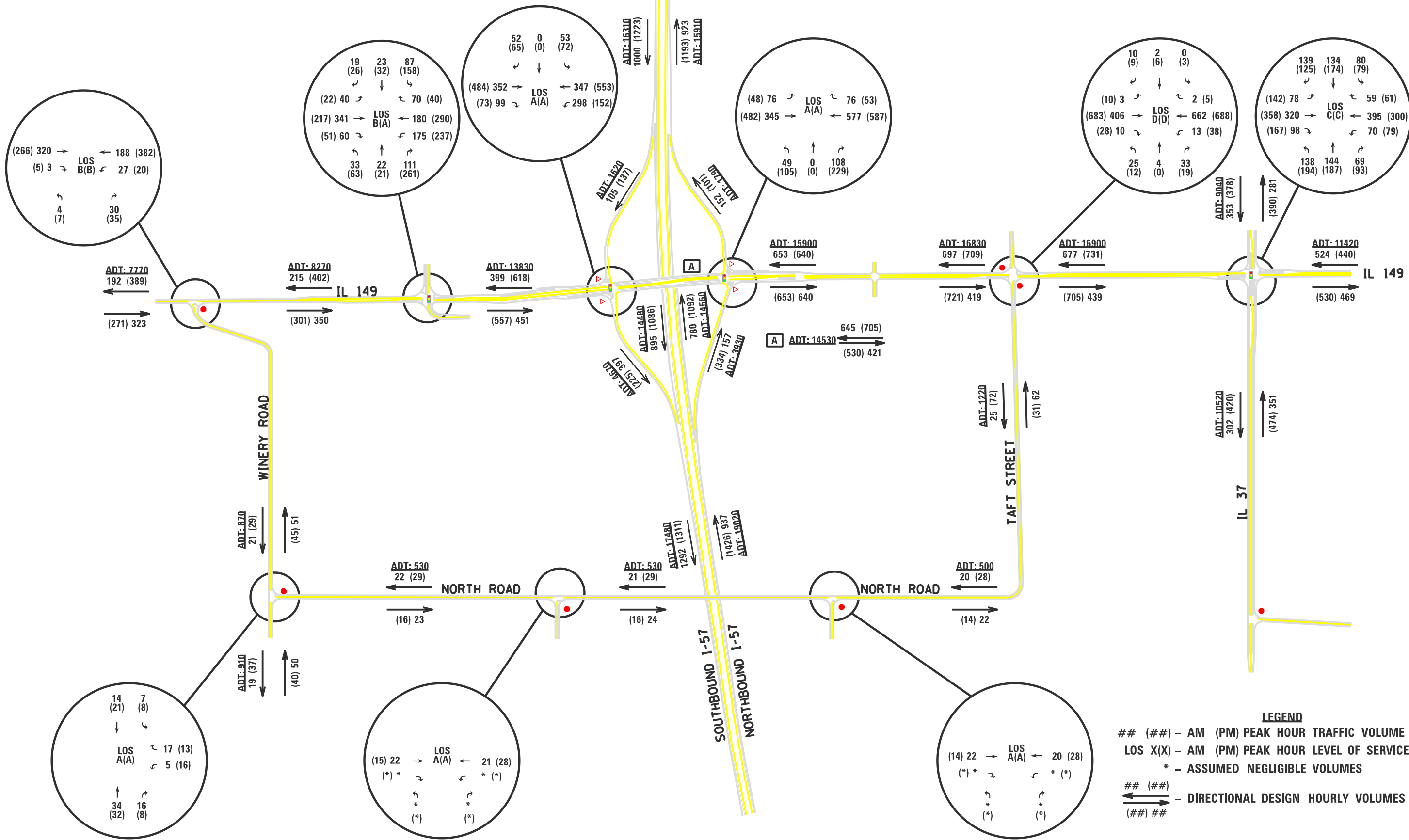
The AJR contents defined in Chapter 37 of the IDOT BDE manual require the following traffic volume maps showing the traffic volumes and operational Levels of Service (LOS) for the AM and PM peak hours for each scenario analyzed, in accordance with BDE Manual items 20 a through c and items 20 e through g.

- **Figure 20-1: Existing Peak Hour Volumes & Levels of Service.** A plan view map, with ramps and mainline through lanes labeled with Existing “AM Peak Hour” and “PM Peak Hour” traffic volumes and the corresponding “AM Peak Hour” and “PM Peak Hour” operational LOS for the existing conditions scenario. (BDE Manual List items a & e)
- **Figure 20-2: Design Year No-Build Peak Hour Volumes & Levels of Service.** A plan view map, with ramps and mainline through lanes labeled with the Design Year No-Build “AM Peak Hour” and “PM Peak Hour” traffic volumes and the corresponding “AM Peak Hour” and “PM Peak Hour” operational LOS for the Design Year No-Build conditions scenario as stated in the operational and safety analysis. (BDE Manual List items b & f) Note: The no-build analysis also applies to Alternative No. 2 as traffic patterns are essentially unchanged in that alternative.
- **Figure 20-3: Design Year Build Peak Hour Volumes & Levels of Service – Alternative No. 3.** A plan view map, with ramps and mainline through lanes labeled with the Design Year Build “AM Peak Hour” and “PM Peak Hour” traffic volumes and the corresponding “AM Peak Hour” and “PM Peak Hour” operational LOS for the Design Year Build conditions scenario for Alternative No. 3. (BDE Manual List items c & g)
- **Figure 20-4: Design Year Build Peak Hour Volumes & Levels of Service – Alternative No. 4.** A plan view map, with ramps and mainline through lanes labeled with the Design Year Build “AM Peak Hour” and “PM Peak Hour” traffic volumes and the corresponding “AM Peak Hour” and “PM Peak Hour” operational LOS for the Design Year Build conditions scenario for Alternative No. 4. (BDE Manual List items c & g)

The 20-year traffic volumes utilized for the analysis were developed using the combination of existing volumes and growth rates provided by IDOT, manual peak hour turning movement counts conducted by the study analysis team, and trip generation/distribution

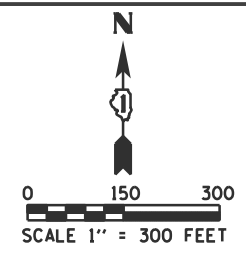
information provided by the developer. All base traffic volumes data, trip generation data, and trip distribution information is provided in the report appendices.

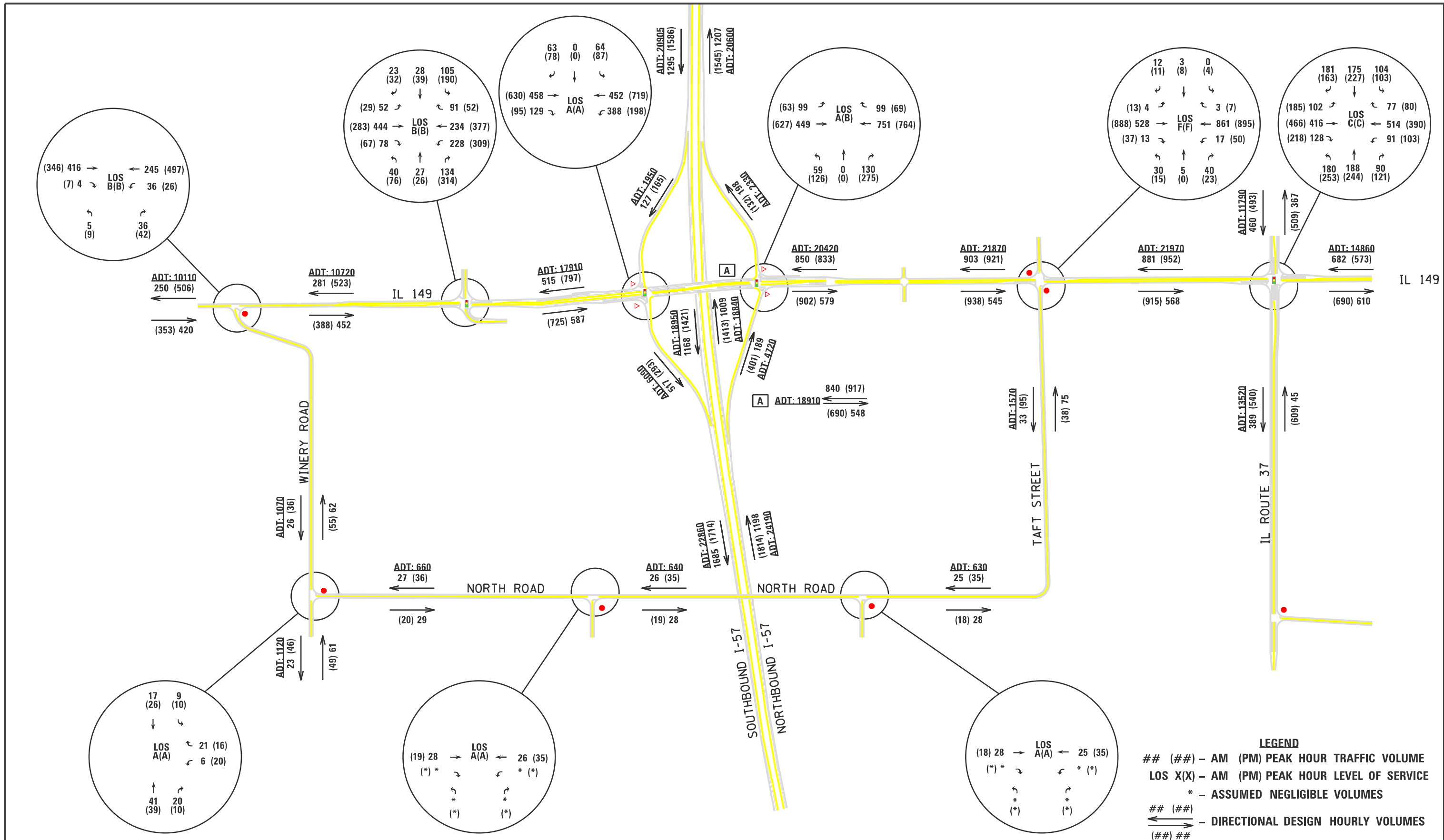
The intersection Level of Service analysis was performed for each scenario depicted in Figures 20-1, 20-2, 20-3, and 20-4 using Synchro 8 (HCM 2010 methods), for signalized and unsignalized intersections. The intersection Levels of Service in Figures 20-1, 20-2, 20-3, and 20-4 are summarized in tabular format (by corridor) in Table 20-1.



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Figure 20-1
2012 EXISTING
PEAK HOUR VOLUMES AND LEVELS OF SERVICE

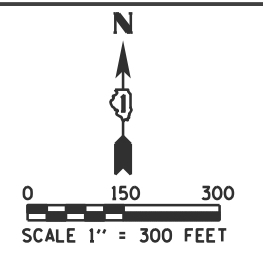


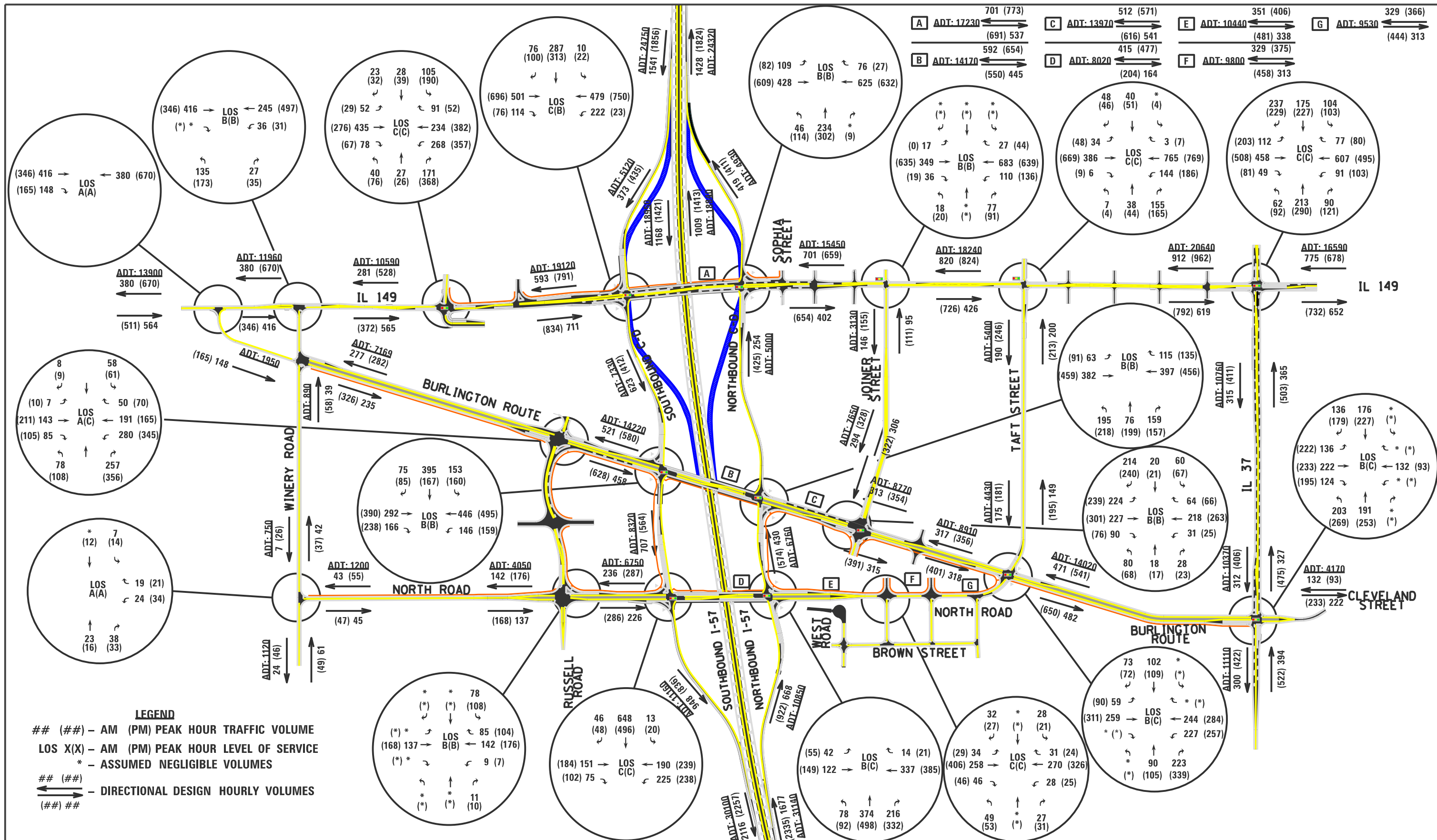


LEGEND
 ## (##) - AM (PM) PEAK HOUR TRAFFIC VOLUME
 LOS X(X) - AM (PM) PEAK HOUR LEVEL OF SERVICE
 * - ASSUMED NEGLIGIBLE VOLUMES
 ## (##) - DIRECTIONAL DESIGN HOURLY VOLUMES
 (##) (##)

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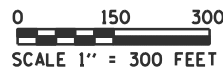
Figure 20-2
2032 Design Year – No-Build
Peal Hour Volumes and Levels of Service

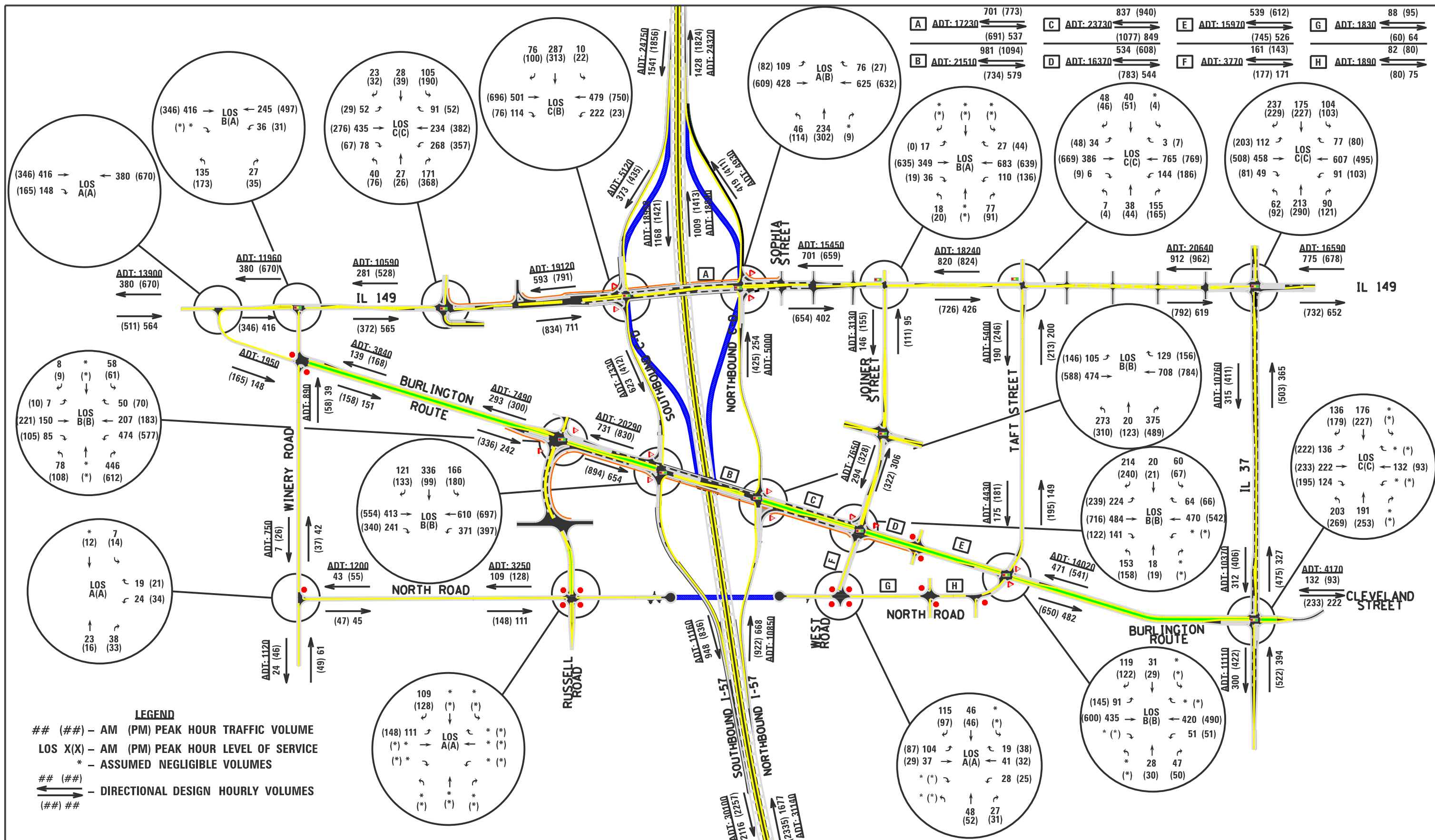




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Figure 20-3
2032 Design Year – Build
Alternative No. 3
Peak Hour Volumes and Levels of Service





I-57 / IL 149 INTERCHANGE MODIFICATION
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Figure 20-4
2032 Design Year – Build
Alternative No. 4
Peak Hour Volumes and Levels of Service

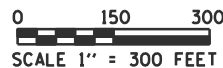


Table 20-1: Summary of Intersection Level of Service (LOS) by Study Corridor

SR 149 Corridor	Existing		2032 No Build		2032 Build (Alt. 3)		2032 Build (Alt. 4)	
	AM	PM	AM	PM	AM	PM	AM	PM
Intersection of SR 149 & Winery Road	B*	B*	B*	B*	A*	A*	A*	A*
New Winery Road	-	-	-	-	A	A	B	A
W. Frankfort Plaza/Ken Gray Blvd.	B	A	B	B	C	C	C	C
I-57 SB Ramps/SB C-D Road	A	A	A	A	C	B	C	B
I-57 NB Ramps/NB C-D Road	A	A	A	B	B	B	A	B
Joiner Street	-	-	-	-	B	B	B	A
Taft Street	D*	D*	F*	F*	C	C	C	C
SR 37	C	C	C	C	C	C	C	C

Burlington Route Blvd Corridor	Existing		2032 No Build		2032 Build (Alt. 3)		2032 Build (Alt. 4)	
	AM	PM	AM	PM	AM	PM	AM	PM
Intersection of Burlington Route Blvd & Winery Road	-	-	-	-	A*	A*	A*	A*
West Commercial Access Drive	-	-	-	-	B*	C*	B*	C*
Russell Road	-	-	-	-	A	C	B	B
SB C-D Road	-	-	-	-	B	B	B	B
NB C-D Road	-	-	-	-	B	B	B	B
Joiner Street	-	-	-	-	B	B	B	B
East Commercial Access Drive	-	-	-	-	B*	B*	B*	B*
Taft Street/North Road Realignment	-	-	-	-	B	B	B	B
SR 37 & Cleveland Street	-	-	-	-	B	C	C	C

North Road Corridor	Existing		2032 No Build		2032 Build (Alt. 3)		2032 Build (Alt. 4)	
	AM	PM	AM	PM	AM	PM	AM	PM
Intersection of North Road & Winery Road	A*	A*	A*	A*	A*	A*	A*	A*
West Commercial Access Drive	-	-	-	-	A*	B*	A*	B*
Russell Road	A*	A*	A*	A*	B*	B*	A*	A*
SB C-D Road/I-57 SB On Ramp	-	-	-	-	C	C	B	B
NB C-D Road/I-57 NB Off Ramp	-	-	-	-	B	C	B	B
SW Road/Joiner Street	A*	A*	A*	A*	C*	C*	B*	B*
East Commercial Access Drive	-	-	-	-	A*	B*	A*	A*

Note: *Unsignalized Intersection – Level of Service (LOS) for the worst minor approach is reported in this table based on an HCM 2010 TWSC Analysis conducted within Synchro.

In addition to intersections analysis, Chapter 37 of the BDE Manual states the following shall be provided in accordance with items 20 d and 20 h through p:

- d. Summary of Operational Analysis. Preferably, provide a table listing the “Freeway LOS”, “Ramp LOS”, “Weave LOS”, and “Non-Weave LOS” for the corresponding Existing AM/PM, Design Year “No-Build” AM/PM, and Design Year “Build” AM/PM for various on-ramps, off-ramps, and through lanes.
- h. Basic Freeway Segments Analyses of Existing Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all adjacent freeway segments.
- i. Basic Freeway Segments Analyses of the Design Year “No-Build” Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all adjacent freeway segments.
- j. Basic Freeway Segments Analyses of the Design Year “Build” Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all adjacent freeway segments.
- k. Ramp Junction Analyses of the Existing Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all ramp junctions.
- l. Ramp Junction Analyses of the Design Year “No-Build” Conditions. Preferably, provide program outputs, including queue analysis, from the latest release of the *HCS* for all ramp junctions.
- m. Ramp Junction Analyses of the Design Year “Build” Conditions. Preferably, provide program outputs, including queue analysis, from the latest release of the *HCS* for all ramp junctions.
- n. Weave Area Analyses of the Existing Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all weaving areas. *None along Interstate 57 within project area.*
- o. Weave Area Analyses of the Design Year “No-Build” Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all weaving areas. *None along Interstate 57 within project area.*

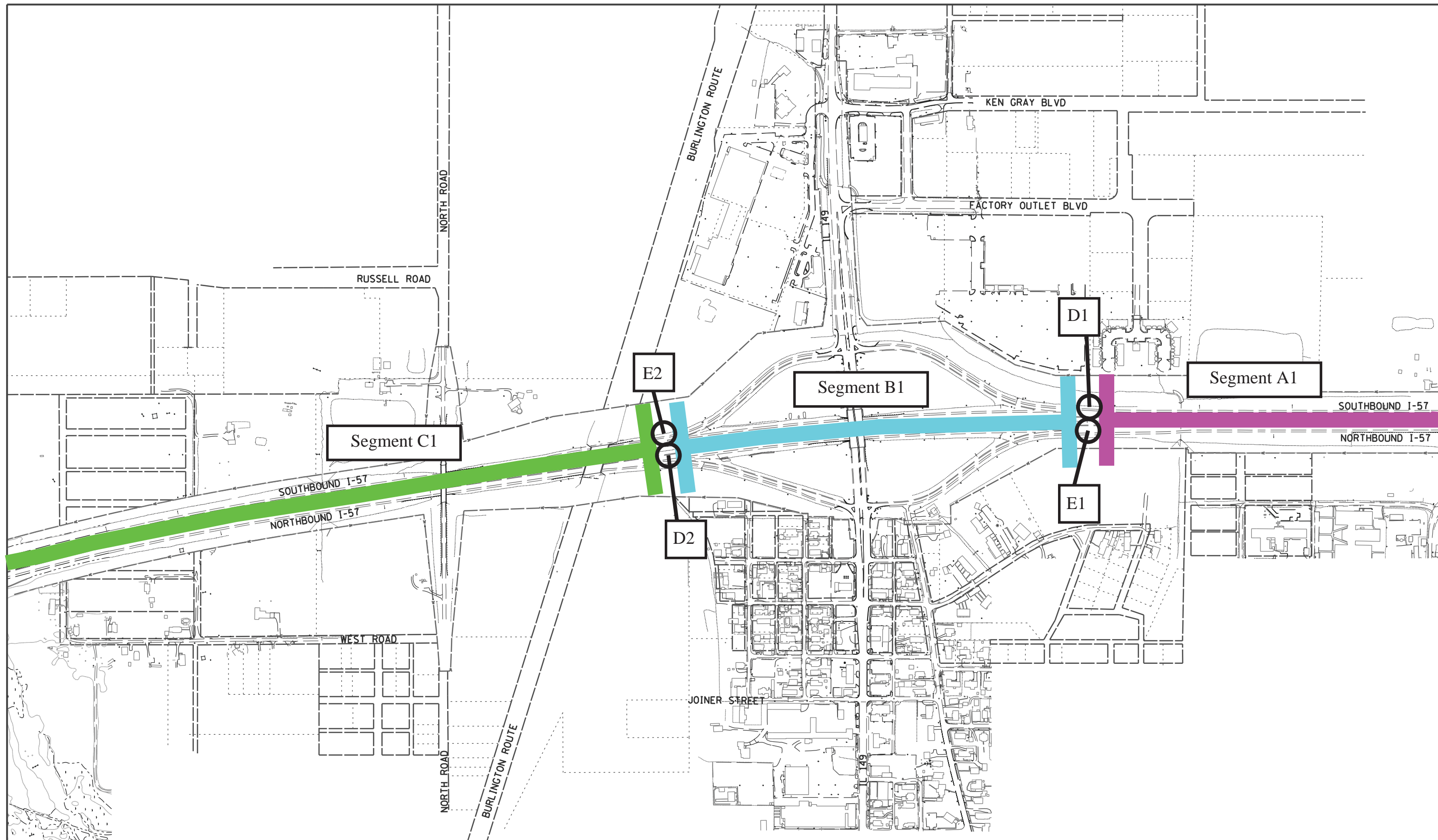
- p. Weave Area Analyses of the Design Year “Build” Conditions. Preferably, provide program outputs from the latest release of the *HCS* for all weaving areas. *None along Interstate 57 within project area.*

Due to the diamond/split-diamond interchange configuration of each analyzed alternative, there are no weaving areas to be analyzed.

The Levels of Service for each freeway segment and merge/diverge location were analyzed using the Highway Capacity Software (HCS), with each location depicted in Figures 20-5, 20-6, and 20-7. The LOS results are summarized in tabular format in Table 20-2.

Detailed program printouts of the analyses performed for each intersection scenario are provided in Appendix E of this report. Detailed program printouts of the analyses performed for each freeway segment, and merge/diverge locations are provided in Appendix F of this report.

Based on the operational analyses performed, the 20-year operation of both split-diamond interchange modification configurations meets all IDOT operational and LOS requirements.



I-57 / IL 149 INTERCHANGE MODIFICATION
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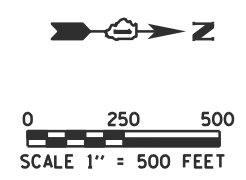
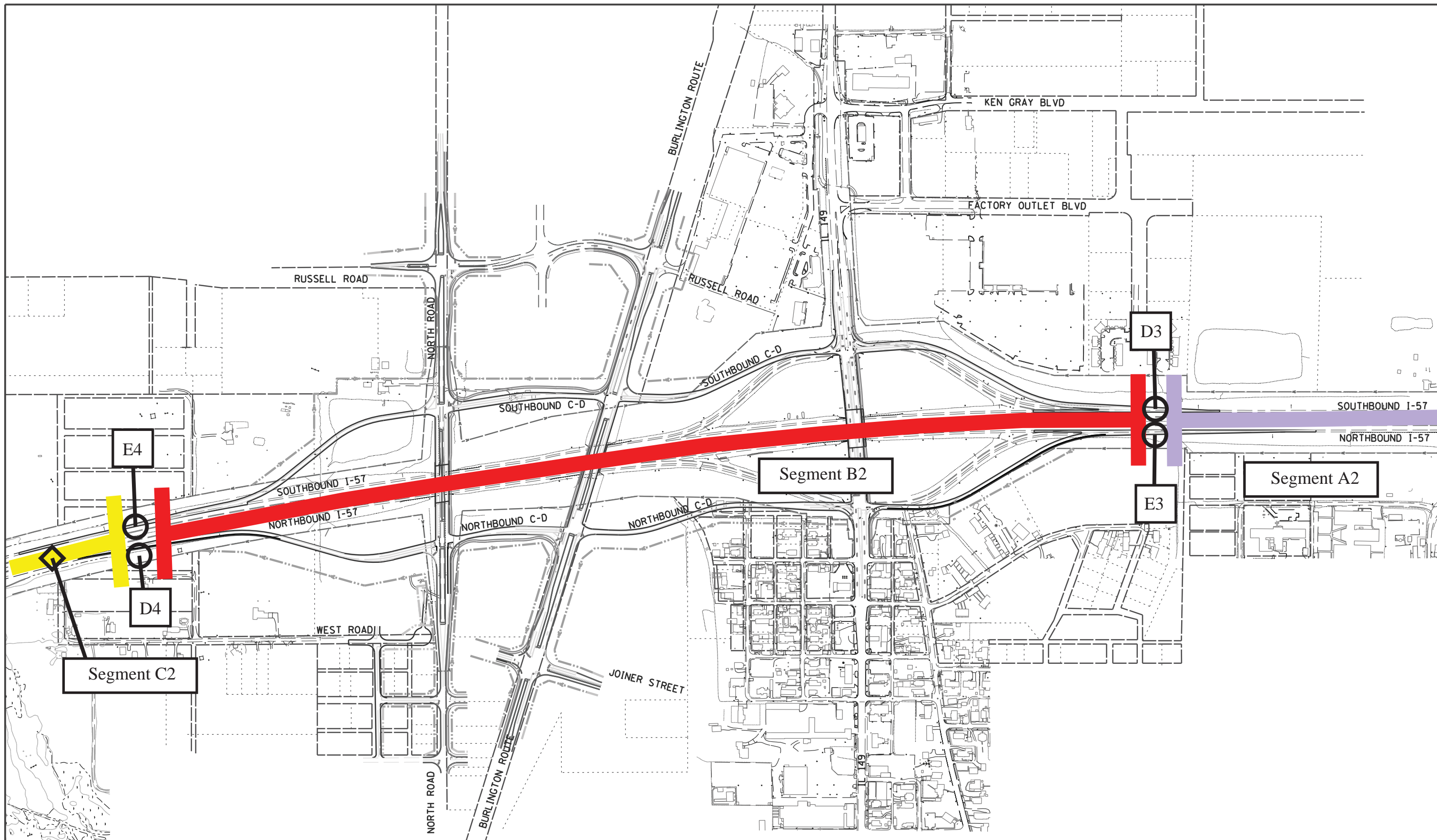


Figure 20-5
Highway Capacity Analysis
Existing & 2032 No-Build
Freeway Segments & Nodes



I-57 / IL 149 INTERCHANGE MODIFICATION
Access Justification Report

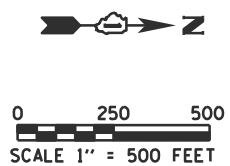
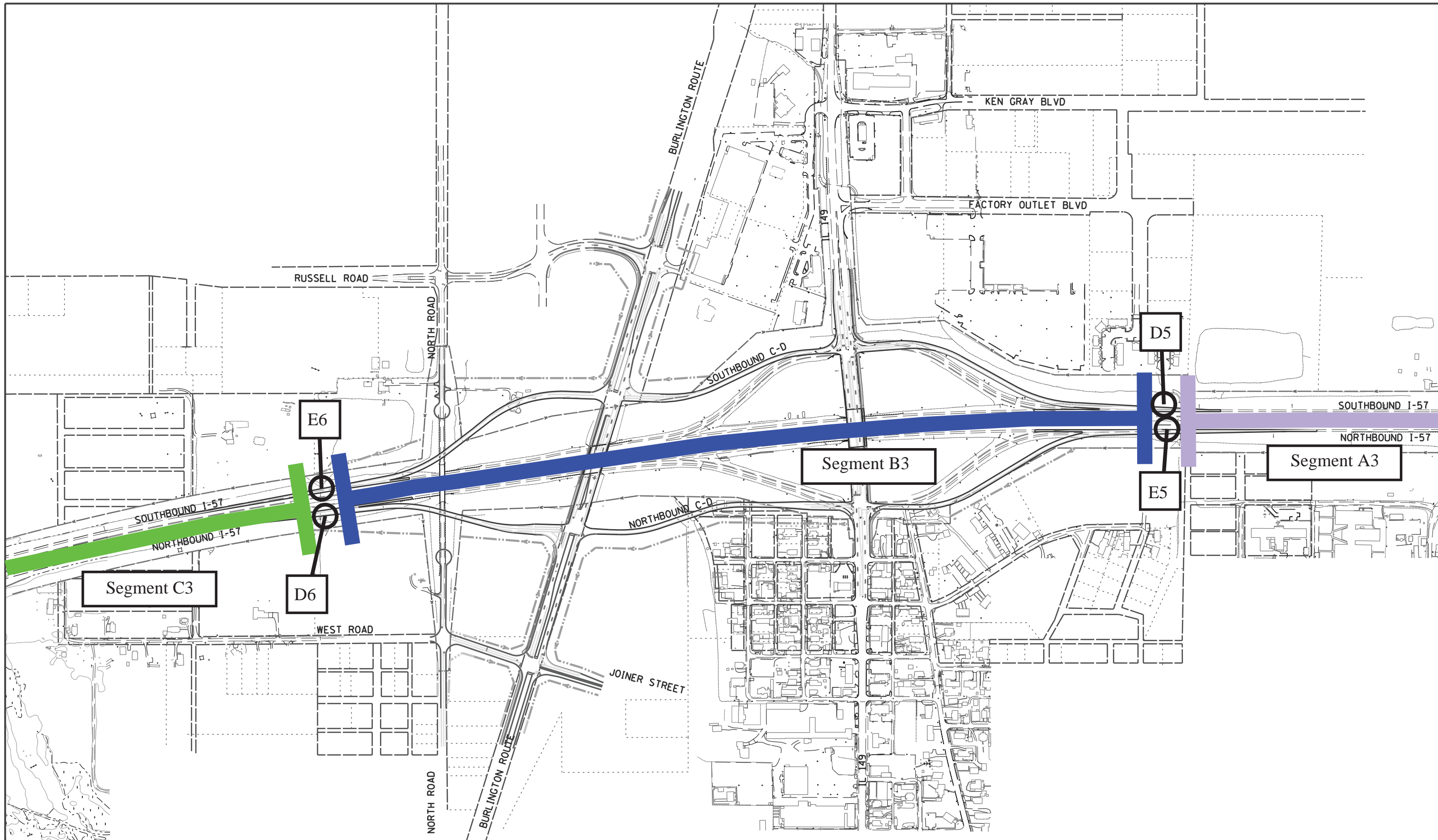


Figure 20-6
Highway Capacity Analysis
Alternate 3 – 2032 Build
Freeway Segments and Nodes



I-57 / IL 149 INTERCHANGE MODIFICATION
Access Justification Report

Figure 20-7
Highway Capacity Analysis
Alternate 4 – 2032 Build
Freeway Segments and Nodes

0 250 500
 SCALE 1" = 500 FEET

Table 20-2: Summary of Operational Analysis for Freeway Segments, Ramp Diverge Areas and Ramp Merge Areas

	Existing		2032 No Build		2032 Build (Alt 3)		2032 Build (Alt 4)	
	AM	PM	AM	PM	AM	PM	AM	PM
Segments North of Ramps								
Segment A1 - NB ²	A	A	A	A	-	-	-	-
Segment A1 - SB ²	A	A	A	A	-	-	-	-
Segment A2 - NB ³	-	-	-	-	A	A	-	-
Segment A2 - SB ³	-	-	-	-	A	A	-	-
Segment A3 - NB ⁴	-	-	-	-	-	-	A	A
Segment A3 - SB ⁴	-	-	-	-	-	-	A	A
Segment Between Merge & Diverge Areas								
Segment B1 – NB ²	A	A	A	A	-	-	-	-
Segment B1 – SB ²	A	A	A	A	-	-	-	-
Segment B2 – NB ³	-	-	-	-	A	A	-	-
Segment B2 – SB ³	-	-	-	-	A	A	-	-
Segment B3 – NB ⁴	-	-	-	-	-	-	A	A
Segment B3 – SB ⁴	-	-	-	-	-	-	A	A
Segments South of Ramps								
Segment C1 – NB ²	A	B	A	A	-	-	-	-
Segment C1 – SB ²	A	A	A	A	-	-	-	-
Segment C2 – NB ³	-	-	-	-	A	B	-	-
Segment C2 – SB ³	-	-	-	-	B	B	-	-
Segment C3 – NB ⁴	-	-	-	-	-	-	A	B
Segment C3 – SB ⁴	-	-	-	-	-	-	B	B
Diverge Areas								
SB Exit to IL 149 (Node D1) ²	B	B	B	B	-	-	-	-
NB Exit to IL 149 (Node D2) ²	B	B	B	B	-	-	-	-
SB Exit to IL 149 (Node D3) ³	-	-	-	-	B	B	-	-
NB Exit to North Rd (Node D4) ³	-	-	-	-	B	C	-	-
SB Exit to IL 149 (Node D5) ⁴	-	-	-	-	-	-	B	B
NB Exit to Burlington Route(Node D6) ⁴	-	-	-	-	-	-	B	C
Merge Areas								
NB On from IL 149 (Node E1) ²	A	B	A	A	-	-	-	-
SB On from IL 149 (Node E2) ²	B	B	B	B	-	-	-	-
NB on from IL 149 (Node E3) ⁴	-	-	-	-	A	B	-	-
SB On from North Rd (Node E4) ³	-	-	-	-	B	B	-	-
NB on from IL 149 (Node E5) ⁴	-	-	-	-	-	-	A	B
SB On from Burlington Route (Node E6) ⁴	-	-	-	-	-	-	B	B

*Notes: See next page

*Notes for Table 20-2:

- 1) The results for the existing conditions analysis shown above reflect the existing 2 travel lanes per direction provided for the mainline through lanes of I-57. The 2032 No-Build and 2032 Build conditions analysis shown above incorporate the planned widening of I-57 from 2 to 3 travel lanes per direction.
- 2) See Figure 20-5 for a depiction of the freeway segments and nodes analyzed for the Existing and 2032 No-Build scenarios.
- 3) See Figure 20-6 for a depiction of the freeway segments and nodes analyzed for the 2032 Build Alternative No. 3.
- 4) See Figure 20-7 for a depiction of the freeway segments and nodes analyzed for the 2032 Build Alternative No. 4.

21 SUMMARY

This Access Justification Report has provided descriptions and analyses of potential interchange modification alternatives for the existing interchange connecting I-57 and IL 149 in the City of West Frankfort. The purpose of the proposed enhancements is to improve the safety and mobility of the roadway network within the boundaries of the project area. The following list is a summary of the analyses and results included in this report.

- Four design alternatives were considered for this AJR:
 - No-Build
 - Upgrade of Existing Diamond Interchange
 - Expanded Split-Diamond Interchange modification with North Road Bridge remaining in place and connected to the proposed roadway network
 - Split-Diamond Interchange modification with North Road Bridge removed and North Road terminated on both sides of the interstate.
- The purpose and need of the proposed project is based on the need to improve the safety, mobility and capacity of the roadway network within the project boundaries. Thereby reducing the number of fatal and injury crashes that occur within the study area. Additionally, the proposed project allows for economic growth and development within the area surrounding the interchange.
- Cost and Funding
- Public Input/awareness – the developer has had many conversations and televised interviews with the local public and authorities regarding the proposed project.

- Further public involvement according to the Context Sensitive Solutions approach will be conducted in phase 1 of the project process.
- NEPA – Preliminary environmental screening concluded that there are no red flags indicated within the project area. However, more detailed environmental surveys are needed. NEPA policy and procedure will be accomplished as part of the normal project development process and as a condition of the final access approval.
 - Concerns
 - I-57 & IL 149 Safety
 - Total of 449 crashes within the study area, 6 fatalities, 174 injuries
 - Coordination between Developer, City of West Frankfort, and IDOT Projects has been a priority thus far, and will continue to be throughout the remainder of the project process.
 - Motorist Guidance – with the new configuration of the proposed interchange modification, a new signing plan will be provided to ensure motorists are comfortable with the new traffic patterns. Special attention will be given to signs prohibiting specific turning movements in order to prevent wrong-way driving along the proposed collector-distributor roads through the proposed split-diamond interchange modification.
 - Connections – Due to the significant distance existing between the project interchange and the nearest interchange to the north and south, the proposed project is not expected to impact their function and IDOT did not require any additional analysis for this project.
 - Design Exceptions –
 - The access control intersection separation requirements in BDE Manual Fig 35-2.8 could not be maintained between the intersection IL 149/Northbound C-D/NB on ramp and IL 149/Sophia Street (235 ft.). The proposed distance between the northbound C-D and Sophia Street is an increase of 15 feet from the existing conditions, thus improving the existing access separation. Sophia Street will remain in its current right-in/right-out configuration. Research of the IDOT crash database indicates that no significant injury crashes or fatal

crashes have occurred in the past several years along the segment of IL 149 between the existing ramp intersection and Sophia Street.

- **Traffic Signals/ Signing**
 - Existing Signal Timing Plan Updates – several of the existing intersection signals provide for both permitted and protected phases. Due to a high number of crashes in the study area resulting from drivers attempting to turn during the permitted left-turn phases, the proposed signal timing plans provide protected only left-turn phases at several locations to help reduce the number of angle crashes in the area, without significantly impacting the overall intersection level of service. The signal timing modifications are not exclusive to this project, they can be updated at any time.
 - Several new signals on the proposed Burlington Route Boulevard and North Road will need to be installed once traffic volumes warrant the need for them.
 - Several new signals on IL 149 will need to be installed once traffic volumes warrant the need for them.
 - The Proposed Signage Plan provides motorists the required guidance within the proposed split-diamond interchange modification including special attention given to signs prohibiting specific turning movements in order to prevent wrong-way driving along the proposed collector-distributor roads.
- Lane Balance is provided along I-57 in accordance to the BDE Manual.
- Pedestrian/Bicycle Facilities will be provided as part of the proposed project along the Burlington Route and the C-D roads for both Alternative No. 3 and Alternative No. 4, connecting Burlington Route Boulevard and IL 149. Facilities will also be provided along North Road in Alternative No. 3. Facilities will connect to the surrounding development when needed as development progresses.
- Access Connection and Design –proposed expanded split-diamond interchange modification Alternative No. 3 provides for all movements to and from I-57, along IL 149, North Road and the proposed Burlington Route Boulevard. Proposed split-diamond interchange modification Alternative No. 4 provides for all movements to and from I-57, along IL 149, and the proposed Burlington Route Boulevard, but terminates and removes the North Road Bridge across I-57. Access control for

- Alternatives 3 and 4 provides a 600-foot minimum separation between the C-D road and all new adjacent local road intersections in accordance with the IDOT BDE manual based on a 20-year rural condition in the vicinity of the interchange.
- **Transportation Land Use Plans** – The proposed project is currently the only interchange planned in the immediate area surrounding the study area. The proposed project is consistent with the existing and proposed land use and zoning maps for the City of West Frankfort. Coordination with the City of West Frankfort has taken place throughout the project’s development.
 - **Comprehensive Network Study** – Analysis of the adjacent interchanges was not required because of the significant distance currently provided between the project interchange and the adjacent interchanges. The proposed split-diamond interchanges are not expected to impact the functioning of these adjacent interchanges.
 - **Coordination with Transportation System Improvements** – The project developer has coordinated with the City of West Frankfort, IDOT and FHWA throughout the project process thus far, and will continue to do so throughout the remaining design and construction processes.
 - **Operational and Safety Analysis**
 - **Crash history** – a large number of the crashes reported in the project area were attributed to roadway deficiencies. For further discussion of the existing roadway deficiencies, see Section 18 of this report.
 - The existing facilities do not provide the necessary capacity or safety requirements within the project area. The proposed improvements mitigate the current safety concerns, while also maintaining and utilizing as much of the existing facilities as practical within the area.
 - Crashes along I-57 related to roadway deficiencies were primarily due to the lack of decision sight distances available at the existing interchange ramps along the horizontal curve of I-57 through the project area.
 - Crashes along IL 149 related to roadway deficiencies were primarily due to the degrading capacity available throughout the study area.

Crashes that occurred at the signalized intersections were also frequently attributed to drivers attempting to turn during the permitted left turn phases of the signal cycles.

- Operational Analysis – Alternative No. 4 is the preferred split-diamond interchange modification configuration and will improve the overall safety of the I-57 mainline traffic flow because the new layout provides improved horizontal alignment and decision sight distances within the major decision making areas of the interchange as well as the mainline travel lanes of the interstate. Additionally, removal of the North Road bridge piers eliminates the potential for fixed object crashes in the vicinity of North Road. As development is constructed, the installation of traffic control signals will be required at the major intersections along the Burlington Route and IL 149 once the traffic volumes increase to the levels warranting signal control.
- The Interchange Location Maps and figures are provided in Section 19 of this report.
- Highway Capacity Analysis/Level of Service analysis was performed for each scenario (No-Build, Upgrade of Existing Diamond Interchange, Expanded Split-Diamond Interchange with North Road Bridge Connection, and Split-Diamond Interchange without North Road Bridge Connection)
 - Due to the diamond/split-diamond interchange modification configuration of each analyzed alternative, there are no weaving areas to be analyzed.
 - Detailed program printouts of the analyses performed for each intersection scenario are provided in *Appendix E* of this report. Detailed program printouts of the analyses performed for each freeway segment, and merge/diverge locations are provided in *Appendix F* of this report.
 - Based on the operational analyses performed, the 20-year operation of the Alternative No. 4 split-diamond interchange modification best meets all IDOT operational and LOS requirements
 - Levels of service for the 2032 Build Scenarios for both Alternative No. 3 and No. 4 are acceptable for all intersections, freeway segments, and ramp junctions based on the LOS results as detailed in the *Highway Capacity Analysis* section of this report and based on the proposed interchange

modification configurations as depicted in the *Interchange Location Map* section of this report.

22 CONCLUSIONS & RECOMMENDATIONS

The following list describes the reasons, based on the complete analysis and results summarized in the previous section, the Alternative No. 4 proposed split-diamond interchange modification configuration is recommended as the preferred design alternative.

- The Alternative No. 4 proposed split-diamond interchange modification configuration provides the most improved decision sight distances and therefore reduces the likelihood of both sideswipe and rear end type crashes along I-57 near the interchange ramps without adding to the total number of access points required on the interstate system.
- The Alternative No. 4 proposed split-diamond interchange modification configuration allows the existing Burlington Route Bridge to remain in place for the proposed Burlington Route Boulevard. Connections will be provided to IL 149, I-57, IL 37 and other local roads that will reduce the current congestion experienced along IL 149. The reduced congestion will serve to reduce the number of capacity/congestion related crashes within the study area, particularly along IL 149.
- The Alternative No. 4 proposed split-diamond interchange modification configuration provides the best opportunity to create a more continuous pedestrian/bicycle facility along the Burlington Route that would allow users to safely cross I-57 as well as provide safer connections to IL 37. The proposed pedestrian/bicycle facilities will potentially reduce the number of pedestrian/bicycle related crashes experienced in the study area by eliminating conflicts resulting from pedestrians/cyclists jointly using the roadway.
- The Alternative No. 4 proposed split-diamond interchange modification configuration minimizes the potential for wrong way driving.
- The Alternative No. 4 proposed split-diamond interchange modification configuration reduces future costs by removing the North Road structure and has fewer signalized intersections (fewer conflict points) when compared to Alternate 3.

- The Alternative No. 4 proposed split-diamond interchange modification configuration increases safety by eliminating potential fixed object crashes at the North Road overpass.
- Finally, the Alternative No. 4 proposed split-diamond interchange modification configuration provides access to currently undeveloped land in the study area. This allows for the most potential for economic growth and future development possibilities that will benefit both the City of West Frankfort and the state of Illinois.



ACCESS JUSTIFICATION REPORT
I-57 & IL 149
WEST FRANKFORT, IL
NOVEMBER 20, 2015

APPENDIX A – NEPA PRELIMINARY RED FLAG SURVEY REPORT

DATE: January 31, 2013

FROM: Angela Kattmann, LPG
RW Armstrong
300 South Meridian Street
Indianapolis, IN 46225
akattmann@rwa.com

RE: Little Egypt Oasis
Interchange Modification
West Frankfort, Franklin County, Illinois

Water Resources

According to the National Hydrography Dataset, there are no rivers, streams, or ponds within the project area. However, through review of the National Wetlands Inventory (NWI), a variety of wetland areas were located. Please note, these NWI maps are not typically exact in the locations of the wetlands; thus a full wetland delineation would be recommended for more precise location and description data. The Flood Zone maps were investigated through the Illinois State Water Survey. According to their data, the far southern extent of the project would be within the 100-year flood zone; however this data should also be verified with a field review to ensure accuracy.

There are multiple well boring locations identified within the area of the proposed project by the Illinois State Geological Survey. These wells are mostly privately owned, and would probably not be affected by the proposed project. The area of the proposed project is underlain by a rock aquifer over 500 ft. below surface level. This deep rock aquifer would be well protected from potential surface contamination.

Soils/Geology

The sub-soils were identified by the National Resources Conservation Service (NRCS). The potentially hydric soils are highlighted in blue on the map. These soils indicate the potential for wetland areas. This information would be incorporated into the wetland delineation.

The bedrock of the area includes Pennsylvanian System coal-containing members (Shelburn-Patoka Formations). There are multiple coal mines in the area of the proposed project. In addition, the Illinois Geological Survey identifies fault areas within the vicinity of the project. Historically there have been shallow earthquakes (less than 33 kilometer below ground level) in the southern Illinois area and according to the U.S. Geological Survey, there is a 3.2 to 2.6% chance of seismic activity within the next 50 years.

Historic Features/Archaeological Features

According to the Illinois Historic Preservation Agency, there are a few sites within the vicinity of the project whose historical significance has not been fully documented. However, significant impacts to these features would not be anticipated. An Area of Potential Effect would be established and the potentially historical features within that area should be researched.

The Illinois State Museum identifies alluvial soils along most streams as potential archaeological sites due to the possibility of encountering Native American artifacts. An archaeological review of the project area may be necessary.

Underground Storage Tanks/Leaking Underground Storage Tanks

The locations of the Underground Storage Tanks (USTs) were searched through the Office of the Illinois State Fire Marshall. There were USTs identified within the search area surrounding the project. However, due to their exact locations, none should impact the proposed project.

The Illinois Environmental Protection Agency maintains a database, the Leaking Underground Storage Tank Incident Tracking (LIT), which identifies and locates Leaking Underground Storage Tank (LUST) incidents reported to the Illinois Emergency Management Agency. LUST incidents were identified within the ½ mile search radius; however due to the exact location of these incidents, none should impact the proposed project.

Hazardous Material

Numerous potential hazardous materials sites were identified through the U.S. Environmental Protection Agency (USEPA), EnviroFacts database within the ½ mile research area. Systems searched included the Air Facility System, Brownfield locations, Resource Conservation and Recovery Act (RCRA) Information, Emission Inventory System, Agency Compliance and Enforcement System, and the National Response Center. Directly adjacent to the project area, there was one NPDES permitted facility, one facility identified through the Illinois state hazardous waste program, and one facility identified as a RCRA site. Additional information regarding these sites would be necessary; however it doesn't seem as though they would affect the project area.

Ecological Information

The Illinois Department of Natural Resources, Endangered Species Protection Board website was researched for Franklin County. The county-wide list does not accurately reflect potential impacts for this specific project site, however, there were six species listed for Franklin County which are identified as state endangered and three species which are identified as state threatened. According to the U.S. Fish & Wildlife Service (USFWS), Federally Endangered, Threatened, and Candidate Species website, Franklin County contains 2 federally endangered species, the Indiana bat (*Myotis sodalis*) and the Piping Plover (*Charadrius melodus*). Further coordination with the USFWS should occur to verify the potential of endangered species impacts in the vicinity of this project.



APPENDIX B – CRASH REPORT DATA

GIS Crash Analysis Report - Crash Data Summary

I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
	0.00	20120108078	Overturned	PD	0	0		Fog/Smoke/Haze	Darkness	West		03/17/12	Sat
	0.00	20120112203	Animal	PD	0	0		Clear	Darkness	East		02/27/12	Mon
	0.00	20120116351	Fixed Object	PD	0	0	Other	Clear	Daylight	West		06/14/12	Thu
	0.00	20110102302	Turning	PD	0	0	Dry	Clear	Daylight	North	North	02/05/11	Sat
	0.00	20110114479	Turning	PD	0	0	Dry	Clear	Daylight	South	North	04/09/11	Sat
	0.00	20110141246	Animal	PD	0	0	Dry	Clear	Darkness	West		11/11/11	Fri
	0.00	20100122910	Pedalcyclist	A-Injury	0	2	Dry	Clear	Daylight	N/A	East	06/25/10	Fri
	0.00	20100146394	Fixed Object	PD	0	0	Wet	Clear	Darkness	West		11/23/10	Tue
	0.00	20090101567	Fixed Object	B-Injury	0	1	Dry	Clear	Daylight	Southwest		01/19/09	Mon
	0.00	20090103426	Fixed Object	PD	0	0	Dry	Clear	Darkness, Lighted Road	West		01/04/09	Sun
	0.00	08-0313679	Fixed Object	PD	0	0	Dry	Clear	Daylight	Unknown		01/17/08	Thu
	0.00	08-1990525	Fixed Object	B-Injury	0	2	Dry	Clear	Darkness	West		05/22/08	Thu
	0.00	08-2886805	Turning	PD	0	0	Wet	Clear	Daylight	East	East	07/28/08	Mon
	0.00	08-4173087	Fixed Object	PD	0	0	Wet	Clear	Darkness	West		10/08/08	Wed
	0.00	07-0114913	Rear End	PD	0	0	Ice	Snow	Daylight	North	North	02/13/07	Tue
	0.00	07-3325631	Fixed Object	PD	0	0	Dry	Clear	Darkness	East		08/05/07	Sun
	0.00	07-4090507	Sideswipe Same Direction	B-Injury	0	1	Dry	Clear	Daylight	South	South	11/10/07	Sat
	0.00	07-4264995	Fixed Object	PD	0	0	Dry	Clear	Darkness	South		11/24/07	Sat
I 057	63.52	20120112881	Rear End	B-Injury	0	1	Dry	Clear	Daylight	South	South	05/26/12	Sat
I 057	63.55	20100102641	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	South	South	02/12/10	Fri
I 057	63.59	20110115549	Rear End	PD	0	0	Dry	Clear	Darkness	North	North	05/17/11	Tue
I 057	63.59	07-4225418	Animal	PD	0	0	Dry	Clear	Darkness	South		11/21/07	Wed

ILLINOIS DEPARTMENT OF TRANSPORTATION
GIS Crash Analysis Report - Crash Data Summary

I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	63.59	07-4716663	Overturned	A-Injury	0	1	Dry	Clear	Daylight	South		12/14/07	Fri
I 057	63.63	20100120233	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	07/17/10	Sat
I 057	63.63	08-0003890	Overturned	PD	0	0	Dry	Clear	Darkness	South		01/03/08	Thu
I 057	63.69	08-2821174	Animal	PD	0	0	Dry	Clear	Daylight	South		08/09/08	Sat
I 057	63.76	08-2487943	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	07/08/08	Tue
I 057	63.92	20120110609	Rear End	B-Injury	0	1	Dry	Clear	Daylight	North	North	05/03/12	Thu
I 057	63.92	08-1671232	Fixed Object	PD	0	0	Dry	Clear	Daylight	South		05/05/08	Mon
I 057	63.99	07-0089065	Other Non-Collision	PD	0	0	Wet	Rain	Daylight	N/A	South	02/12/07	Mon
I 057	64.00	08-0558703	Fixed Object	B-Injury	0	1	Wet	Clear	Daylight	South		03/05/08	Wed
I 057	64.03	20090137903	Animal	PD	0	0	Wet	Clear	Darkness	North		11/30/09	Mon
I 057	64.03	08-0010465	Other Non-Collision	PD	0	0	Dry	Clear	Daylight	North	North	01/03/08	Thu
I 057	64.06	08-2231853	Sideswipe Same Direction	PD	0	0	Dry	Clear	Darkness	South	South	05/29/08	Thu
I 057	64.10	07-0268743	Turning	PD	0	0	Dry	Clear	Darkness	South	South	03/01/07	Thu
I 057	64.11	20120105519	Sideswipe Same Direction	PD	0	0	Dry	Clear	Darkness	North	North	03/10/12	Sat
I 057	64.11	20110107790	Animal	PD	0	0	Dry	Clear	Daylight	South		04/05/11	Tue
I 057	64.11	07-4631169	Animal	PD	0	0	Wet	Rain	Darkness	North		12/10/07	Mon
I 057	64.12	20110101675	Fixed Object	PD	0	0	Snow or	Snow	Daylight	North		01/20/11	Thu
I 057	64.12	20110122553	Sideswipe Same Direction	A-Injury	0	1	Dry	Clear	Daylight	North	North	07/27/11	Wed
I 057	64.12	20100127669	Overturned	A-Injury	0	1	Dry	Clear	Daylight	North		09/02/10	Thu
I 057	64.13	20110104984	Sideswipe Same Direction	PD	0	0	Wet	Clear	Daylight	North	North	03/15/11	Tue
I 057	64.13	20110118030	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	06/20/11	Mon
I 057	64.13	20110120765	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	06/30/11	Thu

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	64.13	20110124018	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	08/04/11	Thu
I 057	64.13	20110132366	Overtuned	PD	0	0	Dry	Clear	Darkness	South		10/11/11	Tue
I 057	64.13	20100110962	Fixed Object	PD	0	0	Dry	Clear	Daylight	N/A	South	04/23/10	Fri
I 057	64.13	20100107037	Fixed Object	B-Injury	0	1	Dry	Clear	Daylight	South		03/30/10	Tue
I 057	64.13	20100129589	Animal	PD	0	0	Dry	Clear	Darkness	North		09/28/10	Tue
I 057	64.13	20100135154	Animal	PD	0	0	Dry	Clear	Darkness	North		10/22/10	Fri
I 057	64.13	20090134346	Animal	PD	0	0	Dry	Clear	Darkness	North		10/31/09	Sat
I 057	64.13	20090134984	Animal	PD	0	0	Dry	Clear	Darkness	North		11/06/09	Fri
I 057	64.13	08-1982860	Rear End	PD	0	0		Clear	Daylight	South	South	05/15/08	Thu
I 057	64.13	07-2371974	Animal	PD	0	0	Dry	Clear	Darkness	South		06/16/07	Sat
I 057	64.14	20120106998	Angle	A-Injury	0	1	Wet	Rain	Daylight	East	South	03/22/12	Thu
I 057	64.14	20100137131	Animal	PD	0	0	Dry	Clear	Darkness	South		11/17/10	Wed
I 057	64.14	08-3790758	Animal	PD	0	0	Dry	Clear	Daylight	North		10/20/08	Mon
I 057	64.15	07-0885173	Rear End	B-Injury	0	1	Wet	Rain	Darkness	North	North	04/28/07	Sat
I 057	64.17	07-1297287	Fixed Object	PD	0	0	Dry	Clear	Daylight	South		06/09/07	Sat
I 057	64.18	20100107026	Fixed Object	A-Injury	0	1	Dry	Clear	Daylight	North		04/02/10	Fri
I 057	64.18	08-5039220	Fixed Object	PD	0	0	Ice	Snow	Darkness	South		12/23/08	Tue
I 057	64.19	20100124698	Other Object	PD	0	0	Dry	Clear	Daylight	North		08/18/10	Wed
I 057	64.19	08-3776377	Head On	Fatal	2	3	Dry	Clear	Daylight	South	North	09/26/08	Fri
I 057	64.23	07-0874011	Fixed Object	PD	0	0	Dry	Clear	Darkness	North		04/07/07	Sat
I 057	64.24	07-3174575	Sideswipe Same Direction	PD	0	0	Wet	Clear	Daylight	South	South	09/20/07	Thu
I 057	64.25	07-4166778	Overtuned	B-Injury	0	4	Dry	Clear	Daylight	North		11/17/07	Sat

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	64.32	20090111594	Animal	PD	0	0	Dry	Clear	Daylight	South		06/07/09	Sun
I 057	64.35	07-0005566	Fixed Object	PD	0	0	Dry	Clear	Darkness	North		01/08/07	Mon
I 057	64.38	20110115406	Animal	PD	0	0	Dry	Clear	Dawn	South		06/01/11	Wed
I 057	64.38	20090134354	Parked Motor Vehicle	PD	0	0	Wet	Rain	Daylight	South	South	10/30/09	Fri
I 057	64.39	08-4727064	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	South	South	11/22/08	Sat
I 057	64.40	20110101324	Angle	B-Injury	0	1	Snow or	Snow	Daylight	Southeast	South	01/11/11	Tue
I 057	64.40	20110119943	Sideswipe Same Direction	B-Injury	0	2	Dry	Clear	Daylight	South	South	07/09/11	Sat
I 057	64.40	20110120768	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	South	South	06/29/11	Wed
I 057	64.40	09-6142351	Animal	PD	0	0	Dry	Clear	Darkness	South		02/08/09	Sun
I 057	64.41	20110123426	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	06/28/11	Tue
I 057	64.41	07-2091325	Fixed Object	PD	0	0	Dry	Clear	Daylight	South		07/24/07	Tue
I 057	64.41	07-4735234	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	12/21/07	Fri
I 057	64.48	20100134628	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	11/05/10	Fri
I 057	64.49	20100137125	Animal	PD	0	0	Dry	Clear	Darkness	South		11/17/10	Wed
I 057	64.54	20100125792	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	08/25/10	Wed
I 057	64.55	20090133205	Rear End	PD	0	0	Dry	Clear	Darkness	South	South	10/09/09	Fri
I 057	64.59	20110129521	Fixed Object	PD	0	0	Dry	Clear	Daylight	North		09/14/11	Wed
I 057	64.59	07-4169186	Animal	PD	0	0	Dry	Clear	Daylight	North		11/18/07	Sun
I 057	64.60	07-5098442	Turning	C-Injury	0	1	Dry	Clear	Daylight	South	West	12/26/07	Wed
I 057	64.61	20120118447	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	Unknown	South	07/11/12	Wed
I 057	64.61	09-6063284	Animal	PD	0	0	Dry	Clear	Darkness	South		01/22/09	Thu
I 057	64.62	20110125593	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	08/15/11	Mon

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	64.64	20100108624	Animal	PD	0	0	Dry	Clear	Darkness	North		04/04/10	Sun
I 057	64.70	07-0993233	Animal	A-Injury	0	3	Dry	Clear	Daylight	South		05/14/07	Mon
I 057	64.71	08-2622424	Parked Motor Vehicle	PD	0	0	Dry	Clear	Daylight	Unknown	South	08/05/08	Tue
I 057	64.79	07-1866602	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	South	South	07/17/07	Tue
I 057	64.80	20120128286	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	09/26/12	Wed
I 057	64.80	20110111857	Sideswipe Same Direction	PD	0	0	Dry	Clear	Darkness	North	North	05/03/11	Tue
I 057	64.80	20090125156	Rear End	A-Injury	0	1	Dry	Clear	Daylight	South	South	08/11/09	Tue
I 057	64.81	07-2008592	Animal	PD	0	0	Dry	Clear	Daylight	South		05/14/07	Mon
I 057	64.84	20100119359	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	07/06/10	Tue
I 057	64.84	08-2493164	Fixed Object	PD	0	0	Dry	Clear	Daylight	South		07/22/08	Tue
I 057	64.84	08-3905901	Animal	PD	0	0	Wet	Rain	Darkness	South		11/06/08	Thu
I 057	64.86	20120113924	Fixed Object	B-Injury	0	1	Dry	Clear	Daylight	North		06/03/12	Sun
I 057	64.86	07-4411695	Animal	PD	0	0	Dry	Clear	Darkness	South		11/30/07	Fri
I 057	64.89	09-6109608	Fixed Object	PD	0	0	Snow or	Snow	Daylight	North		01/27/09	Tue
I 057	64.90	20110132493	Animal	PD	0	0	Dry	Clear	Darkness	South		10/16/11	Sun
I 057	64.96	20090141354	Rear End	A-Injury	0	1	Wet	Rain	Darkness	North	North	12/22/09	Tue
I 057	64.98	20100103649	Animal	PD	0	0	Dry	Clear	Daylight	North		02/21/10	Sun
I 057	65.00	20110134546	Animal	PD	0	0	Dry	Clear	Daylight	North		10/29/11	Sat
I 057	65.00	20090131871	Animal	PD	0	0	Dry	Clear	Darkness	South		10/16/09	Fri
I 057	65.02	20100114987	Animal	PD	0	0	Dry	Clear	Darkness	North		05/31/10	Mon
I 057	65.07	20090137358	Animal	PD	0	0	Dry	Clear	Dawn	South		11/25/09	Wed
I 057	65.08	20120105456	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	South	South	03/11/12	Sun

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	65.08	20120110090	Other Object	PD	0	0	Dry	Clear	Darkness, Lighted Road	North	North	04/25/12	Wed
I 057	65.08	20120129237	Animal	PD	0	0	Dry	Clear	Darkness	South		10/04/12	Thu
I 057	65.08	20110104593	Fixed Object	B-Injury	0	1	Dry	Clear	Daylight	North		03/07/11	Mon
I 057	65.08	20110130316	Other Non-Collision	PD	0	0	Dry	Clear	Daylight	North	North	08/31/11	Wed
I 057	65.08	20110132219	Animal	PD	0	0	Dry	Clear	Darkness	North		10/15/11	Sat
I 057	65.08	20100102987	Other Non-Collision	C-Injury	0	3	Dry	Clear	Darkness	South		02/20/10	Sat
I 057	65.08	20100106496	Overturned	B-Injury	0	1	Dry	Clear	Daylight	North		03/24/10	Wed
I 057	65.08	20100117300	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	06/22/10	Tue
I 057	65.08	20100117694	Overturned	C-Injury	0	1	Dry	Clear	Darkness	South		06/23/10	Wed
I 057	65.08	20100120233	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	07/17/10	Sat
I 057	65.08	20100122310	Angle	PD	0	0	Dry	Clear	Daylight	Unknown	North	08/02/10	Mon
I 057	65.08	20100122925	Sideswipe Same Direction	B-Injury	0	1	Dry	Clear	Daylight	North	North	08/04/10	Wed
I 057	65.08	20100124557	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	08/19/10	Thu
I 057	65.08	20100125263	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	08/23/10	Mon
I 057	65.08	20100140708	Animal	PD	0	0	Dry	Clear	Dusk	North		12/21/10	Tue
I 057	65.08	20090101402	Animal	PD	0	0	Dry	Clear	Darkness	North		01/09/09	Fri
I 057	65.08	20090123294	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	08/15/09	Sat
I 057	65.08	20090136306	Animal	PD	0	0	Wet	Clear	Darkness	North		11/17/09	Tue
I 057	65.08	08-1807505	Animal	PD	0	0	Dry	Clear	Daylight	South		03/21/08	Fri
I 057	65.08	07-1078513	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	05/22/07	Tue
I 057	65.08	07-1468672	Animal	PD	0	0			Darkness	South		06/21/07	Thu
I 057	65.09	20100123169	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	08/09/10	Mon

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	65.09	20100123456	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	08/09/10	Mon
I 057	65.09	20100134432	Fixed Object	PD	0	0	Dry	Clear	Daylight	North		11/04/10	Thu
I 057	65.10	07-4083916	Animal	PD	0	0				North		11/07/07	Wed
I 057	65.10	07-4167461	Animal	PD	0	0	Dry	Clear	Daylight	North		11/18/07	Sun
I 057	65.14	08-3993352	Rear End	Fatal	1	3	Wet	Rain	Darkness	North	North	11/12/08	Wed
I 057	65.25	20090116134	Fixed Object	A-Injury	0	2	Dry	Clear	Daylight	South		07/03/09	Fri
I 057	65.27	20110122482	Rear End	B-Injury	0	1	Dry	Clear	Daylight	N/A	South	07/21/11	Thu
I 057	65.29	20110106839	Fixed Object	PD	0	0	Snow or	Snow	Daylight	North		02/05/11	Sat
I 057	65.33	20110145785	Animal	PD	0	0	Dry	Clear	Darkness	South		11/09/11	Wed
I 057	65.33	20100119198	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	07/07/10	Wed
I 057	65.33	20090105968	Sideswipe Same Direction	B-Injury	0	2	Dry	Clear	Daylight	South	South	04/25/09	Sat
I 057	65.34	20120125647	Animal	PD	0	0	Wet	Rain	Daylight	North		09/02/12	Sun
I 057	65.34	20110135331	Sideswipe Same Direction	PD	0	0	Dry	Clear	Darkness	South	South	11/11/11	Fri
I 057	65.35	20110127377	Rear End	B-Injury	0	1	Dry	Clear	Daylight	North	North	09/05/11	Mon
I 057	65.36	20120115622	Overtaken	C-Injury	0	1	Dry	Clear	Daylight	South	South	06/12/12	Tue
I 057	65.36	20100134230	Other Object	PD	0	0	Dry	Clear	Daylight	South		10/28/10	Thu
I 057	65.36	07-4084229	Rear End	PD	0	0	Dry	Rain	Daylight	South	South	11/06/07	Tue
I 057	65.37	20090132935	Animal	PD	0	0	Dry	Clear	Darkness	North		10/17/09	Sat
I 057	65.39	20110128334	Other Object	PD	0	0	Dry	Rain	Daylight	North		09/14/11	Wed
I 057	65.39	20100113815	Other Object	B-Injury	0	1	Dry	Clear	Daylight	North	North	05/26/10	Wed
I 057	65.45	08-3672063	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	10/08/08	Wed
I 057	65.47	20120112515	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	05/24/12	Thu

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
I 057	65.53	20090142362	Rear End	PD	0	0	Wet	Rain	Daylight	North	North	12/23/09	Wed
I 057	65.53	07-1883813	Turning	B-Injury	0	1	Dry	Clear	Daylight	North	North	07/17/07	Tue
I 057	65.59	20100138703	Animal	PD	0	0	Dry	Clear	Darkness	North		12/04/10	Sat
I 057	65.64	08-1808768	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	05/27/08	Tue
I 057	65.88	20100121258	Rear End	Fatal	2	2	Dry	Clear	Daylight	North	North	07/15/10	Thu
I 057	65.91	20100131158	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	10/10/10	Sun
I 057	65.91	20090115688	Overtuned	PD	0	0	Dry	Clear	Darkness	North		06/30/09	Tue
I 057	65.93	20100116586	Fixed Object	PD	0	0	Wet	Rain	Daylight	South		06/17/10	Thu
I 057	65.96	07-0776513	Animal	PD	0	0			Darkness	South		04/11/07	Wed
I 057	65.98	07-1876841	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	06/29/07	Fri
I 057	66.06	07-0136411	Rear End	PD	0	0	Snow or	Snow	Daylight	South	South	02/13/07	Tue
IL037	65.90	20120108100	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	02/14/12	Tue
IL037	65.90	20120114166	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	04/23/12	Mon
IL037	65.90	20120114174	Turning	PD	0	0	Dry	Clear	Daylight	South	North	05/26/12	Sat
IL037	65.90	20120114321	Turning	PD	0	0	Dry	Clear	Daylight	South	West	05/25/12	Fri
IL037	65.90	20120121264	Turning	PD	0	0	Dry	Clear	Daylight	West	North	05/21/12	Mon
IL037	65.90	20120122812	Angle	PD	0	0	Dry	Clear	Daylight	North	Unknown	07/02/12	Mon
IL037	65.90	20110122332	Angle	PD	0	0	Dry	Clear	Daylight	East	South	06/26/11	Sun
IL037	65.90	20110129937	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	08/23/11	Tue
IL037	65.90	20110129937	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	08/18/11	Thu
IL037	65.90	20110137585	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	10/31/11	Mon
IL037	65.90	20110137588	Turning	PD	0	0	Dry	Clear	Daylight	North	South	10/20/11	Thu

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL037	65.90	20110144180	Rear End	PD	0	0	Wet	Rain	Daylight	East	East	12/15/11	Thu
IL037	65.90	20100104904	Angle	PD	0	0	Dry	Clear	Daylight	North	East	01/14/10	Thu
IL037	65.90	20100109937	Rear End	PD	0	0	Wet	Rain	Daylight	West	West	02/05/10	Fri
IL037	65.90	20100109940	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	02/12/10	Fri
IL037	65.90	20100112417	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	03/05/10	Fri
IL037	65.90	20100113056	Rear End	B-Injury	0	1	Dry	Clear	Daylight	East	East	03/18/10	Thu
IL037	65.90	20100114156	Turning	C-Injury	0	1	Dry	Clear	Dusk	North	South	04/02/10	Fri
IL037	65.90	20100114157	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	East	East	04/07/10	Wed
IL037	65.90	20100114187	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	04/27/10	Tue
IL037	65.90	20100117272	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	05/08/10	Sat
IL037	65.90	20100117276	Rear End	C-Injury	0	1		Clear	Daylight	East	East	05/11/10	Tue
IL037	65.90	20100124866	Rear End	B-Injury	0	1	Dry	Clear	Daylight	West	West	07/08/10	Thu
IL037	65.90	20100128756	Sideswipe Same Direction	PD	0	0	Wet	Rain	Daylight	East	East	08/12/10	Thu
IL037	65.90	20100133200	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	09/20/10	Mon
IL037	65.90	20100136726	Turning	B-Injury	0	1	Dry	Clear	Darkness, Lighted Road	Southwest	North	10/16/10	Sat
IL037	65.90	20100137248	Angle	PD	0	0	Dry	Clear	Daylight	North	East	10/05/10	Tue
IL037	65.90	20100145290	Angle	C-Injury	0	3	Dry	Clear	Daylight	South	East	12/04/10	Sat
IL037	65.90	20100146436	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	12/18/10	Sat
IL037	65.90	20090102836	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	01/09/09	Fri
IL037	65.90	20090103042	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	01/15/09	Thu
IL037	65.90	20090109659	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	03/22/09	Sun
IL037	65.90	20090113536	Turning	PD	0	0	Dry	Clear	Daylight	West	East	04/11/09	Sat

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL037	65.90	20090121913	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	04/29/09	Wed
IL037	65.90	20090123376	Sideswipe Same Direction	PD	0	0	Wet	Rain	Daylight	West	West	06/15/09	Mon
IL037	65.90	20090127068	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	07/23/09	Thu
IL037	65.90	20090134350	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	09/25/09	Fri
IL037	65.90	20090135616	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	09/07/09	Mon
IL037	65.90	20090139134	Turning	PD	0	0	Dry	Clear	Daylight	North	South	10/03/09	Sat
IL037	65.90	08-1306235	Turning	PD	0	0	Wet	Clear	Daylight	South	West	03/03/08	Mon
IL037	65.90	08-2415985	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	06/03/08	Tue
IL037	65.90	08-2886854	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	07/25/08	Fri
IL037	65.90	08-2887381	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	07/12/08	Sat
IL037	65.90	08-3613729	Rear End	C-Injury	0	3	Dry	Clear	Daylight	West	West	09/23/08	Tue
IL037	65.90	08-4173145	Turning	PD	0	0	Wet	Rain	Darkness, Lighted Road	Northeast	Southeast	10/07/08	Tue
IL037	65.90	08-4585322	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	11/01/08	Sat
IL037	65.90	08-5089704	Rear End	A-Injury	0	1	Dry	Clear	Darkness	South	South	12/05/08	Fri
IL037	65.90	07-0374053	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	North	North	01/02/07	Tue
IL037	65.90	07-0769658	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	02/22/07	Thu
IL037	65.90	07-1394399	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	03/27/07	Tue
IL037	65.90	07-1647655	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	04/04/07	Wed
IL037	65.90	07-1648612	Rear End	PD	0	0	Wet	Clear	Daylight	West	West	04/14/07	Sat
IL037	65.90	07-2926306	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	07/25/07	Wed
IL037	65.90	07-3326340	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	08/16/07	Thu
IL037	65.90	07-4653148	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	11/08/07	Thu

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL037	65.90	07-5100917	Angle	PD	0	0	Dry	Clear	Daylight	East	South	12/04/07	Tue
IL149	34.82	20100116079	Rear End	B-Injury	0	3	Dry	Clear	Daylight	West	West	05/02/10	Sun
IL149	34.82	07-2005580	Turning	A-Injury	0	1	Dry	Clear	Daylight	West	West	03/14/07	Wed
IL149	34.82	07-3727893	Rear End	B-Injury	0	1	Dry	Clear	Daylight	West	West	09/14/07	Fri
IL149	34.86	20100132905	Rear End	B-Injury	0	2	Dry	Clear	Daylight	West	West	10/22/10	Fri
IL149	34.95	20100141545	Other Non-Collision	PD	0	0	Wet	Rain	Daylight	West	East	11/25/10	Thu
IL149	34.97	20100139407	Rear End	PD	0	0	Wet	Rain	Daylight	West	West	10/26/10	Tue
IL149	34.97	07-4793118	Animal	PD	0	0			Darkness	East		12/19/07	Wed
IL149	35.02	07-2373236	Turning	PD	0	0				Unknown	East	06/20/07	Wed
IL149	35.03	20100128761	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	08/27/10	Fri
IL149	35.05	20090142675	Sideswipe Opposite	PD	0	0	Dry	Clear	Daylight	West	East	11/22/09	Sun
IL149	35.06	07-5096537	Rear End	PD	0	0	Ice	Clear	Daylight	East	East	12/07/07	Fri
IL149	35.08	07-1615793	Turning	PD	0	0	Dry	Clear	Daylight	East	East	03/31/07	Sat
IL149	35.11	20100103669	Rear End	C-Injury	0	3	Wet	Snow	Daylight	West	West	01/09/10	Sat
IL149	35.17	20090123371	Rear End	A-Injury	0	1	Dry	Clear	Daylight	West	West	06/23/09	Tue
IL149	35.18	20090121090	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	05/27/09	Wed
IL149	35.18	20090135619	Turning	PD	0	0	Dry	Clear	Daylight	West	West	09/09/09	Wed
IL149	35.19	20120114167	Turning	A-Injury	0	1	Dry	Clear	Daylight	South	North	05/14/12	Mon
IL149	35.19	20120114174	Turning	B-Injury	0	1	Dry	Clear	Daylight	South	East	05/10/12	Thu
IL149	35.19	20110106694	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	01/31/11	Mon
IL149	35.19	20110109988	Turning	PD	0	0	Dry	Clear	Daylight	South	North	02/08/11	Tue
IL149	35.19	20110114520	Rear End	B-Injury	0	2	Dry	Clear	Daylight	East	East	04/01/11	Fri

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.19	20110141160	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	11/16/11	Wed
IL149	35.19	20110144165	Parked Motor Vehicle	PD	0	0	Snow or	Snow	Darkness, Lighted Road	Northwest	East	12/27/11	Tue
IL149	35.19	20100125592	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	07/07/10	Wed
IL149	35.19	20100133868	Turning	B-Injury	0	3	Dry	Clear	Daylight	North	West	09/29/10	Wed
IL149	35.19	20090109658	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	03/05/09	Thu
IL149	35.19	20090121191	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	05/28/09	Thu
IL149	35.19	20090121193	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	North	North	05/26/09	Tue
IL149	35.19	20090121198	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	05/18/09	Mon
IL149	35.19	20090123375	Rear End	C-Injury	0	1	Dry	Clear	Daylight	Southeast	Southeast	06/21/09	Sun
IL149	35.19	20090130182	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	08/26/09	Wed
IL149	35.19	20090130185	Rear End	PD	0	0		Clear	Daylight	East	East	08/21/09	Fri
IL149	35.19	20090139158	Angle	PD	0	0	Wet	Rain	Darkness, Lighted Road	South	West	10/27/09	Tue
IL149	35.19	20090145636	Turning	PD	0	0	Dry	Snow	Daylight	South	North	12/27/09	Sun
IL149	35.19	08-0953334	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	02/29/08	Fri
IL149	35.19	08-1305666	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	West	West	03/10/08	Mon
IL149	35.19	08-1629222	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	04/07/08	Mon
IL149	35.19	08-4172899	Turning	PD	0	0	Dry	Clear	Daylight	North	East	10/11/08	Sat
IL149	35.19	07-2451214	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	06/04/07	Mon
IL149	35.19	07-2476336	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	06/20/07	Wed
IL149	35.19	07-3326456	Angle	PD	0	0	Dry	Clear	Daylight	West	South	08/16/07	Thu
IL149	35.19	07-3776908	Turning	PD	0	0	Dry	Clear	Daylight	Southeast	East	09/28/07	Fri
IL149	35.19	07-3860108	Turning	PD	0	0	Dry	Clear	Daylight	North	North	09/07/07	Fri

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.19	07-5100578	Turning	PD	0	0	Wet		Daylight	North	West	12/11/07	Tue
IL149	35.29	20090102805	Turning	PD	0	0	Dry	Clear	Daylight	South	East	01/21/09	Wed
IL149	35.29	20090135616	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	09/04/09	Fri
IL149	35.30	20100139409	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	West	West	10/17/10	Sun
IL149	35.30	07-0233838	Other Non-Collision	PD	0	0	Ice	Sleet/Hail	Daylight	West		02/13/07	Tue
IL149	35.37	20110138710	Pedestrian	Fatal	1	0	Wet	Rain	Darkness	East	N/A	12/05/11	Mon
IL149	35.42	20110137139	Animal	PD	0	0	Dry	Clear	Darkness, Lighted Road	West		11/25/11	Fri
IL149	35.45	20120103425	Turning	PD	0	0	Dry	Clear	Daylight	South	East	01/24/12	Tue
IL149	35.45	20120105793	Turning	B-Injury	0	1	Wet	Rain	Darkness, Lighted Road	West	South	02/15/12	Wed
IL149	35.45	20120108073	Turning	B-Injury	0	2	Dry	Clear	Daylight	East	East	03/30/12	Fri
IL149	35.45	20120117312	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	04/06/12	Fri
IL149	35.45	20110116897	Turning	C-Injury	0	2	Dry	Clear	Daylight	South	East	05/10/11	Tue
IL149	35.45	20110116956	Rear End	PD	0	0	Wet	Rain	Daylight	South	South	05/23/11	Mon
IL149	35.45	20110129673	Turning	PD	0	0	Dry	Clear	Daylight	Southwest	West	08/09/11	Tue
IL149	35.45	20100104901	Turning	C-Injury	0	2	Wet	Clear	Daylight	West	South	01/11/10	Mon
IL149	35.45	20100106805	Rear End	PD	0	0	Wet	Rain	Daylight	West	West	02/05/10	Fri
IL149	35.45	20100124877	Turning	PD	0	0		Clear	Daylight	East	West	07/18/10	Sun
IL149	35.45	20100133203	Sideswipe Same Direction	PD	0	0	Dry		Daylight	West	West	09/23/10	Thu
IL149	35.45	20090102808	Turning	PD	0	0	Dry	Clear	Daylight	South	East	01/12/09	Mon
IL149	35.45	20090102810	Turning	B-Injury	0	3	Dry	Clear	Dusk	East	West	01/09/09	Fri
IL149	35.45	20090106136	Turning	B-Injury	0	1	Wet	Clear	Daylight	West	South	01/30/09	Fri
IL149	35.45	20090109640	Turning	PD	0	0	Dry	Clear	Daylight	South	East	03/29/09	Sun

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.45	20090139151	Angle	B-Injury	0	2	Dry	Clear	Darkness, Lighted Road	West	South	10/18/09	Sun
IL149	35.45	20090142667	Turning	A-Injury	0	1	Dry	Clear	Daylight	South	West	11/05/09	Thu
IL149	35.45	08-0311921	Turning	B-Injury	0	2	Wet	Clear	Daylight	South	East	01/29/08	Tue
IL149	35.45	08-2887282	Turning	PD	0	0		Clear	Daylight	West	South	07/13/08	Sun
IL149	35.45	08-3850719	Turning	PD	0	0	Dry	Clear	Daylight	West	East	11/06/08	Thu
IL149	35.45	08-5073609	Turning	B-Injury	0	1	Dry	Clear	Darkness	East	West	12/11/08	Thu
IL149	35.45	07-2242068	Angle	PD	0	0	Dry	Clear	Daylight	West	South	05/30/07	Wed
IL149	35.45	07-2450497	Turning	PD	0	0	Dry	Clear	Darkness	West	East	06/10/07	Sun
IL149	35.45	07-2450620	Turning	B-Injury	0	2	Dry	Clear	Daylight	West	Southeast	06/12/07	Tue
IL149	35.45	07-3780637	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	09/21/07	Fri
IL149	35.45	07-4301961	Turning	PD	0	0		Clear	Darkness	South	West	10/07/07	Sun
IL149	35.48	20110136514	Animal	PD	0	0	Wet	Clear	Darkness, Lighted Road	West		11/21/11	Mon
IL149	35.49	20120107325	Fixed Object	PD	0	0	Dry	Clear	Daylight	East		02/14/12	Tue
IL149	35.50	20090134995	Animal	PD	0	0	Dry	Clear	Darkness	West		11/06/09	Fri
IL149	35.54	07-4830811	Animal	PD	0	0	Dry	Clear	Daylight	West		12/28/07	Fri
IL149	35.61	20120103417	Turning	C-Injury	0	2	Dry	Clear	Dusk	East	West	01/03/12	Tue
IL149	35.61	20120110993	Rear End	PD	0	0	Wet	Clear	Daylight	West	West	04/12/12	Thu
IL149	35.61	20120114166	Angle	PD	0	0	Dry	Clear	Darkness	North	West	05/05/12	Sat
IL149	35.61	20120116351	Rear End	B-Injury	0	2	Dry	Clear	Daylight	West	West	06/09/12	Sat
IL149	35.61	20120140629	Turning	B-Injury	0	2	Dry	Clear	Daylight	Northeast	West	03/08/12	Thu
IL149	35.61	20110105802	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	01/06/11	Thu
IL149	35.61	20110121462	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	06/01/11	Wed

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.61	20110137586	Turning	PD	0	0	Dry	Clear	Daylight	East	West	10/24/11	Mon
IL149	35.61	20110141083	Rear End	C-Injury	0	2	Wet	Rain	Daylight	West	West	11/28/11	Mon
IL149	35.61	20110141140	Angle	PD	0	0	Dry	Clear	Daylight	South	West	10/29/11	Sat
IL149	35.61	20110144422	Turning	PD	0	0	Dry	Clear	Darkness	East	Northwest	12/09/11	Fri
IL149	35.61	20100104908	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	01/25/10	Mon
IL149	35.61	20100109809	Turning	PD	0	0	Dry	Clear	Daylight	West	North	02/23/10	Tue
IL149	35.61	20100112417	Turning	PD	0	0	Dry	Clear	Daylight	Northeast	Northeast	03/03/10	Wed
IL149	35.61	20100114155	Fixed Object	A-Injury	0	1	Dry	Clear	Darkness, Lighted Road	North		03/25/10	Thu
IL149	35.61	20100123568	Rear End	C-Injury	0	2	Dry	Clear	Daylight	East	East	06/14/10	Mon
IL149	35.61	20100146447	Rear End	PD	0	0	Wet	Clear	Darkness, Lighted Road	East	East	12/29/10	Wed
IL149	35.61	20090102808	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	North	North	01/11/09	Sun
IL149	35.61	20090109658	Turning	B-Injury	0	1	Dry	Clear	Daylight	East	East	03/08/09	Sun
IL149	35.61	20090121192	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	05/23/09	Sat
IL149	35.61	20090121203	Turning	PD	0	0	Dry	Clear	Daylight	West	North	05/09/09	Sat
IL149	35.61	20090121210	Turning	PD	0	0	Dry	Clear	Daylight	West	North	05/09/09	Sat
IL149	35.61	20090123376	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	06/16/09	Tue
IL149	35.61	20090135619	Rear End	C-Injury	0	1	Dry	Clear	Daylight	North	North	09/12/09	Sat
IL149	35.61	20090145629	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	12/05/09	Sat
IL149	35.61	20090145644	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	12/28/09	Mon
IL149	35.61	08-0313273	Turning	C-Injury	0	1	Dry	Clear	Daylight	East	North	01/23/08	Wed
IL149	35.61	08-1333866	Turning	PD	0	0	Dry	Clear	Daylight	West	Northeast	03/23/08	Sun
IL149	35.61	08-1628521	Rear End	PD	0	0	Dry	Clear	Daylight	Northeast	Northeast	04/26/08	Sat

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.61	08-1989584	Turning	PD	0	0	Dry	Clear	Daylight	North	West	05/23/08	Fri
IL149	35.61	08-3260521	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	08/27/08	Wed
IL149	35.61	08-3621581	Turning	PD	0	0	Dry	Clear	Daylight	West	North	09/02/08	Tue
IL149	35.61	08-3621722	Turning	PD	0	0	Dry	Clear	Daylight	West	Northeast	09/29/08	Mon
IL149	35.61	08-4227347	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	12/04/08	Thu
IL149	35.61	07-0374475	Turning	PD	0	0	Dry	Clear	Daylight	North	East	01/03/07	Wed
IL149	35.61	07-2131774	Rear End	B-Injury	0	1	Dry	Clear	Daylight	North	North	07/26/07	Thu
IL149	35.61	07-3406761	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	08/10/07	Fri
IL149	35.61	07-4642240	Turning	A-Injury	0	4	Dry	Clear	Darkness	Southwest	East	11/08/07	Thu
IL149	35.61	07-5101022	Rear End	PD	0	0	Wet	Rain	Darkness, Lighted Road	East	East	12/10/07	Mon
IL149	35.61	07-5102442	Turning	PD	0	0	Dry	Clear	Daylight	East	North	12/03/07	Mon
IL149	35.61	07-5382440	Turning	PD	0	0	Dry	Clear	Daylight	East	North	12/31/07	Mon
IL149	35.71	20120106226	Turning	PD	0	0	Dry	Clear	Daylight	East	East	01/29/12	Sun
IL149	35.71	20110116374	Angle	B-Injury	0	1	Dry	Clear	Daylight	North	West	05/31/11	Tue
IL149	35.71	20110121464	Turning	PD	0	0	Dry	Clear	Daylight	West	West	06/01/11	Wed
IL149	35.71	20110133029	Fixed Object	PD	0	0	Dry	Clear	Daylight	East		09/20/11	Tue
IL149	35.71	20090102838	Fixed Object	PD	0	0	Dry	Clear	Darkness, Lighted Road	West		01/05/09	Mon
IL149	35.71	20090113550	Turning	PD	0	0	Dry	Clear	Daylight	West	West	04/05/09	Sun
IL149	35.72	08-4584747	Turning	PD	0	0	Dry	Clear	Daylight	North	West	11/02/08	Sun
IL149	35.72	07-0769252	Turning	PD	0	0	Snow or	Snow	Daylight	East	South	02/13/07	Tue
IL149	35.74	07-2922545	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	East	East	07/02/07	Mon
IL149	35.77	20110141099	Angle	PD	0	0	Dry	Clear	Daylight	South	West	11/19/11	Sat

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Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.77	20100122908	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	East	East	06/17/10	Thu
IL149	35.77	20090121201	Turning	PD	0	0	Dry	Clear	Daylight	North	East	05/12/09	Tue
IL149	35.78	20120122798	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	07/21/12	Sat
IL149	35.79	20120125231	Angle	PD	0	0	Dry	Clear	Daylight	West	South	07/01/12	Sun
IL149	35.79	08-3621672	Rear End	B-Injury	0	1	Dry	Clear	Daylight	East	East	09/19/08	Fri
IL149	35.79	08-3686808	Turning	PD	0	0	Dry	Clear	Daylight	South	Northwest	09/25/08	Thu
IL149	35.79	07-1349864	Turning	PD	0	0	Dry	Clear	Daylight	North	South	03/21/07	Wed
IL149	35.79	07-5100248	Angle	PD	0	0	Wet	Clear	Daylight	South	West	12/13/07	Thu
IL149	35.80	08-0948219	Angle	PD	0	0	Wet	Rain	Daylight	South	West	02/05/08	Tue
IL149	35.81	20110144424	Turning	PD	0	0	Dry	Clear	Darkness, Lighted Road	Southeast	East	12/10/11	Sat
IL149	35.82	20120133234	Turning	A-Injury	0	1	Dry	Clear	Darkness	West	East	08/25/12	Sat
IL149	35.83	20110111066	Fixed Object	PD	0	0	Dry	Clear	Daylight	East		03/22/11	Tue
IL149	35.84	20120121264	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	05/21/12	Mon
IL149	35.84	08-1989410	Turning	PD	0	0	Dry	Clear	Daylight	North	West	05/23/08	Fri
IL149	35.85	20110116903	Turning	PD	0	0	Dry	Clear	Daylight	West	West	05/16/11	Mon
IL149	35.85	08-2417312	Rear End	B-Injury	0	1	Dry	Rain	Daylight	West	West	06/26/08	Thu
IL149	35.86	07-0769393	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	02/12/07	Mon
IL149	35.87	20110133028	Parked Motor Vehicle	A-Injury	0	1	Wet	Rain	Daylight	East	East	09/19/11	Mon
IL149	35.88	20110138090	Turning	PD	0	0	Dry	Clear	Daylight	Northwest	Southeast	10/05/11	Wed
IL149	35.88	20100146441	Turning	PD	0	0	Dry	Clear	Darkness, Lighted Road	Northwest	East	12/21/10	Tue
IL149	35.91	07-1351993	Angle	PD	0	0	Dry	Clear	Dusk	South	West	03/03/07	Sat
IL149	35.96	20110144165	Rear End	B-Injury	0	1	Dry	Clear	Daylight	West	West	12/21/11	Wed

GIS Crash Analysis Report - Crash Data Summary

I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	35.98	20110117198	Rear End	B-Injury	0	1	Dry	Clear	Daylight	West	West	05/06/11	Fri
IL149	35.98	08-2891359	Turning	PD	0	0	Dry	Clear	Daylight	West	South	07/02/08	Wed
IL149	36.03	20120116382	Angle	PD	0	0	Dry	Clear	Daylight	South	East	05/24/12	Thu
IL149	36.03	20110129936	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	08/24/11	Wed
IL149	36.03	20100117273	Turning	PD	0	0	Dry	Clear	Daylight	North	East	05/08/10	Sat
IL149	36.03	20090130183	Angle	PD	0	0	Dry	Clear	Daylight	North	East	08/26/09	Wed
IL149	36.03	08-1316747	Turning	PD	0	0	Dry	Clear	Daylight	Northwest	West	03/24/08	Mon
IL149	36.03	08-2856360	Rear End	B-Injury	0	1	Dry	Clear	Daylight	West	West	07/20/08	Sun
IL149	36.03	07-4707092	Fixed Object	PD	0	0	Dry	Clear	Darkness	East		11/24/07	Sat
IL149	36.04	20120117250	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	04/05/12	Thu
IL149	36.04	07-1618029	Turning	PD	0	0	Dry	Clear	Daylight	East	East	04/30/07	Mon
IL149	36.07	20090142666	Rear End	C-Injury	0	2	Wet	Rain	Daylight	West	West	11/18/09	Wed
IL149	36.08	20110124956	Rear End	C-Injury	0	2	Dry	Clear	Daylight	East	East	07/11/11	Mon
IL149	36.08	07-1350607	Turning	PD	0	0	Dry	Clear	Dusk	West	North	03/15/07	Thu
IL149	36.09	20100141924	Turning	PD	0	0	Dry	Clear	Darkness, Lighted Road	North	East	11/17/10	Wed
IL149	36.09	08-0948268	Rear End	PD	0	0	Snow or	Clear	Daylight	East	East	02/13/08	Wed
IL149	36.09	08-0953060	Rear End	PD	0	0	Dry	Clear	Daylight	South	South	02/29/08	Fri
IL149	36.10	08-1629743	Rear End	PD	0	0	Wet	Rain	Daylight	East	East	04/18/08	Fri
IL149	36.11	20110141134	Fixed Object	PD	0	0	Dry	Clear	Dawn	East		11/12/11	Sat
IL149	36.13	20120137065	Turning	PD	0	0	Wet	Rain	Daylight	East	West	10/01/12	Mon
IL149	36.13	20090110639	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	03/23/09	Mon
IL149	36.14	20100112424	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	03/31/10	Wed

I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	36.14	08-3265603	Rear End	A-Injury	0	1	Dry	Clear	Daylight	East	East	08/20/08	Wed
IL149	36.14	07-3324238	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	08/03/07	Fri
IL149	36.14	07-4707845	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	East	East	11/19/07	Mon
IL149	36.15	20120106169	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	01/23/12	Mon
IL149	36.15	20110117198	Angle	PD	0	0	Dry	Clear	Daylight	South	East	04/30/11	Sat
IL149	36.15	20110133014	Turning	A-Injury	0	2	Dry	Clear	Daylight	North	South	08/26/11	Fri
IL149	36.15	20110141138	Turning	PD	0	0	Dry	Clear	Daylight	North	East	10/03/11	Mon
IL149	36.15	20110141143	Angle	PD	0	0	Dry	Clear	Dusk	East	South	11/01/11	Tue
IL149	36.15	20110144190	Rear End	PD	0	0	Dry	Clear	Darkness, Lighted Road	North	North	12/15/11	Thu
IL149	36.15	20100114159	Angle	PD	0	0	Dry	Clear	Daylight	North	West	04/10/10	Sat
IL149	36.15	20090121918	Rear End	PD	0	0		Clear	Daylight	East	East	05/11/09	Mon
IL149	36.16	08-3261867	Rear End	C-Injury	0	1	Dry	Clear	Daylight	West	West	08/18/08	Mon
IL149	36.16	07-4311564	Angle	B-Injury	0	1	Dry	Clear	Daylight	South	West	10/29/07	Mon
IL149	36.17	20100146443	Turning	PD	0	0	Dry	Clear	Daylight	South	West	12/22/10	Wed
IL149	36.21	08-1628828	Overtuned	PD	0	0	Dry	Clear	Daylight	East		04/24/08	Thu
IL149	36.22	20120114166	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	05/14/12	Mon
IL149	36.22	20100122905	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	06/04/10	Fri
IL149	36.22	20090109658	Turning	PD	0	0	Dry	Clear	Daylight	South	West	03/09/09	Mon
IL149	36.22	20090121065	Rear End	B-Injury	0	1	Wet	Rain	Daylight	East	East	05/01/09	Fri
IL149	36.22	08-1316960	Angle	PD	0	0	Wet	Rain	Dusk	North	West	03/26/08	Wed
IL149	36.22	07-1410633	Rear End	C-Injury	0	1	Dry	Clear	Daylight	East	East	03/26/07	Mon
IL149	36.22	07-3780645	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	09/21/07	Fri

ILLINOIS DEPARTMENT OF TRANSPORTATION
GIS Crash Analysis Report - Crash Data Summary

I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	36.24	20120133752	Rear End	PD	0	0	Dry	Clear	Daylight	West	West	09/06/12	Thu
IL149	36.24	20090105533	Fixed Object	PD	0	0	Dry	Clear	Darkness, Lighted Road	West		04/25/09	Sat
IL149	36.25	20110122332	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	06/08/11	Wed
IL149	36.26	20090127076	Parked Motor Vehicle	PD	0	0	Dry	Clear	Daylight	Unknown	Unknown	07/08/09	Wed
IL149	36.27	20120106188	Rear End	PD	0	0	Wet	Rain	Darkness, Lighted Road	East	East	01/26/12	Thu
IL149	36.27	20110121427	Turning	C-Injury	0	1	Dry	Clear	Daylight	East	West	06/15/11	Wed
IL149	36.28	20120111073	Angle	C-Injury	0	1	Dry	Clear	Daylight	North	West	04/28/12	Sat
IL149	36.28	20100112418	Turning	PD	0	0	Dry	Clear	Daylight	North	East	03/15/10	Mon
IL149	36.28	20100136715	Rear End	PD	0	0	Dry	Clear	Daylight	North	North	10/10/10	Sun
IL149	36.28	20090109658	Rear End	C-Injury	0	3	Dry	Clear	Daylight	East	East	03/17/09	Tue
IL149	36.28	20090130057	Angle	PD	0	0	Dry	Clear	Daylight	East	North	07/28/09	Tue
IL149	36.28	20090134348	Turning	PD	0	0	Dry	Clear	Daylight	South	East	09/23/09	Wed
IL149	36.28	08-0312150	Fixed Object	C-Injury	0	1	Dry	Clear	Darkness, Lighted Road	North		01/18/08	Fri
IL149	36.28	08-1768996	Rear End	PD	0	0		Clear	Daylight	South	South	04/02/08	Wed
IL149	36.28	08-3261172	Angle	PD	0	0	Dry	Clear	Daylight	North	West	08/26/08	Tue
IL149	36.28	07-1351811	Turning	PD	0	0	Dry	Clear	Daylight	East	East	03/08/07	Thu
IL149	36.28	07-2492176	Rear End	PD	0	0	Dry	Clear	Daylight	East	East	06/01/07	Fri
IL149	36.29	20120126699	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	East	East	07/15/12	Sun
IL149	36.29	20100103659	Rear End	PD	0	0	Wet	Clear	Darkness, Lighted Road	East	East	01/12/10	Tue
IL149	36.29	07-3325912	Turning	PD	0	0	Dry	Clear	Daylight	East	East	08/19/07	Sun
IL149	36.31	20120108072	Turning	B-Injury	0	1	Dry	Clear	Daylight	West	East	03/09/12	Fri
IL149	36.31	20100122907	Turning	PD	0	0	Dry	Clear	Daylight	Southwest	East	06/03/10	Thu

ILLINOIS DEPARTMENT OF TRANSPORTATION
 GIS Crash Analysis Report - Crash Data Summary

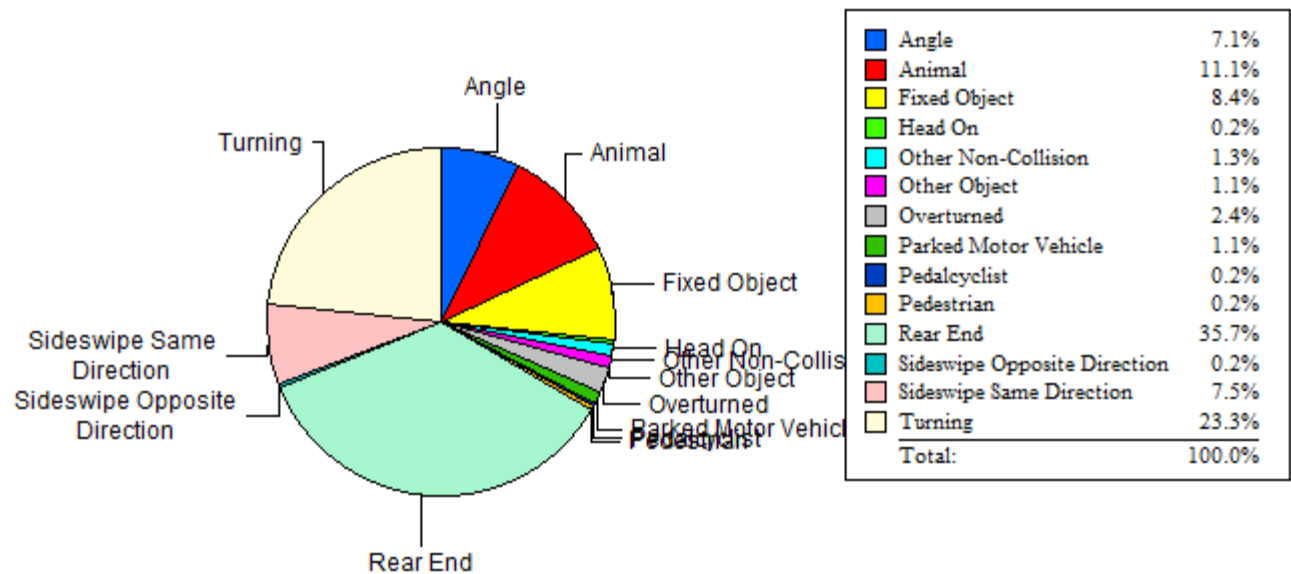
I57_ILL149_CrashData

Route	Mile	Case Number	Collision Type	Injury Type	Fatal Count	Injury Count	Surface Condition	Weather Description	Lighting Conditions	Vehicle Direction		Crash Date	Day of Week
										1	2		
IL149	36.31	07-3780652	Rear End	PD	0	0		Clear	Daylight	East	East	09/21/07	Fri
IL149	36.32	20090121204	Turning	PD	0	0	Dry	Clear	Daylight	South	East	05/04/09	Mon
IL149	36.33	20100112418	Turning	PD	0	0	Dry	Clear	Darkness, Lighted Road	Northwest	East	03/05/10	Fri
IL149	36.33	20100117284	Sideswipe Same Direction	C-Injury	0	1	Dry	Clear	Daylight	East	East	05/25/10	Tue
IL149	36.33	20100129327	Turning	PD	0	0	Dry	Clear	Daylight	East	East	08/30/10	Mon
IL149	36.33	20100133200	Turning	C-Injury	0	1	Dry	Clear	Darkness, Lighted Road	East	East	09/19/10	Sun
IL149	36.33	20100136725	Turning	PD	0	0	Dry	Clear	Daylight	West	East	10/14/10	Thu
IL149	36.33	20090130068	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	East	East	08/01/09	Sat
IL149	36.33	20090139134	Turning	A-Injury	0	1	Dry	Clear	Daylight	East	North	10/02/09	Fri
IL149	36.34	20120103425	Sideswipe Same Direction	PD	0	0	Dry	Clear	Daylight	East	East	01/05/12	Thu
IL149	36.34	20120105067	Angle	PD	0	0	Dry	Clear	Daylight	Northeast	East	01/27/12	Fri

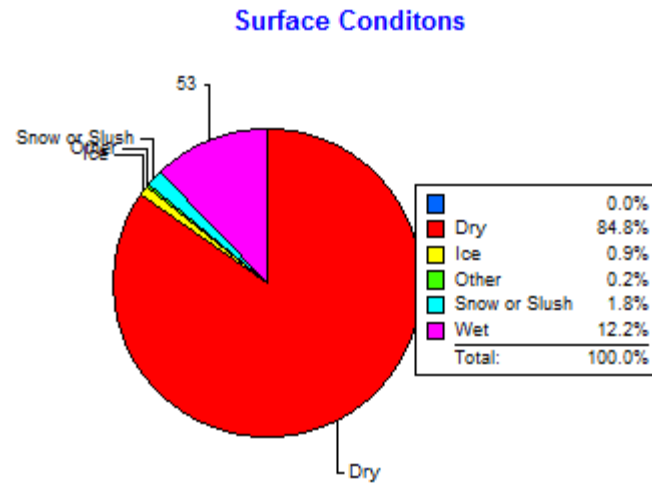
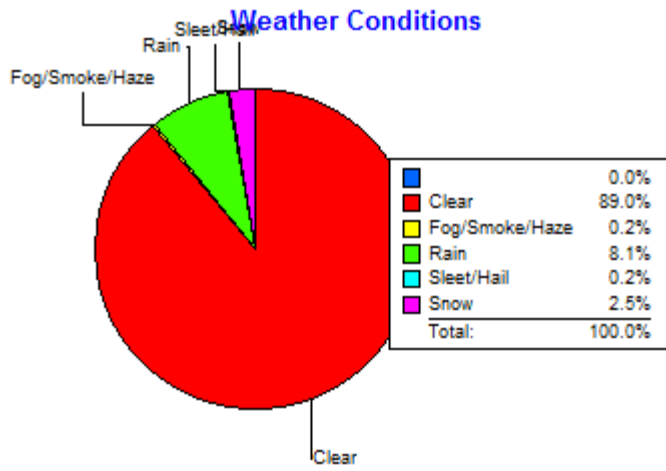
Total Fatalities: 6 Total Injuries: 169 Total Crashes: 451

I57_ILL149_CrashData

Collision Type

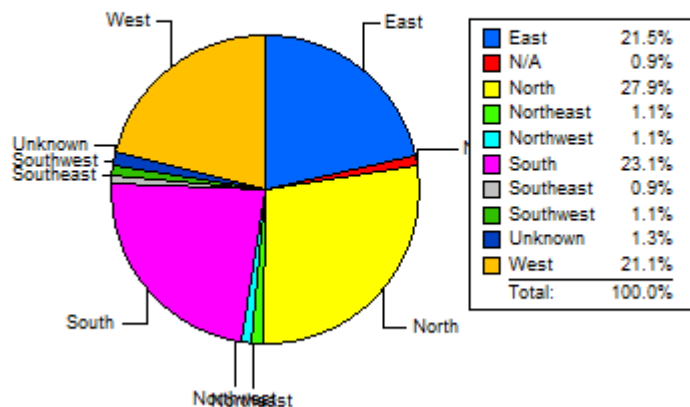


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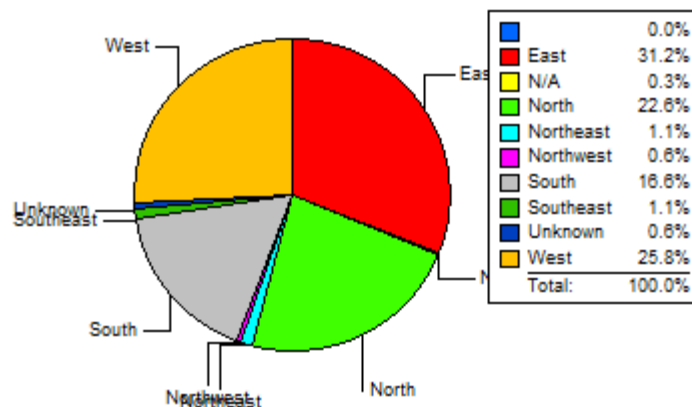


I57_ILL149_CrashData

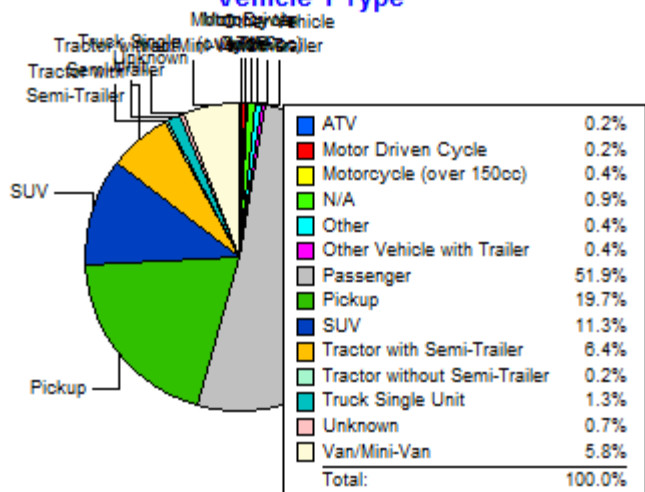
Direction of Travel - Vehicle 1



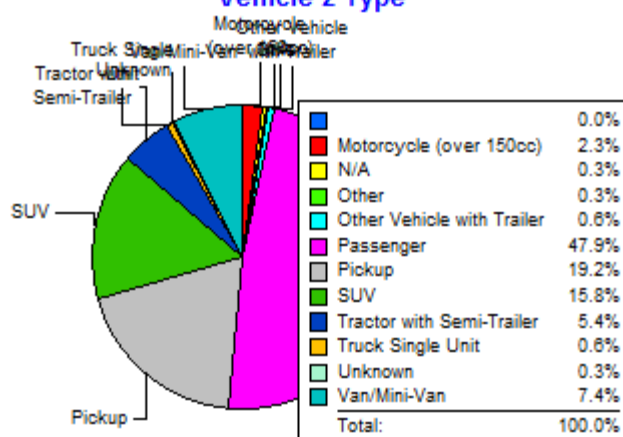
Direction of Travel - Vehicle 2



Vehicle 1 Type

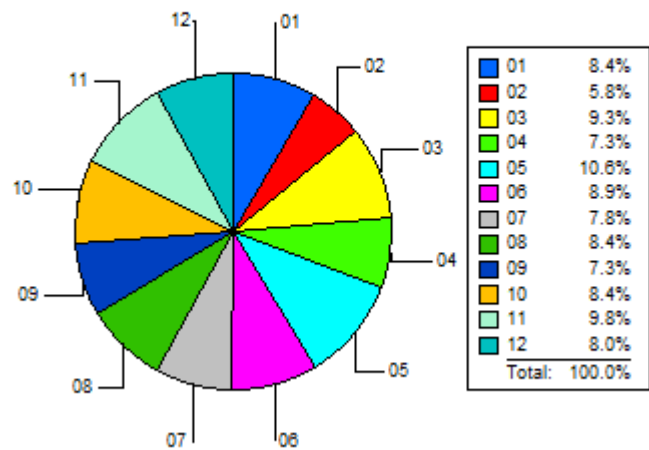


Vehicle 2 Type

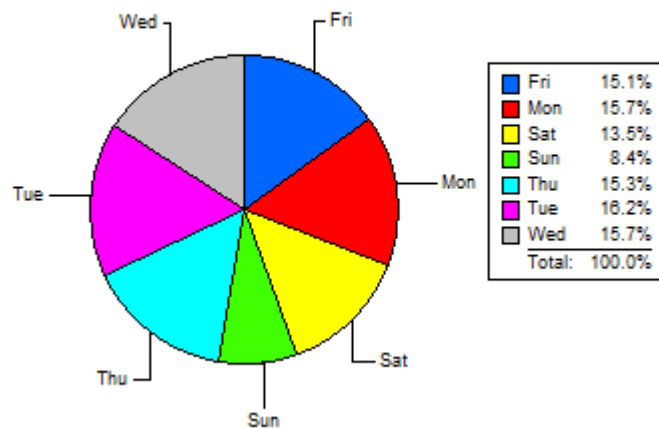


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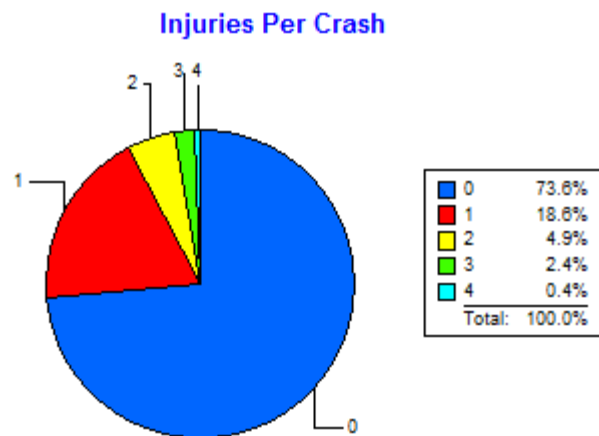
Month of Year



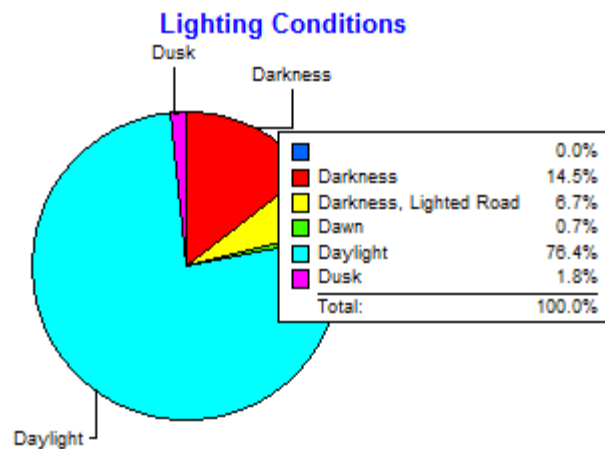
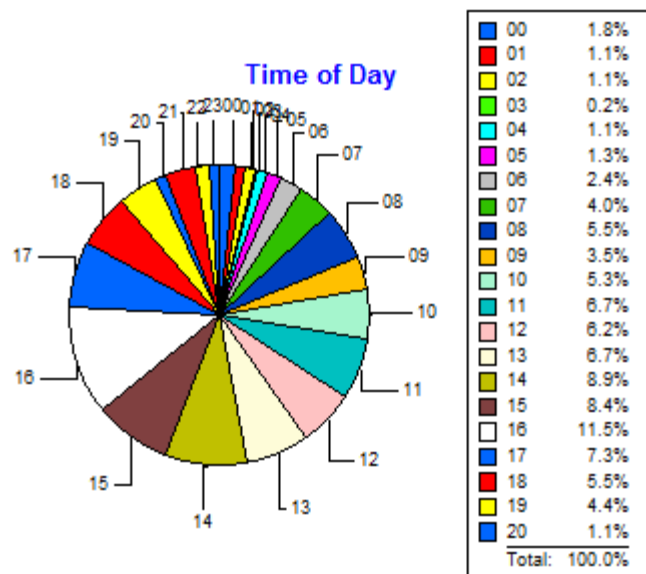
Day of Week



I57_ILL149_CrashData



I57_ILL149_CrashData





APPENDIX C – TRIP GENERATION INFORMATION TABLE

Little Egypt Trip Generation Information Tables

Proposed Area Land Use Type	Avg SQFT	Avg # of	Independent Variable Used	Area												Total # of Developed Areas by Use	Total GFA SQFT	Total Acres	Total # of	Units	
				1	2	3	4	5	6	7	8	9	10	11	12						
Motel	62,500	110.00	# of Rooms		1	2	1					2	1	2		2	8	500000	29.60	880	Rooms
Dining Casual	6,500	200.00	# of Seats		1		1			1		1	1	2			7	45500	21.00	1400	Seats
Dining Fast	2,650	80.00	# of Seats					2		2		1	1	2			8	21200	17.00	640	Seats
Strip retail (7 stores per unit)	15,300	15.30	1,000 SQFT GLA		1	3				1		1	3		2		11	168300	42.70	168.3	Stores
Office cluster (4 offices per unit)	12,000	12.00	1,000 SQFT GFA	4								2					8	96000	18.50	96	Offices
Theater (8 Screens)	20,000	8.00	# of Screens							1							1	20000	8.10	8	Screens
C-Market/Oasis	3,000	3.00	1,000 SQFT GFA				1						1				2	6000	6.00	6	KSF GFA
Recreational Vehicle Park		50.00	Sites													1	1		10.00	50	RV spaces/ Campsites
Traveler Amenities	2,000	2.00	1,000 SQFT GFA																		
Trucker Amenities	15,000	15.00	1,000 SQFT GFA																		
Travel Center	17,000	17.00	1,000 SQFT GFA					1									1	17000	12.62		
Distribution Center	30,000	13.75	# of Acres									1					1	30000	13.75		
This center will be on a side street accessible from Burlington Route or North Road (West)																					

Distribution %

ITE Trip Gen Code	Independent Variable Used	AM Rate	AM IN		PM Rate	PM IN		AM Trips	AM OUT		PM Trips	PM OUT	
			AM IN	AM OUT		PM IN	PM OUT		AM IN	AM OUT		PM IN	PM OUT
320 - Motel	# of Rooms	0.45	36%	64%	0.47	54%	46%	50	18	32	52	28	24
932 - High-Turnover (Sit-Down) Restaurant	# of Seats	0.47	52%	48%	0.41	57%	43%	94	49	45	82	47	35
934 - Fast Food Restaurant w/Drive-Thru Window	# of Seats	1.27	53%	47%	0.95	53%	47%	102	54	48	76	40	36
826 - Specialty Retail Center	1,000 SQFT GLA				2.71	44%	56%	0	0	0	42	18	24
710 - General Office Building	1,000 SQFT GFA	1.56	88%	12%	1.49	17%	83%	19	17	2	18	3	15
444 - Movie Theater with Matinee	# of Movie Screens				20.22	40%	60%	0	0	0	162	65	97
851 - Convenience Market (Open 24-hours)	1,000 SQFT GFA	67.03	50%	50%	52.41	51%	49%	202	101	101	158	81	77
416 - Campground/Recreational Vehicle Park	# of Occupied Camp Sites	0.21	36%	64%	0.27	65%	35%	11	4	7	14	9	5
945 - Gasoline/service Station WITH CONV MARKET	1,000 SQFT GFA	82.13	51%	49%	97.47	50%	50%	165	84	81	195	98	97
950 - Truck Stop	1,000 SQFT GFA				13.63	52%	48%	0	0	0	205	107	98
Travel Center Total for Passenger & Trucker	# of Acres	82.13	51%	49%	55.5	51%	49%	165	84	81	400	205	195
150 - Warehousing	# of Acres	10.03	72%	28%	8.69	35%	65%	138	99	39	120	42	78

Land Use Summary Table

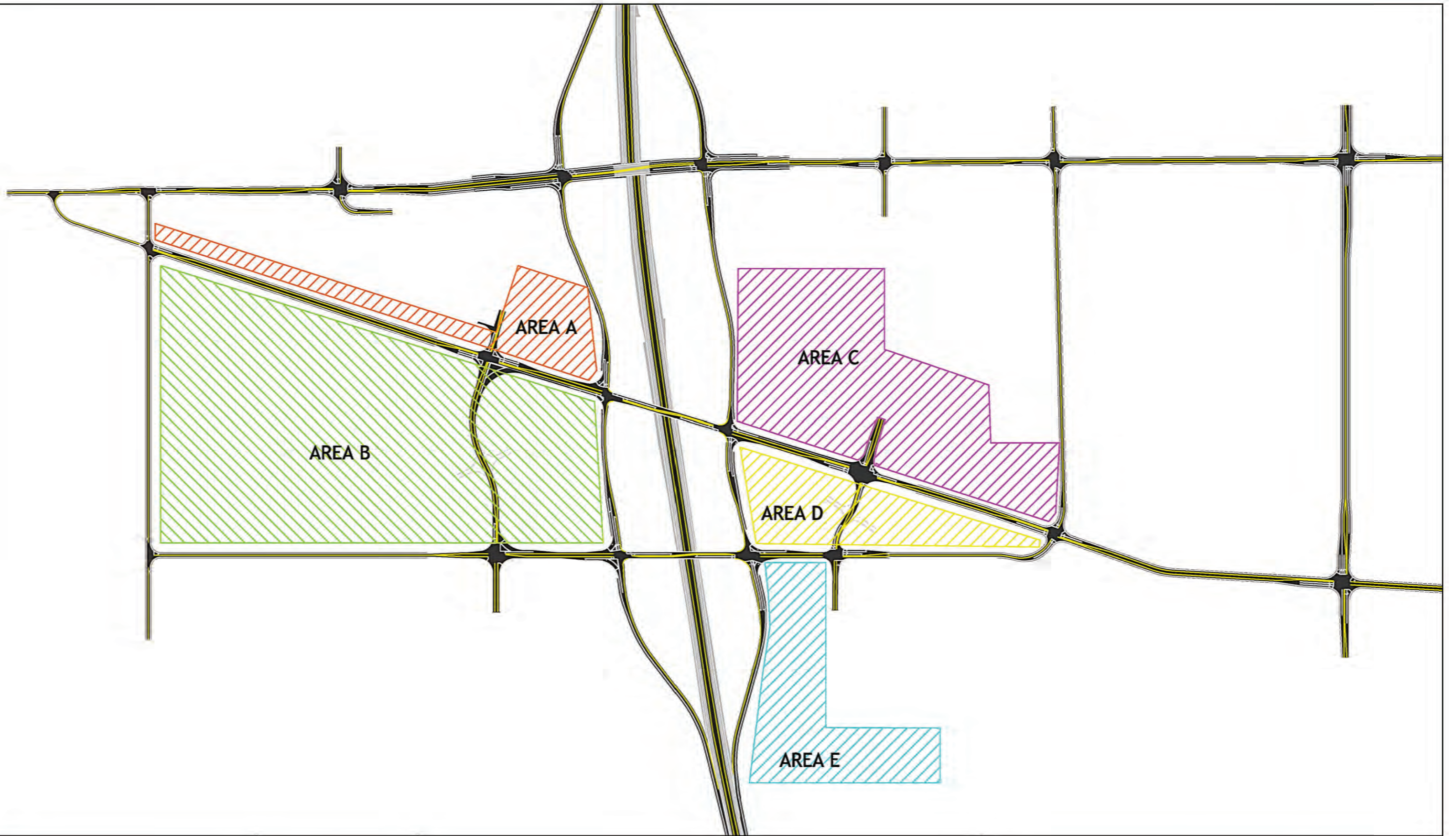
Land Use	Avg SQFT	Avg # of	Independent Variable Used	AREA					Total
				A	B	C	D	E	
Motel	62,500	110.00	# of Rooms	1	3	2	0	2	8
Dining Casual	6,500	200.00	# of Seats	1	2	2	2	0	7
Dining Fast	2,650	80.00	# of Seats	0	4	2	2	0	8
Strip retail (7 stores per unit)	15,300	15.30	1,000 SQFT GLA	1	4	4	2	0	11
Office cluster (4 offices per unit)	12,000	12.00	GFA	4	0	2	0	2	8
Theater (8 Screens)	20,000	8.00	# of Screens	0	1	0	0	0	1
C-Market/Oasis	3,000	3.00	1,000 SQFT GFA	0	1	1	0	0	2
Recreational Vehicle Park		50.00	# of Occupied Sites	0	0	0	0	1	1
Travel Center	17,000	17.00	1,000 SQFT GFA	0	1	0	0	0	1
Distribution Center	30,000	13.75	# of Acres	0	1	0	0	0	1

Trip Generation info put into distribution map						
Area #	AM Trips	AM IN	AM OUT	PM Trips	PM IN	PM OUT
1	76	68	8	72	12	60
2	144	67	77	176	93	83
3	100	36	64	230	110	120
4	346	168	178	292	156	136
5	369	192	177	552	285	267
6	298	157	141	438	210	228
7	138	99	39	120	42	78
8	334	173	161	340	167	173
9	398	204	194	442	222	220
10	392	206	186	316	174	142
11	0	0	0	84	36	48
12	149	74	75	154	71	83

Area	AM Trips	AM IN	AM OUT	PM Trips	PM IN	PM OUT
A	220	135	85	248	105	143
B	1251	652	599	1632	803	829
C	732	377	355	782	389	393
D	392	206	186	400	210	190
E	149	74	75	154	71	83
Totals	2744	1444	1300	3216	1578	1638



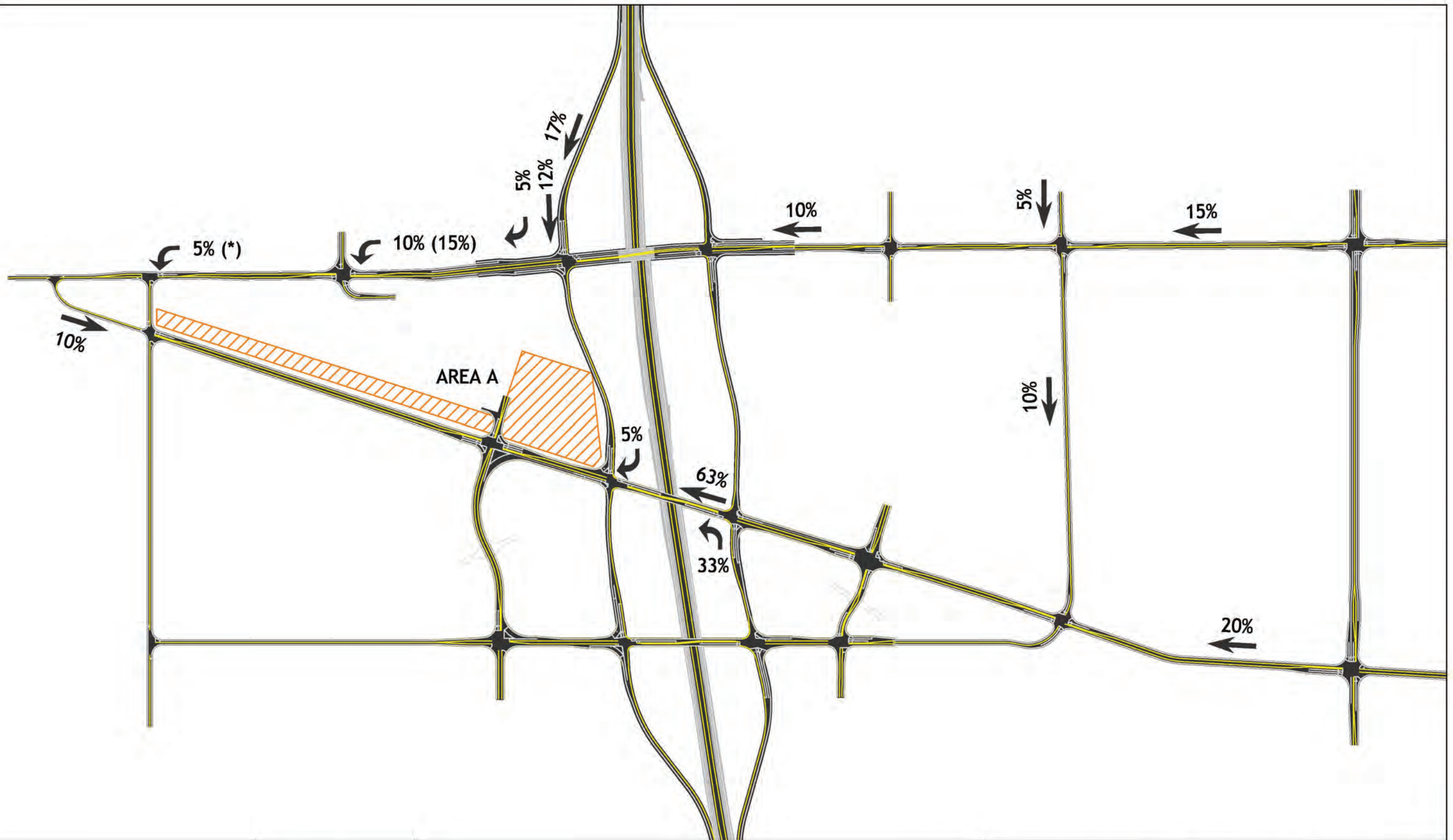
APPENDIX D – TRIP DISTRIBUTION FIGURES



Proposed Development Areas
Adjacent to Split-Diamond Interchange
for Alternate 3



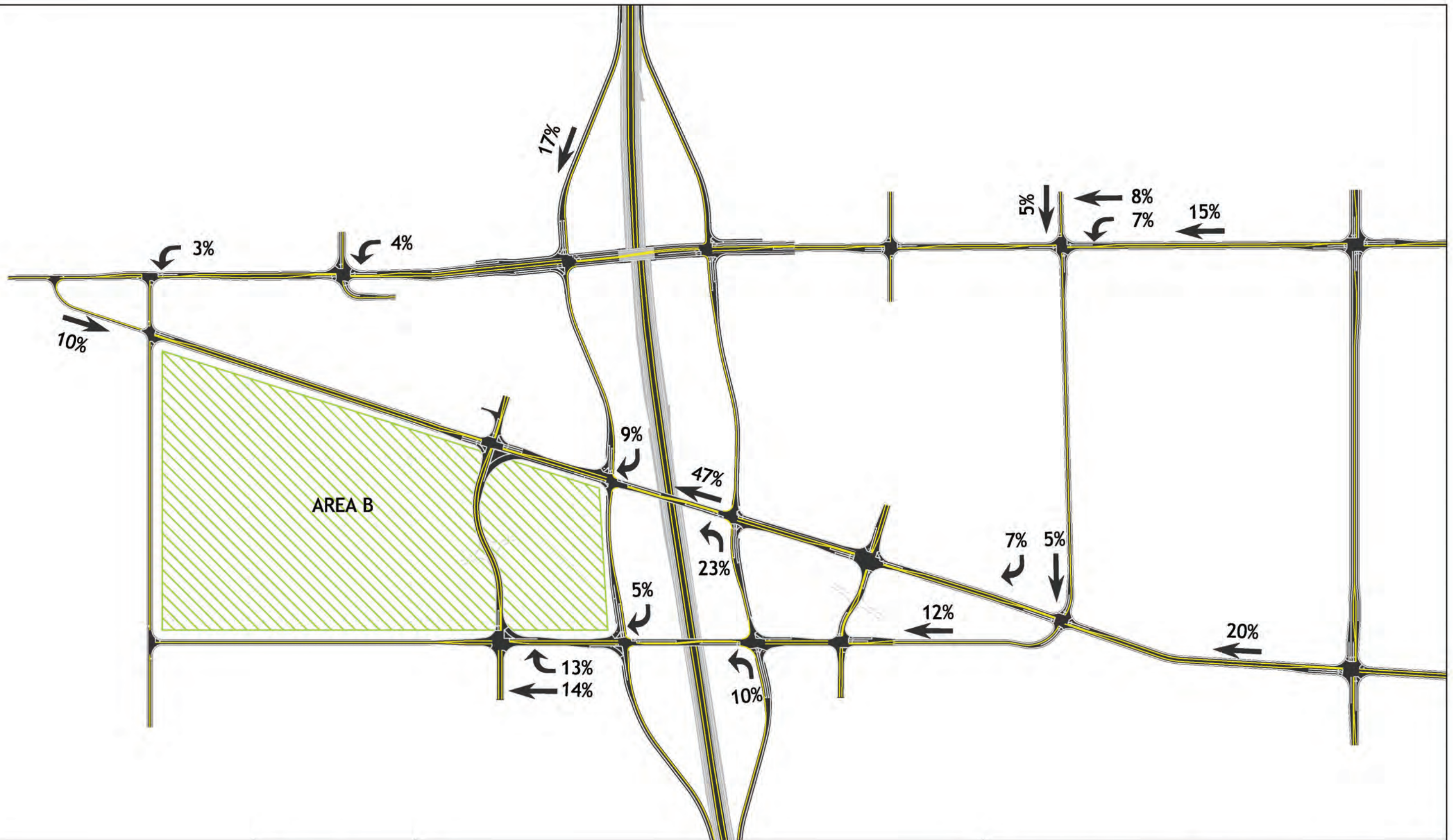
BROWN & ROBERTS INC.



Proposed Development Area A
Trip Distributions for Alternate 3



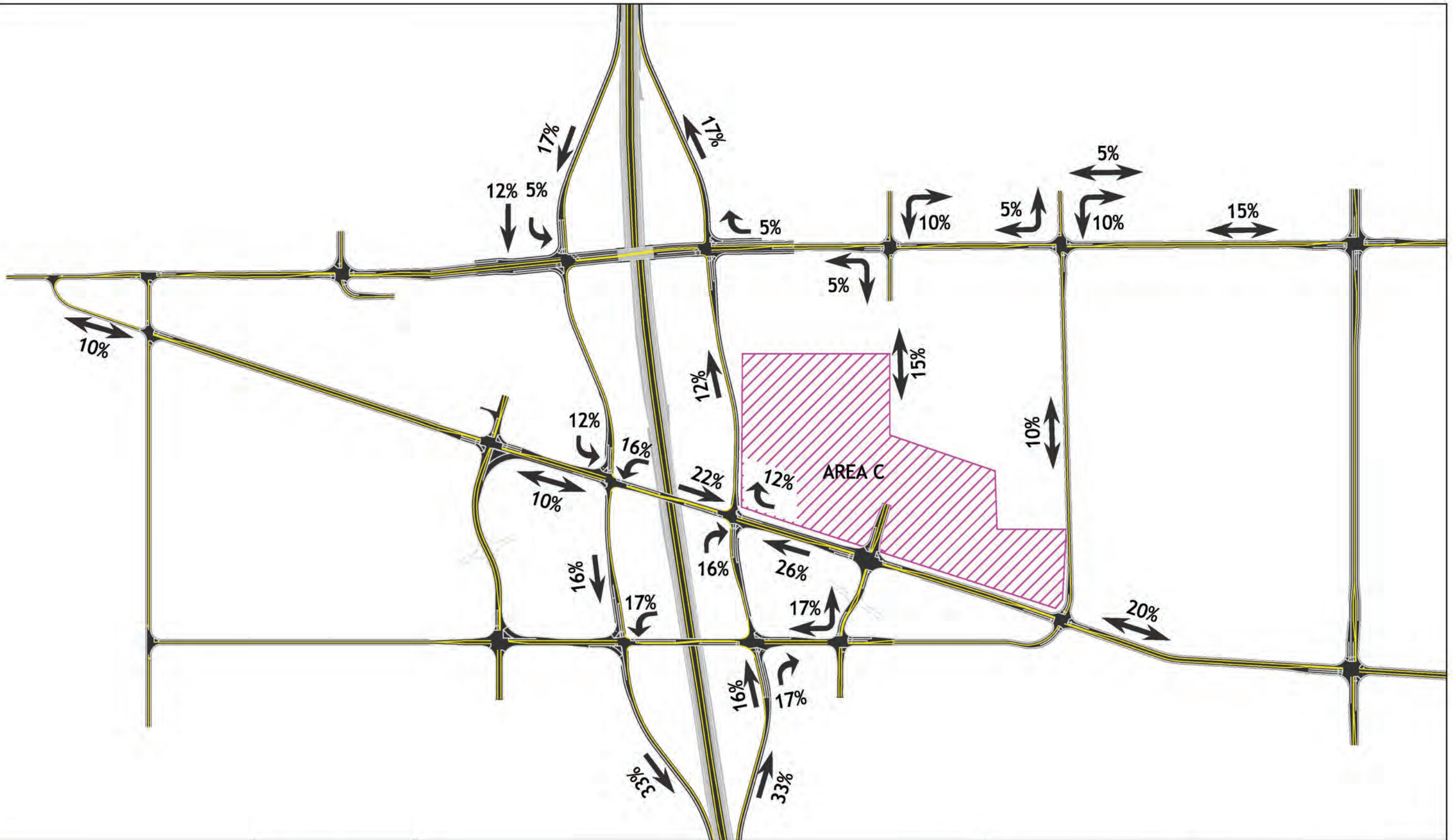
BROWN & ROBERTS INC.



Proposed Development Area B
Trip Distributions for Alternate 3



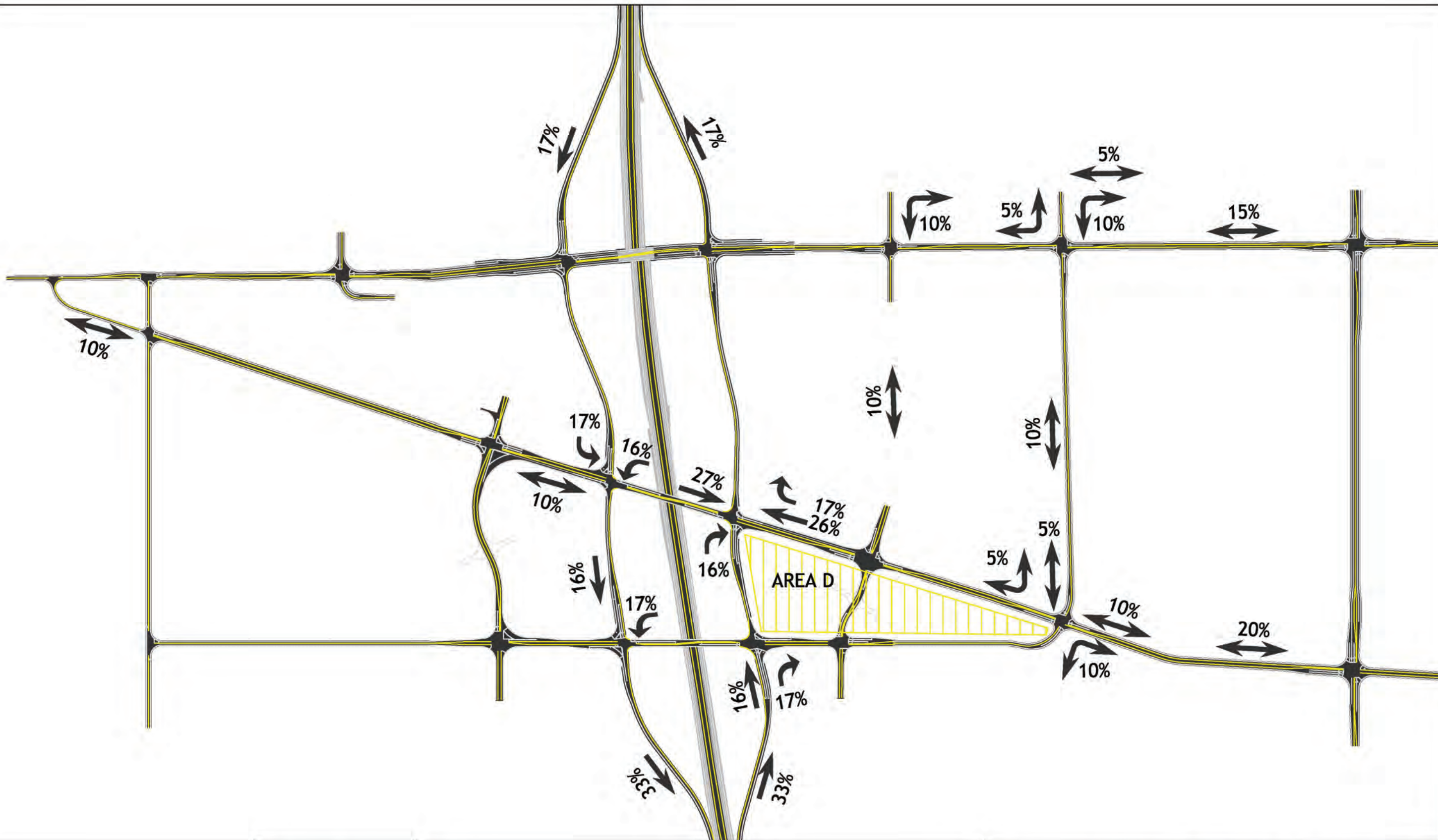
BROWN & ROBERTS INC.



Proposed Development Area C
Trip Distributions for Alternate 3



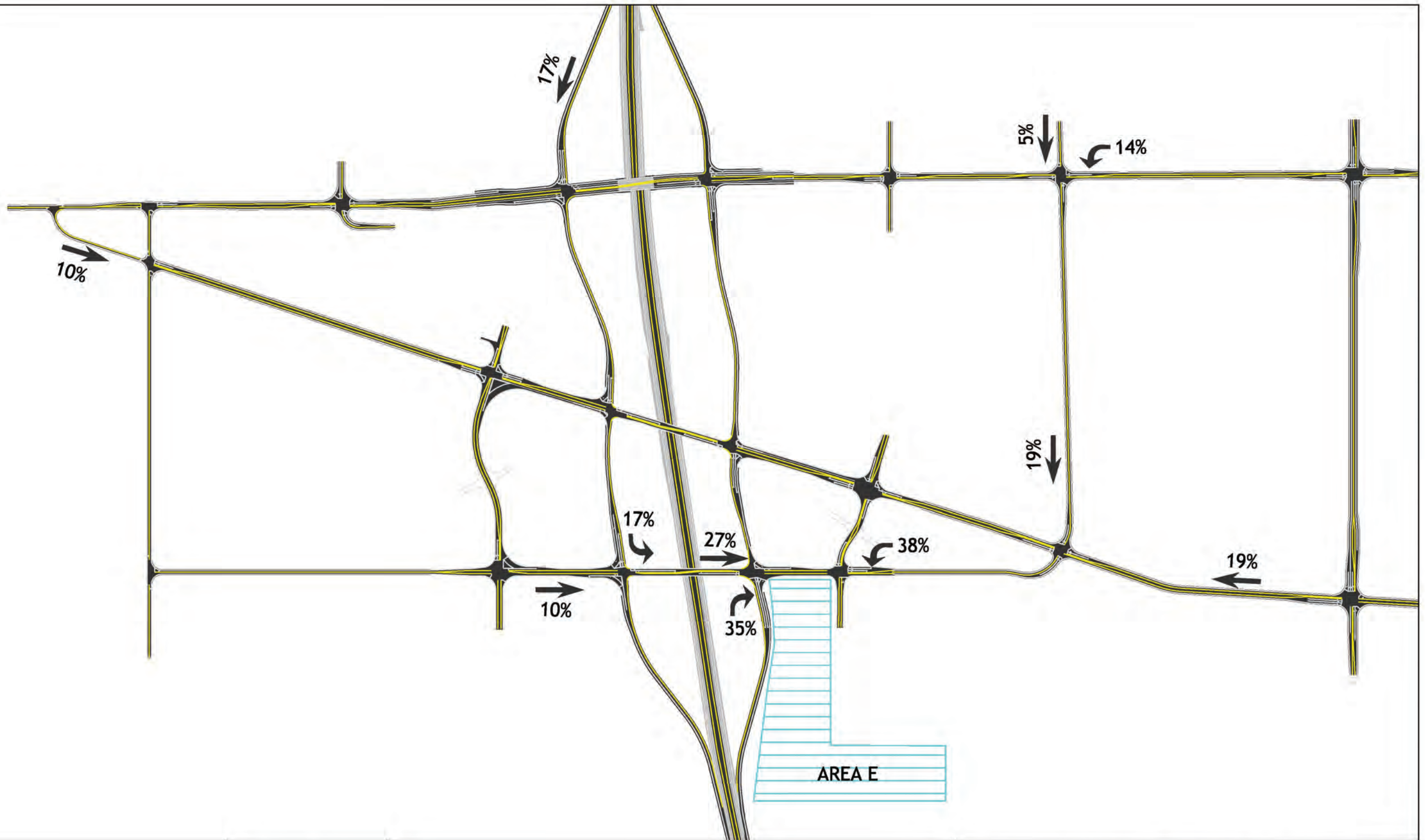
BROWN & ROBERTS INC.



Proposed Development Area D
Trip Distributions for Alternate 3



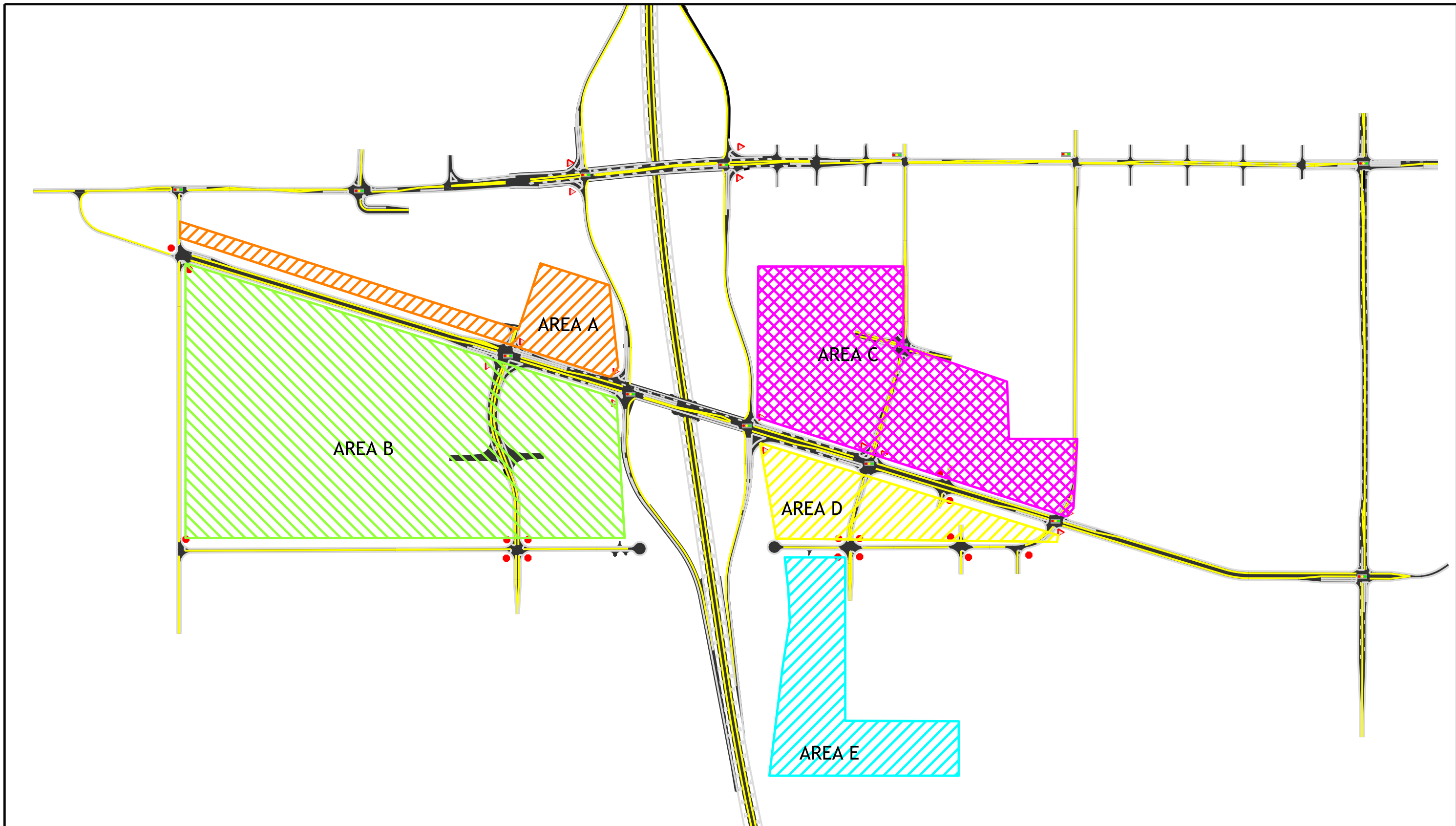
BROWN & ROBERTS INC.



Proposed Development Area E
Trip Distributions for Alternate 3



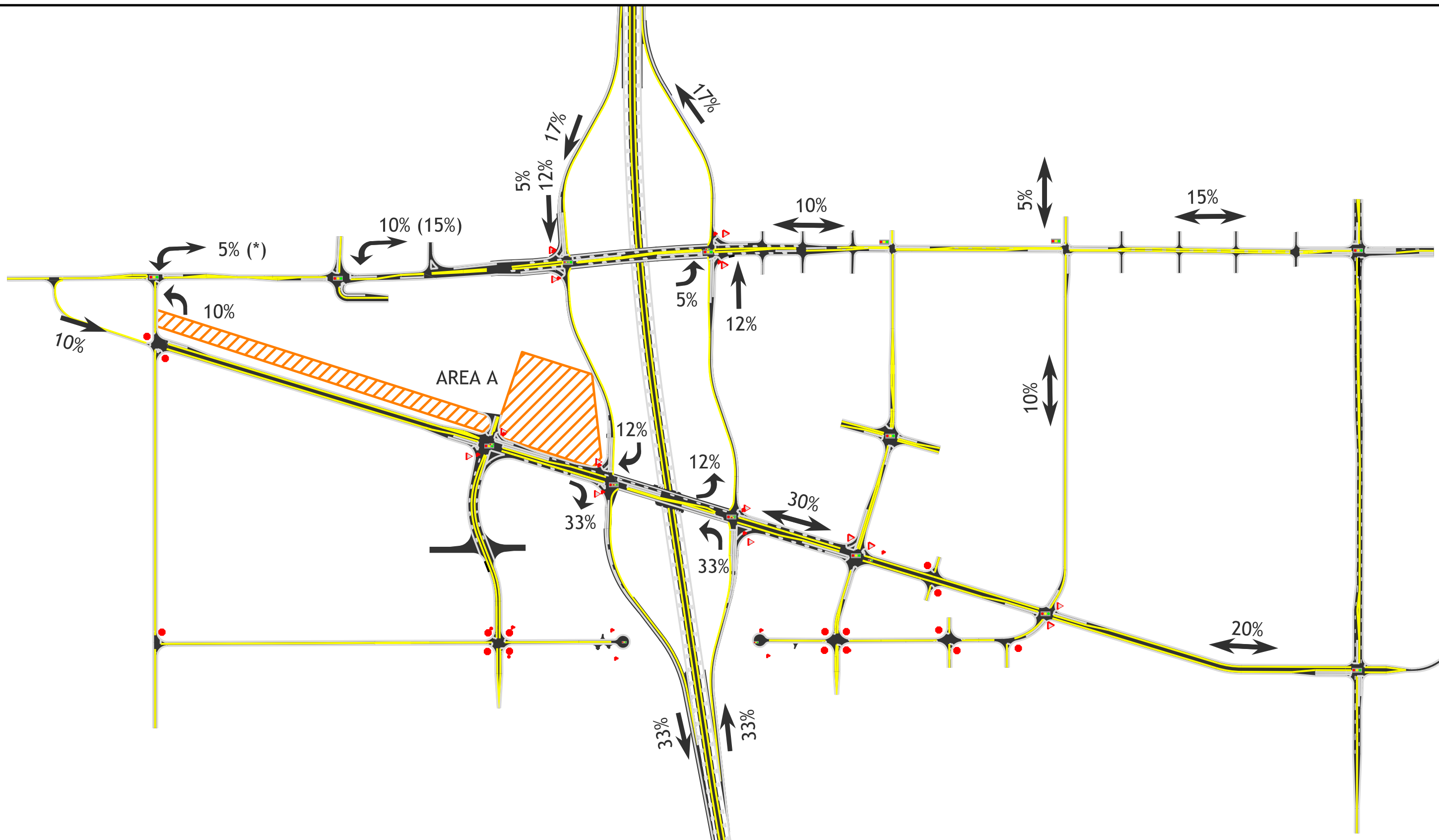
BROWN & ROBERTS INC.



Proposed Development Areas
Trip Distributions For Alternate 4



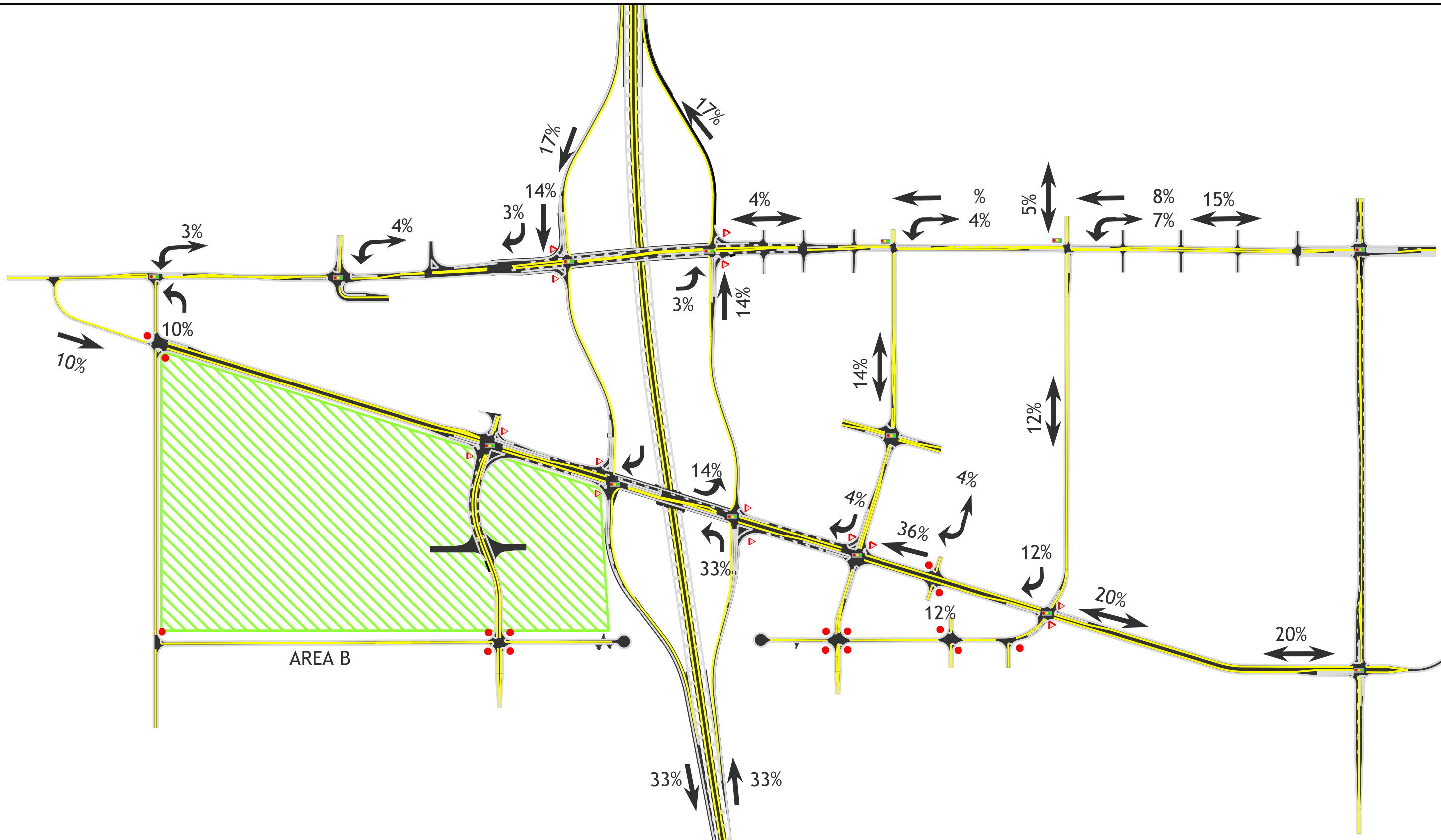
BROWN & ROBERTS INC.



Proposed Development Area A
Trip Distributions For Alternate 4



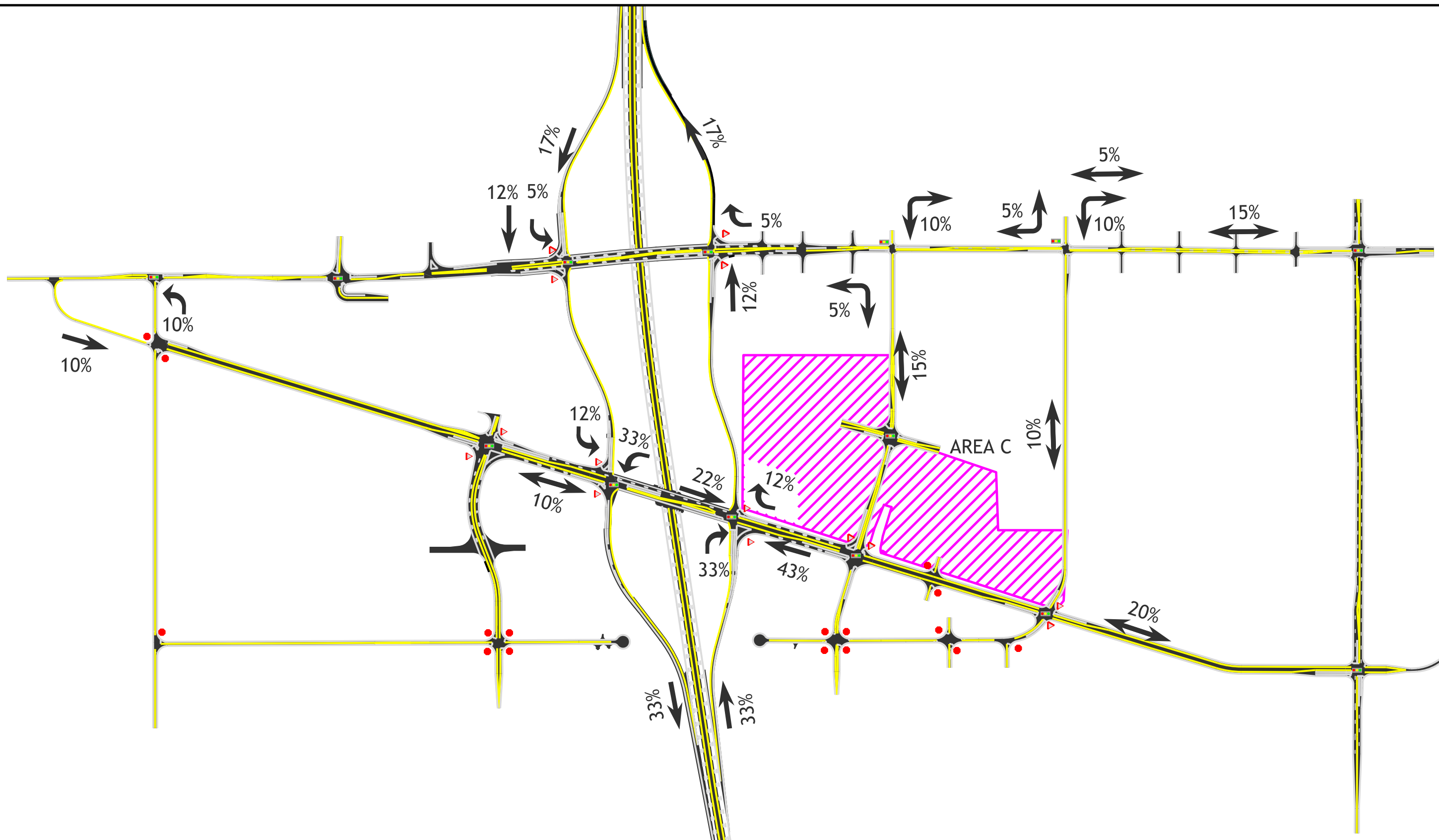
BROWN & ROBERTS INC.



Proposed Development Area B
Trip Distributions For Alternate 4



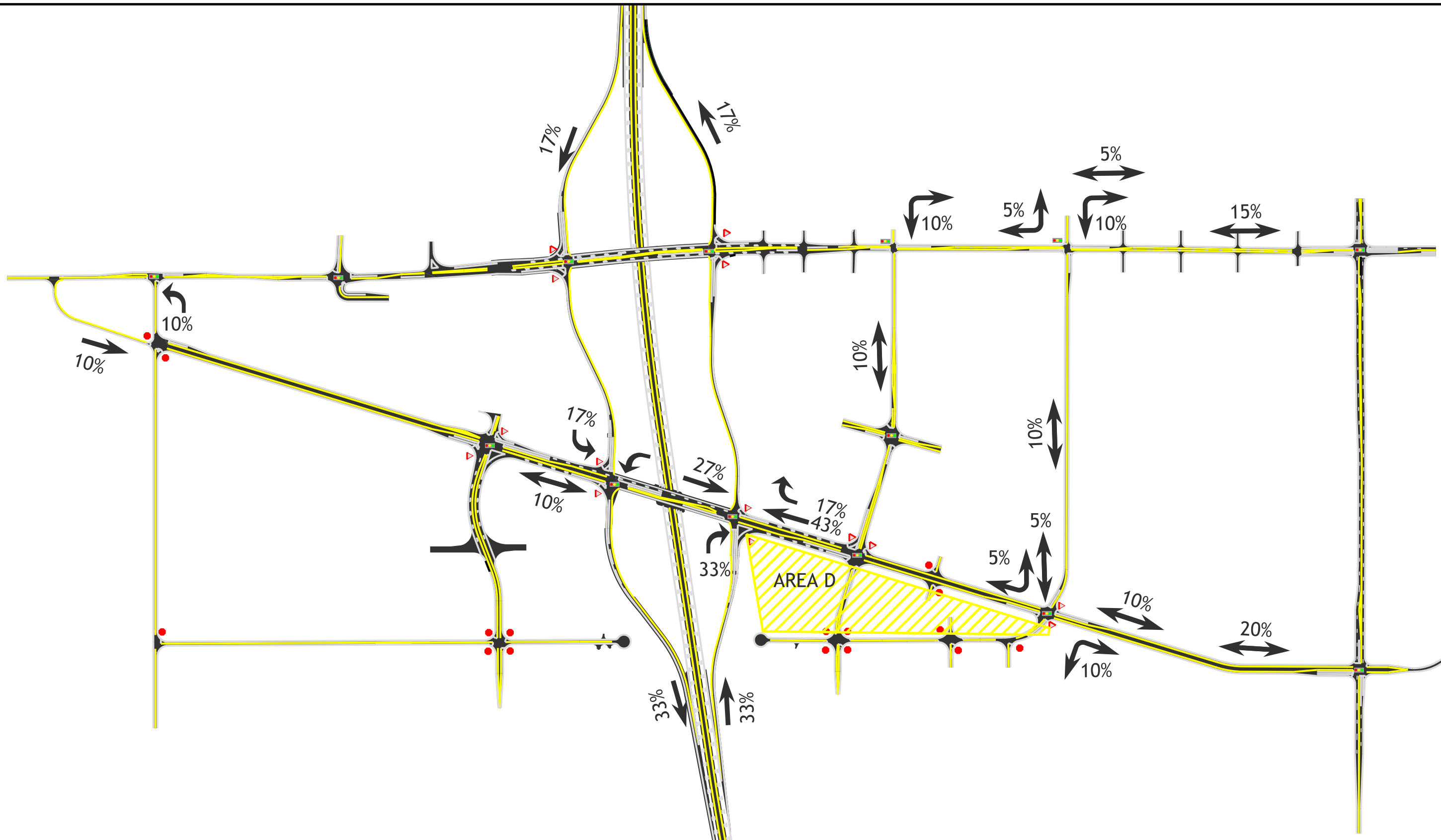
BROWN & ROBERTS INC.



Proposed Development Area C
Trip Distributions For Alternate 4



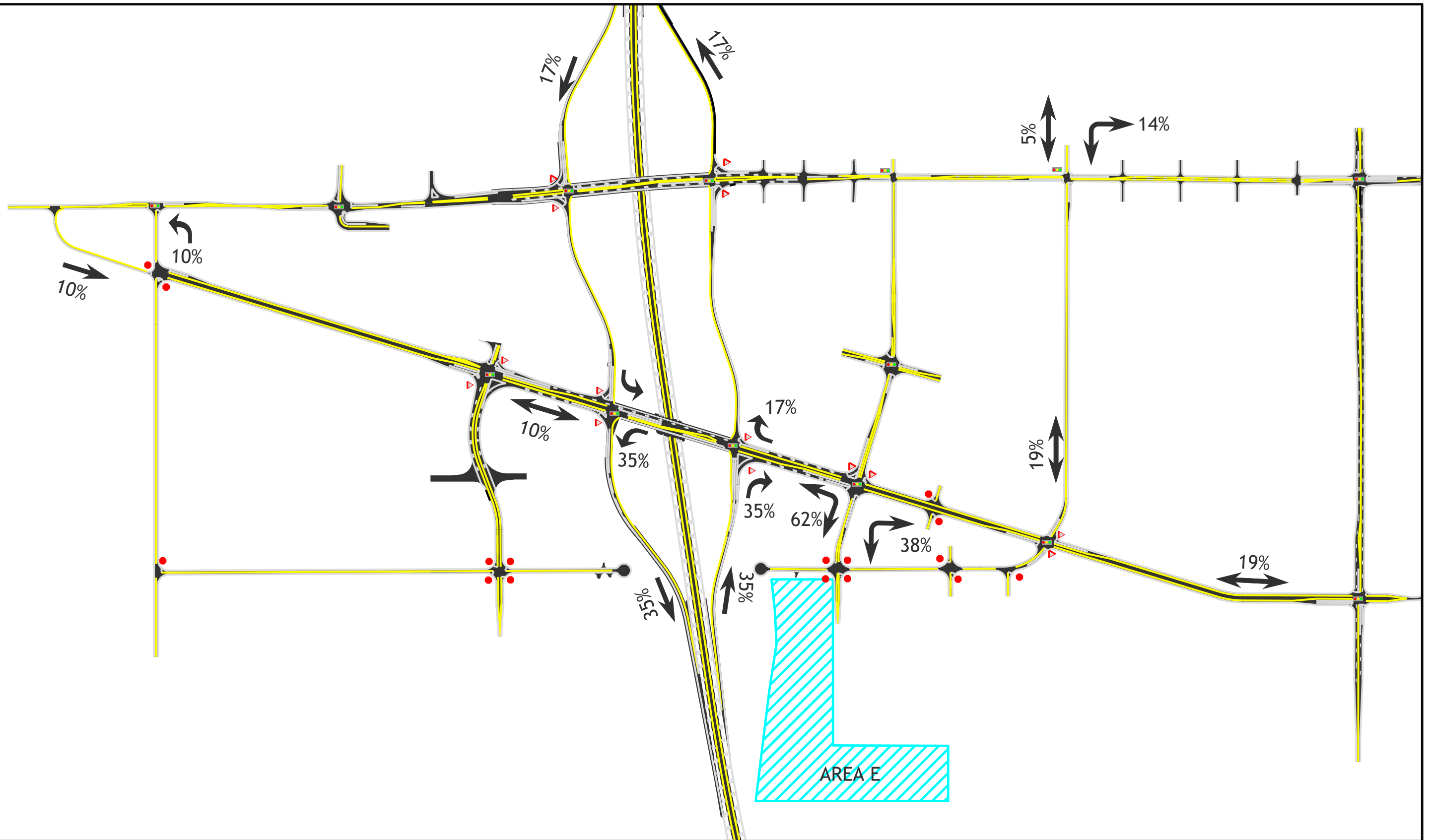
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Proposed Development Area D
Trip Distributions For Alternate 4



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Proposed Development Area E
Trip Distributions For Alternate 4



BROWN & ROBERTS INC.



ACCESS JUSTIFICATION REPORT
I-57 & IL 149
WEST FRANKFORT, IL
NOVEMBER 20, 2015

**APPENDIX E – SYNCHRO (HCM 2010 METHOD) PROGRAM PRINTOUTS
FOR INTERSECTION CAPACITY AND LOS ANALYSIS**

Intersection

Intersection Delay, s/veh 1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	320	3	27	188	4	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	8	0	15	16	0	7
Mvmt Flow	390	4	33	229	5	37

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	394
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.335
Pot Capacity-1 Maneuver	-	-	1097
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1097
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	11.4
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	603	-	-	1097	-
HCM Lane V/C Ratio	0.069	-	-	0.03	-
HCM Control Delay (s)	11.4	-	-	8.383	0
HCM Lane LOS	B			A	A
HCM 95th %tile Q(veh)	0.221	-	-	0.093	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	17	34	16	7	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	18	6	0	0	0
Mvmt Flow	6	21	42	20	9	18

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	88	53	0
Stage 1	53	-	-
Stage 2	35	-	-
Follow-up Headway	3.5	3.462	-
Pot Capacity-1 Maneuver	918	971	-
Stage 1	975	-	-
Stage 2	993	-	-
Time blocked-Platoon, %			-
Mov Capacity-1 Maneuver	912	971	-
Mov Capacity-2 Maneuver	912	-	-
Stage 1	975	-	-
Stage 2	987	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	2.4
HCM LOS	A		






















Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	957	1553	-
HCM Lane V/C Ratio	-	-	0.029	0.006	-
HCM Control Delay (s)	-	-	8.9	7.331	0
HCM Lane LOS			A	A	A
HCM 95th %tile Q(veh)	-	-	0.089	0.017	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined













HCM 2010 Signalized Intersection Summary
6: Frankfort Plaza/Ken Gray Blvd & IL 149

2012 Existing Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	341	60	175	180	70	33	22	111	87	23	19
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	181.0	178.3	190.0	182.7	174.7	190.0	190.0	186.2	179.2	171.2	176.4	190.0
Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Cap, veh/h	660	670	0	558	784	0	250	130	379	329	258	0
Arrive On Green	0.03	0.38	0.00	0.17	0.75	0.00	0.15	0.15	0.00	0.15	0.15	0.00
Sat Flow, veh/h	1723	1783	0	1740	1747	0	722	888	1524	1268	1764	0
Grp Volume(v), veh/h	45	383	0	197	202	0	62	0	0	98	26	0
Grp Sat Flow(s),veh/h/ln	1723	1783	0	1740	1747	0	1609	0	1524	1268	1764	0
Q Serve(g_s), s	0.6	6.8	0.0	2.3	1.4	0.0	0.0	0.0	0.0	3.0	0.5	0.0
Cycle Q Clear(g_c), s	0.6	6.8	0.0	2.3	1.4	0.0	1.2	0.0	0.0	4.1	0.5	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.60		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	660	670	0	558	784	0	380	0	379	329	258	0
V/C Ratio(X)	0.07	0.57	0.00	0.35	0.26	0.00	0.16	0.00	0.00	0.30	0.10	0.00
Avail Cap(c_a), veh/h	1084	1027	0	860	1006	0	964	0	957	810	928	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.3	9.9	0.0	5.5	2.9	0.0	15.0	0.0	0.0	16.9	14.8	0.0
Incr Delay (d2), s/veh	0.0	3.5	0.0	0.4	0.8	0.0	0.2	0.0	0.0	0.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.3	5.0	0.0	0.8	1.0	0.0	0.8	0.0	0.0	1.5	0.4	0.0
Lane Grp Delay (d), s/veh	7.3	13.4	0.0	5.9	3.7	0.0	15.2	0.0	0.0	17.4	14.9	0.0
Lane Grp LOS	A	B		A	A		B			B	B	
Approach Vol, veh/h		428			399			62			124	
Approach Delay, s/veh		12.8			4.8			15.2			16.9	
Approach LOS		B			A			B			B	
Timer												
Assigned Phs	5	2		1	6			8			4	
Phs Duration (G+Y+Rc), s	6.2	20.0		9.1	22.9			10.8			10.8	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0			5.0			5.0	
Max Green Setting (Gmax), s	11.0	23.0		11.0	23.0			21.0			21.0	
Max Q Clear Time (g_c+I1), s	2.6	8.8		4.3	3.4			3.2			6.1	
Green Ext Time (p_c), s	0.0	6.2		0.3	7.6			0.6			0.6	
Intersection Summary												
HCM 2010 Ctrl Delay				10.3								
HCM 2010 LOS				B								
Notes												

HCM 2010 Signalized Intersection Summary
 10: I-57 SB Onramp/I-57 SB Offramp & IL 149

2012 Existing Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑						↑	↑
Volume (veh/h)	0	352	99	298	347	0	0	0	0	53	0	52
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow veh/h/ln	0.0	181.0	179.2	186.3	182.7	0.0				190.0	169.6	177.6
Lanes	0	2	1	1	2	0				0	1	1
Cap, veh/h	0	1813	763	742	2679	0				156	0	146
Arrive On Green	0.00	0.17	0.17	0.26	1.00	0.00				0.10	0.00	0.10
Sat Flow, veh/h	0	3619	1524	1774	3654	0				1616	0	1509
Grp Volume(v), veh/h	0	391	110	331	386	0				59	0	58
Grp Sat Flow(s),veh/h/ln	0	1810	1524	1774	1827	0				1616	0	1509
Q Serve(g_s), s	0.0	4.7	3.1	4.1	0.0	0.0				1.7	0.0	1.8
Cycle Q Clear(g_c), s	0.0	4.7	3.1	4.1	0.0	0.0				1.7	0.0	1.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1813	763	742	2679	0				156	0	146
V/C Ratio(X)	0.00	0.22	0.14	0.45	0.14	0.00				0.38	0.00	0.40
Avail Cap(c_a), veh/h	0	2067	870	935	3332	0				518	0	484
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.97	0.97	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.3	11.7	3.4	0.0	0.0				21.1	0.0	21.2
Incr Delay (d2), s/veh	0.0	0.3	0.4	0.4	0.1	0.0				1.5	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.0	3.2	1.8	1.3	0.1	0.0				1.2	0.0	1.2
Lane Grp Delay (d), s/veh	0.0	12.6	12.1	3.8	0.1	0.0				22.6	0.0	22.9
Lane Grp LOS		B	B	A	A					C		C
Approach Vol, veh/h		501			717						117	
Approach Delay, s/veh		12.5			1.8						22.8	
Approach LOS		B			A						C	
Timer												
Assigned Phs		2		1	6							4
Phs Duration (G+Y+Rc), s		29.5		11.6	41.1							8.8
Change Period (Y+Rc), s		4.5		5.0	4.5							4.0
Max Green Setting (Gmax), s		28.5		12.0	45.5							16.0
Max Q Clear Time (g_c+I1), s		6.7		6.1	2.0							3.8
Green Ext Time (p_c), s		1.9		0.5	2.0							0.3
Intersection Summary												
HCM 2010 Ctrl Delay				7.7								
HCM 2010 LOS				A								
Notes												

Intersection

Intersection Delay, s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	22	1	0	21	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	1	0	22	1	2

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	24
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1591
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1591
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A



















Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1021	-	-	1591	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.009	-	-	0	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 16: I-57 NB Offramp/I-57 NB Onramp & IL 149

2012 Existing Conditions
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	76	345	0	0	577	76	49	0	108	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow veh/h/ln	175.9	181.0	0.0	0.0	186.3	179.2	190.0	175.9	181.0			
Lanes	1	2	0	0	2	1	0	1	1			
Cap, veh/h	571	2527	0	0	1900	777	209	0	192			
Arrive On Green	0.17	1.00	0.00	0.00	0.51	0.51	0.12	0.00	0.12			
Sat Flow, veh/h	1675	3619	0	0	3725	1524	1675	0	1538			
Grp Volume(v), veh/h	84	383	0	0	641	84	54	0	120			
Grp Sat Flow(s),veh/h/ln	1675	1810	0	0	1863	1524	1675	0	1538			
Q Serve(g_s), s	0.9	0.0	0.0	0.0	4.9	1.4	1.4	0.0	3.6			
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.0	4.9	1.4	1.4	0.0	3.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	571	2527	0	0	1900	777	209	0	192			
V/C Ratio(X)	0.15	0.15	0.00	0.00	0.34	0.11	0.26	0.00	0.63			
Avail Cap(c_a), veh/h	848	3428	0	0	2210	904	558	0	512			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.99	0.99	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.5	0.0	0.0	0.0	7.0	6.1	19.0	0.0	20.0			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.5	0.3	2.3	0.0	11.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile Back of Q (95%), veh/ln	0.3	0.1	0.0	0.0	3.1	0.7	1.2	0.0	3.3			
Lane Grp Delay (d), s/veh	3.7	0.1	0.0	0.0	7.4	6.4	21.4	0.0	31.5			
Lane Grp LOS	A	A			A	A	C		C			
Approach Vol, veh/h		467			725			174				
Approach Delay, s/veh		0.8			7.3			28.3				
Approach LOS		A			A			C				
Timer												
Assigned Phs	5	2			6			8				
Phs Duration (G+Y+Rc), s	9.0	38.0			29.0			10.0				
Change Period (Y+Rc), s	5.0	4.5			4.5			4.0				
Max Green Setting (Gmax), s	12.0	45.5			28.5			16.0				
Max Q Clear Time (g_c+I1), s	2.9	2.0			6.9			5.6				
Green Ext Time (p_c), s	0.1	2.7			2.6			1.1				
Intersection Summary												
HCM 2010 Ctrl Delay					7.8							
HCM 2010 LOS					A							
Notes												

Intersection

Intersection Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	22	2	0	20	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	2	0	21	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	25
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1589
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1589
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	965	-	-	1589	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.003	-	-	0	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection												
Intersection Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	453	0	0	653	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	477	0	0	687	0	0	0	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	687	0	0	477	0	0	1164	1164	238	925	1164	687
Stage 1	-	-	-	-	-	-	477	477	-	687	687	-
Stage 2	-	-	-	-	-	-	687	687	-	238	477	-
Follow-up Headway	2.218	-	-	2.22	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Capacity-1 Maneuver	907	-	-	1082	-	-	160	194	764	236	194	446
Stage 1	-	-	-	-	-	-	539	555	-	436	446	-
Stage 2	-	-	-	-	-	-	436	446	-	745	555	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	907	-	-	1082	-	-	160	194	764	236	194	446
Mov Capacity-2 Maneuver	-	-	-	-	-	-	160	194	-	236	194	-
Stage 1	-	-	-	-	-	-	539	555	-	436	446	-
Stage 2	-	-	-	-	-	-	436	446	-	745	555	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			0		
HCM LOS							A			A		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	0	907	-	-	1082	-	-	0				
HCM Lane V/C Ratio	+	-	-	-	-	-	-	+				
HCM Control Delay (s)	0	0	-	-	0	-	-	0				
HCM Lane LOS	A	A			A			A				
HCM 95th %tile Q(veh)	+	0	-	-	0	-	-	+				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection

Intersection Delay, s/veh 1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	3	406	10	13	662	2	25	4	33	0	2	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	483	12	15	788	2	30	5	39	0	2	12

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	790	0	0	495
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	2.218	-	-	2.218
Pot Capacity-1 Maneuver	830	-	-	1069
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	830	-	-	1069
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	29.4	17.1
HCM LOS			D	C

























Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	220	830	-	-	1069	-	-	311
HCM Lane V/C Ratio	0.335	0.004	-	-	0.014	-	-	0.046
HCM Control Delay (s)	29.4	9.356	-	-	8.417	-	-	17.1
HCM Lane LOS	D	A			A			C
HCM 95th %tile Q(veh)	1.406	0.013	-	-	0.044	-	-	0.144

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
30: IL 37 & IL 149

2012 Existing Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	78	320	98	70	395	59	138	144	69	80	134	139
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	163.8	184.5	184.5	188.1	188.1	190.0	186.3	180.9	190.0	184.5	185.3	190.0
Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Cap, veh/h	296	604	513	369	610	523	357	455	208	381	316	269
Arrive On Green	0.07	0.33	0.33	0.06	0.32	0.32	0.09	0.19	0.19	0.07	0.17	0.17
Sat Flow, veh/h	1560	1845	1568	1792	1881	1615	1774	2354	1075	1757	1853	1575
Grp Volume(v), veh/h	95	390	120	85	482	72	168	133	127	98	163	170
Grp Sat Flow(s),veh/h/ln	1560	1845	1568	1792	1881	1615	1774	1809	1619	1757	1853	1575
Q Serve(g_s), s	2.3	10.5	3.3	1.8	13.6	1.8	4.4	3.8	4.0	2.6	4.7	5.9
Cycle Q Clear(g_c), s	2.3	10.5	3.3	1.8	13.6	1.8	4.4	3.8	4.0	2.6	4.7	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.66	1.00		1.00
Lane Grp Cap(c), veh/h	296	604	513	369	610	523	357	350	313	381	316	269
V/C Ratio(X)	0.32	0.65	0.23	0.23	0.79	0.14	0.47	0.38	0.40	0.26	0.52	0.63
Avail Cap(c_a), veh/h	330	925	786	414	943	810	357	777	695	414	790	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	16.8	14.3	12.5	17.9	14.0	17.1	20.5	20.6	18.0	22.0	22.5
Incr Delay (d2), s/veh	2.2	5.3	1.1	0.1	10.1	0.5	3.5	0.3	0.3	0.1	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	1.6	8.8	2.2	1.2	11.6	1.3	3.6	2.8	2.7	1.8	3.6	3.9
Lane Grp Delay (d), s/veh	15.5	22.0	15.4	12.6	28.0	14.5	20.5	20.8	20.9	18.1	22.5	23.5
Lane Grp LOS	B	C	B	B	C	B	C	C	C	B	C	C
Approach Vol, veh/h		605			639			428			431	
Approach Delay, s/veh		19.7			24.5			20.7			21.9	
Approach LOS		B			C			C			C	
Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	8.7	24.4		8.5	24.2		10.0	16.8		8.7	15.5	
Change Period (Y+Rc), s	4.8	5.3		4.8	5.3		4.7	5.5		4.7	5.5	
Max Green Setting (Gmax), s	5.2	29.3		5.2	29.3		5.3	25.1		5.1	24.9	
Max Q Clear Time (g_c+I1), s	4.3	12.5		3.8	15.6		6.4	6.0		4.6	7.9	
Green Ext Time (p_c), s	0.0	3.6		0.0	3.3		0.0	2.2		0.0	2.1	
Intersection Summary												
HCM 2010 Ctrl Delay				21.8								
HCM 2010 LOS				C								
Notes												

Intersection

Intersection Delay, s/veh 0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	266	5	20	382	7	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	13	0	0	6	29	9
Mvmt Flow	289	5	22	415	8	38

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	295
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.2
Pot Capacity-1 Maneuver	-	-	1278
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1278
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.4
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	610	-	-	1278	-
HCM Lane V/C Ratio	0.075	-	-	0.017	-
HCM Control Delay (s)	11.4	-	-	7.866	0
HCM Lane LOS	B			A	A
HCM 95th %tile Q(veh)	0.242	-	-	0.052	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	16	13	32	8	8	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	15	0	0	0	0
Mvmt Flow	20	16	39	10	10	26

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	89	44	0
Stage 1	44	-	-
Stage 2	45	-	-
Follow-up Headway	3.5	3.435	-
Pot Capacity-1 Maneuver	917	990	-
Stage 1	984	-	-
Stage 2	983	-	-
Time blocked-Platoon, %			
Mov Capacity-1 Maneuver	911	990	-
Mov Capacity-2 Maneuver	911	-	-
Stage 1	984	-	-
Stage 2	977	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2
HCM LOS	A		






















Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	945	1571	-
HCM Lane V/C Ratio	-	-	0.037	0.006	-
HCM Control Delay (s)	-	-	9	7.306	0
HCM Lane LOS			A	A	A
HCM 95th %tile Q(veh)	-	-	0.117	0.019	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined













HCM 2010 Signalized Intersection Summary
6: Frankfort Plaza/Ken Gray Blvd & IL 149

2012 Existing Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	22	217	51	237	290	40	63	21	261	158	32	26
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	180.5	190.0	188.1	187.7	190.0	190.0	187.2	188.1	188.1	190.0	190.0
Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Cap, veh/h	531	538	0	622	757	0	374	104	542	414	412	0
Arrive On Green	0.02	0.30	0.00	0.24	0.81	0.00	0.22	0.22	0.00	0.22	0.22	0.00
Sat Flow, veh/h	1810	1805	0	1792	1877	0	1024	480	1599	1398	1900	0
Grp Volume(v), veh/h	23	226	0	247	302	0	88	0	0	165	33	0
Grp Sat Flow(s),veh/h/ln	1810	1805	0	1792	1877	0	1504	0	1599	1398	1900	0
Q Serve(g_s), s	0.4	4.1	0.0	3.0	1.9	0.0	1.2	0.0	0.0	4.6	0.6	0.0
Cycle Q Clear(g_c), s	0.4	4.1	0.0	3.0	1.9	0.0	1.9	0.0	0.0	6.4	0.6	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.75		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	531	538	0	622	757	0	479	0	542	414	412	0
V/C Ratio(X)	0.04	0.42	0.00	0.40	0.40	0.00	0.18	0.00	0.00	0.40	0.08	0.00
Avail Cap(c_a), veh/h	983	1005	0	881	1045	0	909	0	1008	822	966	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.8	11.6	0.0	5.3	2.6	0.0	13.4	0.0	0.0	16.1	12.9	0.0
Incr Delay (d2), s/veh	0.0	2.4	0.0	0.4	1.6	0.0	0.2	0.0	0.0	0.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.2	3.1	0.0	1.2	1.4	0.0	1.1	0.0	0.0	2.5	0.4	0.0
Lane Grp Delay (d), s/veh	9.8	14.0	0.0	5.7	4.1	0.0	13.5	0.0	0.0	16.7	13.0	0.0
Lane Grp LOS	A	B		A	A		B			B	B	
Approach Vol, veh/h		249			549			88			198	
Approach Delay, s/veh		13.6			4.8			13.5			16.1	
Approach LOS		B			A			B			B	
Timer												
Assigned Phs	5	2		1	6			8				4
Phs Duration (G+Y+Rc), s	5.7	17.3		10.0	21.7			14.0				14.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0			5.0				5.0
Max Green Setting (Gmax), s	11.0	23.0		11.0	23.0			21.0				21.0
Max Q Clear Time (g_c+I1), s	2.4	6.1		5.0	3.9			3.9				8.4
Green Ext Time (p_c), s	0.0	6.2		0.4	6.6			1.0				0.9
Intersection Summary												
HCM 2010 Ctrl Delay				9.6								
HCM 2010 LOS				A								
Notes												

HCM 2010 Signalized Intersection Summary
 10: I-57 SB Onramp/I-57 SB Offramp & IL 149

2012 Existing Conditions
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑						↖	↗
Volume (veh/h)	0	484	73	152	553	0	0	0	0	72	0	65
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00				0.90	1.00	1.00
Adj Sat Flow veh/h/ln	0.0	184.5	188.1	182.7	186.3	0.0				190.0	184.5	182.7
Lanes	0	2	1	1	2	0				0	1	1
Cap, veh/h	0	1879	814	643	2685	0				168	0	165
Arrive On Green	0.00	0.17	0.17	0.22	1.00	0.00				0.11	0.00	0.11
Sat Flow, veh/h	0	3689	1599	1740	3725	0				1581	0	1553
Grp Volume(v), veh/h	0	526	79	165	601	0				78	0	71
Grp Sat Flow(s),veh/h/ln	0	1845	1599	1740	1863	0				1581	0	1553
Q Serve(g_s), s	0.0	6.1	2.1	1.7	0.0	0.0				2.3	0.0	2.1
Cycle Q Clear(g_c), s	0.0	6.1	2.1	1.7	0.0	0.0				2.3	0.0	2.1
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1879	814	643	2685	0				168	0	165
V/C Ratio(X)	0.00	0.28	0.10	0.26	0.22	0.00				0.46	0.00	0.43
Avail Cap(c_a), veh/h	0	2142	929	879	3454	0				515	0	506
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.97	0.97	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.6	10.9	3.5	0.0	0.0				20.6	0.0	20.5
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.2	0.2	0.0				2.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.0	4.8	1.2	0.6	0.1	0.0				1.6	0.0	1.4
Lane Grp Delay (d), s/veh	0.0	12.9	11.1	3.7	0.2	0.0				22.6	0.0	22.3
Lane Grp LOS		B	B	A	A					C		C
Approach Vol, veh/h		605			766						149	
Approach Delay, s/veh		12.7			0.9						22.5	
Approach LOS		B			A						C	
Timer												
Assigned Phs		2		1	6							4
Phs Duration (G+Y+Rc), s		29.5		10.4	39.9							9.2
Change Period (Y+Rc), s		4.5		5.0	4.5							4.0
Max Green Setting (Gmax), s		28.5		12.0	45.5							16.0
Max Q Clear Time (g_c+I1), s		8.1		3.7	2.0							4.3
Green Ext Time (p_c), s		7.9		0.3	9.8							0.4
Intersection Summary												
HCM 2010 Ctrl Delay				7.7								
HCM 2010 LOS				A								
Notes												

Intersection

Intersection Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	15	1	1	28	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	1	1	29	1	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	17
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1600
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1600
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	8.6
HCM LOS			A



















Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1009	-	-	1600	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.6	-	-	7.251	0
HCM Lane LOS	A			A	A
HCM 95th %tile Q(veh)	0.006	-	-	0.002	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 16: I-57 NB Offramp/I-57 NB Onramp & IL 149

2012 Existing Conditions
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	482	0	0	587	53	105	0	229	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow veh/h/ln	179.2	186.3	0.0	0.0	186.3	177.6	190.0	179.2	184.5			
Lanes	1	2	0	0	2	1	0	1	1			
Cap, veh/h	469	2116	0	0	1457	590	350	0	321			
Arrive On Green	0.13	1.00	0.00	0.00	0.39	0.39	0.20	0.00	0.20			
Sat Flow, veh/h	1707	3725	0	0	3725	1509	1707	0	1568			
Grp Volume(v), veh/h	51	507	0	0	618	56	111	0	241			
Grp Sat Flow(s),veh/h/ln	1707	1863	0	0	1863	1509	1707	0	1568			
Q Serve(g_s), s	0.7	0.0	0.0	0.0	5.3	1.0	2.4	0.0	6.4			
Cycle Q Clear(g_c), s	0.7	0.0	0.0	0.0	5.3	1.0	2.4	0.0	6.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	469	2116	0	0	1457	590	350	0	321			
V/C Ratio(X)	0.11	0.24	0.00	0.00	0.42	0.09	0.32	0.00	0.75			
Avail Cap(c_a), veh/h	827	3851	0	0	2370	960	582	0	534			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.98	0.98	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	5.9	0.0	0.0	0.0	9.8	8.5	14.9	0.0	16.4			
Incr Delay (d2), s/veh	0.1	0.3	0.0	0.0	0.9	0.3	0.5	0.0	3.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile Back of Q (95%), veh/ln	0.3	0.1	0.0	0.0	3.6	0.6	1.6	0.0	4.2			
Lane Grp Delay (d), s/veh	6.0	0.3	0.0	0.0	10.7	8.8	15.4	0.0	20.0			
Lane Grp LOS	A	A			B	A	B		B			
Approach Vol, veh/h		558			674			352				
Approach Delay, s/veh		0.8			10.5			18.5				
Approach LOS		A			B			B				
Timer												
Assigned Phs	5	2			6			8				
Phs Duration (G+Y+Rc), s	7.8	30.0			22.2			14.0				
Change Period (Y+Rc), s	5.0	5.0			5.0			5.0				
Max Green Setting (Gmax), s	12.0	45.5			28.0			15.0				
Max Q Clear Time (g_c+I1), s	2.7	2.0			7.3			8.4				
Green Ext Time (p_c), s	0.0	9.7			7.8			0.8				
Intersection Summary												
HCM 2010 Ctrl Delay					8.9							
HCM 2010 LOS					A							
Notes												

Intersection												
Intersection Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	704	5	10	635	1	3	0	5	1	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	741	5	11	668	1	3	0	5	1	1	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	669	0	0	746	0	0	1438	1437	744	1438	1438	669
Stage 1	-	-	-	-	-	-	746	746	-	690	690	-
Stage 2	-	-	-	-	-	-	692	691	-	748	748	-
Follow-up Headway	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Capacity-1 Maneuver	921	-	-	862	-	-	111	133	415	111	133	458
Stage 1	-	-	-	-	-	-	405	421	-	435	446	-
Stage 2	-	-	-	-	-	-	434	446	-	404	420	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	921	-	-	862	-	-	109	131	415	108	131	458
Mov Capacity-2 Maneuver	-	-	-	-	-	-	109	131	-	108	131	-
Stage 1	-	-	-	-	-	-	405	421	-	435	440	-
Stage 2	-	-	-	-	-	-	425	440	-	398	420	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			23.6			24.6		
HCM LOS	C			C			C			C		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	202	921	-	-	862	-	-	188				
HCM Lane V/C Ratio	0.042	0.001	-	-	0.012	-	-	0.022				
HCM Control Delay (s)	23.6	8.913	-	-	9.228	-	-	24.6				
HCM Lane LOS	C	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.13	0.003	-	-	0.037	-	-	0.069				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection

Intersection Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	14	2	1	28	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	2	1	29	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	17
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1600
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1600
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	8.8
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	961	-	-	1600	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.251	0
HCM Lane LOS	A			A	A
HCM 95th %tile Q(veh)	0.003	-	-	0.002	-

Notes

























~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection												
Intersection Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	705	5	15	640	1	3	0	5	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	742	5	16	674	1	3	0	5	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	675	0	0	747	0	0	1453	1453	374	1079	1455	674
Stage 1	-	-	-	-	-	-	747	747	-	706	706	-
Stage 2	-	-	-	-	-	-	706	706	-	373	749	-
Follow-up Headway	2.218	-	-	2.22	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Capacity-1 Maneuver	916	-	-	857	-	-	99	130	624	184	129	454
Stage 1	-	-	-	-	-	-	372	419	-	426	438	-
Stage 2	-	-	-	-	-	-	426	438	-	621	418	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	916	-	-	857	-	-	98	127	624	180	126	454
Mov Capacity-2 Maneuver	-	-	-	-	-	-	98	127	-	180	126	-
Stage 1	-	-	-	-	-	-	372	419	-	426	430	-
Stage 2	-	-	-	-	-	-	418	430	-	615	418	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			23.1			0		
HCM LOS							C			A		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	207	916	-	-	857	-	-	0				
HCM Lane V/C Ratio	0.041	0.001	-	-	0.018	-	-	+				
HCM Control Delay (s)	23.1	8.935	-	-	9.28	-	-	0				
HCM Lane LOS	C	A			A			A				
HCM 95th %tile Q(veh)	0.127	0.003	-	-	0.056	-	-	+				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection												
Intersection Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	683	28	38	688	5	12	0	19	3	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	10	704	29	39	709	5	12	0	20	3	6	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	714	0	0	733	0	0	1537	1532	719	1539	1544	712
Stage 1	-	-	-	-	-	-	739	739	-	790	790	-
Stage 2	-	-	-	-	-	-	798	793	-	749	754	-
Follow-up Headway	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.509	4.009	3.309
Pot Capacity-1 Maneuver	891	-	-	876	-	-	95	117	430	95	115	434
Stage 1	-	-	-	-	-	-	411	425	-	385	403	-
Stage 2	-	-	-	-	-	-	381	402	-	405	419	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	891	-	-	876	-	-	85	111	430	87	109	434
Mov Capacity-2 Maneuver	-	-	-	-	-	-	85	111	-	87	109	-
Stage 1	-	-	-	-	-	-	406	420	-	381	385	-
Stage 2	-	-	-	-	-	-	351	384	-	382	414	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.5			31.6			29.9		
HCM LOS	D			D			D			D		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	167	891	-	-	876	-	-	163				
HCM Lane V/C Ratio	0.191	0.012	-	-	0.045	-	-	0.114				
HCM Control Delay (s)	31.6	9.088	-	-	9.302	-	-	29.9				
HCM Lane LOS	D	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.682	0.035	-	-	0.14	-	-	0.378				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

HCM 2010 Signalized Intersection Summary
30: IL 37 & IL 149

2012 Existing Conditions
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	142	358	167	79	300	61	194	187	93	79	174	125
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	184.5	184.5	186.3	190.0	186.3	186.3	190.0	188.7	190.0	188.1	186.0	190.0
Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Cap, veh/h	390	495	425	336	463	393	436	515	245	413	333	225
Arrive On Green	0.09	0.27	0.27	0.07	0.25	0.25	0.12	0.21	0.21	0.07	0.16	0.16
Sat Flow, veh/h	1757	1845	1583	1810	1863	1583	1810	2419	1152	1792	2073	1400
Grp Volume(v), veh/h	143	362	169	80	303	62	196	146	137	80	157	145
Grp Sat Flow(s),veh/h/ln	1757	1845	1583	1810	1863	1583	1810	1887	1684	1792	1860	1613
Q Serve(g_s), s	3.0	9.4	4.6	1.7	7.6	1.6	4.3	3.4	3.7	1.9	4.0	4.3
Cycle Q Clear(g_c), s	3.0	9.4	4.6	1.7	7.6	1.6	4.3	3.4	3.7	1.9	4.0	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.68	1.00		0.87
Lane Grp Cap(c), veh/h	390	495	425	336	463	393	436	402	358	413	299	259
V/C Ratio(X)	0.37	0.73	0.40	0.24	0.65	0.16	0.45	0.36	0.38	0.19	0.52	0.56
Avail Cap(c_a), veh/h	448	958	823	397	932	792	510	981	875	470	853	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	17.4	15.7	13.6	17.7	15.4	13.7	17.6	17.7	16.4	20.1	20.3
Incr Delay (d2), s/veh	2.1	9.2	2.8	0.1	7.1	0.9	2.6	0.2	0.3	0.1	0.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	2.3	8.7	0.6	1.1	7.2	1.1	3.4	2.6	2.4	1.3	3.1	2.8
Lane Grp Delay (d), s/veh	14.8	26.7	18.5	13.7	24.7	16.2	16.4	17.8	17.9	16.5	20.7	21.0
Lane Grp LOS	B	C	B	B	C	B	B	B	B	B	C	C
Approach Vol, veh/h		674			445			479			382	
Approach Delay, s/veh		22.1			21.6			17.2			19.9	
Approach LOS		C			C			B			B	
Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.3	19.3		8.2	18.3		10.9	16.6		8.1	13.9	
Change Period (Y+Rc), s	4.8	5.3		4.8	5.3		4.7	5.5		4.7	5.5	
Max Green Setting (Gmax), s	6.2	27.2		5.2	26.2		8.3	27.2		5.1	24.0	
Max Q Clear Time (g_c+I1), s	5.0	11.4		3.7	9.6		6.3	5.7		3.9	6.3	
Green Ext Time (p_c), s	0.1	2.7		0.0	2.7		0.3	2.2		0.0	2.1	
Intersection Summary												
HCM 2010 Ctrl Delay				20.4								
HCM 2010 LOS				C								
Notes												

Intersection

Intersection Delay, s/veh 1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	416	4	36	245	5	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	8	0	15	16	0	7
Mvmt Flow	507	5	44	299	6	44

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	512
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.335
Pot Capacity-1 Maneuver	-	-	990
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	990
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	13
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	501	-	-	990	-
HCM Lane V/C Ratio	0.1	-	-	0.044	-
HCM Control Delay (s)	13	-	-	8.805	0
HCM Lane LOS	B			A	A
HCM 95th %tile Q(veh)	0.331	-	-	0.139	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	6	21	41	20	9	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	18	6	0	0	0
Mvmt Flow	8	26	51	25	11	21

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	108	64	0
Stage 1	64	-	-
Stage 2	44	-	-
Follow-up Headway	3.5	3.462	-
Pot Capacity-1 Maneuver	894	957	-
Stage 1	964	-	-
Stage 2	984	-	-
Time blocked-Platoon, %			
Mov Capacity-1 Maneuver	888	957	-
Mov Capacity-2 Maneuver	888	-	-
Stage 1	964	-	-
Stage 2	977	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	2.5
HCM LOS	A		






















Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	941	1536	-
HCM Lane V/C Ratio	-	-	0.036	0.007	-
HCM Control Delay (s)	-	-	9	7.361	0
HCM Lane LOS			A	A	A
HCM 95th %tile Q(veh)	-	-	0.111	0.022	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined













HCM 2010 Signalized Intersection Summary
6: Frankfort Plaza/Key Gray Blvd & IL 149

2032 Design Year - No Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	444	78	228	234	91	40	27	134	105	28	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	181.0	178.3	190.0	182.7	174.7	190.0	190.0	186.3	179.2	171.2	176.4	190.0
Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Cap, veh/h	641	714	0	496	840	0	254	140	436	322	304	0
Arrive On Green	0.03	0.40	0.00	0.19	0.80	0.00	0.17	0.17	0.00	0.17	0.17	0.00
Sat Flow, veh/h	1723	1783	0	1740	1747	0	775	811	1524	1263	1764	0
Grp Volume(v), veh/h	58	499	0	256	263	0	75	0	0	118	31	0
Grp Sat Flow(s),veh/h/ln	1723	1783	0	1740	1747	0	1586	0	1524	1263	1764	0
Q Serve(g_s), s	0.9	11.2	0.0	3.3	1.9	0.0	0.4	0.0	0.0	4.3	0.7	0.0
Cycle Q Clear(g_c), s	0.9	11.2	0.0	3.3	1.9	0.0	1.7	0.0	0.0	6.0	0.7	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.60		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	641	714	0	496	840	0	393	0	436	322	304	0
V/C Ratio(X)	0.09	0.70	0.00	0.52	0.31	0.00	0.19	0.00	0.00	0.37	0.10	0.00
Avail Cap(c_a), veh/h	979	856	0	697	840	0	802	0	842	658	773	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.9	12.0	0.0	7.1	2.6	0.0	17.1	0.0	0.0	19.7	16.7	0.0
Incr Delay (d2), s/veh	0.1	5.6	0.0	0.8	1.0	0.0	0.2	0.0	0.0	0.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.5	8.5	0.0	1.5	1.2	0.0	1.2	0.0	0.0	2.2	0.5	0.0
Lane Grp Delay (d), s/veh	8.0	17.6	0.0	8.0	3.6	0.0	17.3	0.0	0.0	20.4	16.8	0.0
Lane Grp LOS	A	B		A	A		B			C	B	
Approach Vol, veh/h		557			519			75			149	
Approach Delay, s/veh		16.6			5.8			17.3			19.7	
Approach LOS		B			A			B			B	
Timer												
Assigned Phs	5	2		1	6			8			4	
Phs Duration (G+Y+Rc), s	6.6	24.2		10.5	28.0			13.2			13.2	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0			5.0			5.0	
Max Green Setting (Gmax), s	11.0	23.0		11.0	23.0			21.0			21.0	
Max Q Clear Time (g_c+I1), s	2.9	13.2		5.3	3.9			3.7			8.0	
Green Ext Time (p_c), s	0.1	6.0		0.4	9.8			0.8			0.7	
Intersection Summary												
HCM 2010 Ctrl Delay				12.7								
HCM 2010 LOS				B								
Notes												

HCM 2010 Signalized Intersection Summary
 10: I-57 SB Onramp/I-57 SB Offramp & IL 149

2032 Design Year - No Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑						↖	↗
Volume (veh/h)	0	458	129	388	452	0	0	0	0	64	0	63
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow veh/h/ln	0.0	181.0	179.2	186.3	182.7	0.0				190.0	169.6	177.6
Lanes	0	2	1	1	2	0				0	1	1
Cap, veh/h	0	1721	725	708	2699	0				161	0	150
Arrive On Green	0.00	0.16	0.16	0.34	1.00	0.00				0.10	0.00	0.10
Sat Flow, veh/h	0	3619	1524	1774	3654	0				1616	0	1509
Grp Volume(v), veh/h	0	509	143	431	502	0				71	0	70
Grp Sat Flow(s),veh/h/ln	0	1810	1524	1774	1827	0				1616	0	1509
Q Serve(g_s), s	0.0	6.5	4.3	6.3	0.0	0.0				2.2	0.0	2.3
Cycle Q Clear(g_c), s	0.0	6.5	4.3	6.3	0.0	0.0				2.2	0.0	2.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1721	725	708	2699	0				161	0	150
V/C Ratio(X)	0.00	0.30	0.20	0.61	0.19	0.00				0.44	0.00	0.47
Avail Cap(c_a), veh/h	0	1962	826	815	3163	0				492	0	459
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	0.94	0.94	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.4	13.4	3.9	0.0	0.0				22.3	0.0	22.3
Incr Delay (d2), s/veh	0.0	0.4	0.6	1.0	0.1	0.0				1.9	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.0	5.1	2.7	1.7	0.1	0.0				1.6	0.0	1.6
Lane Grp Delay (d), s/veh	0.0	14.8	14.0	4.9	0.1	0.0				24.2	0.0	24.6
Lane Grp LOS		B	B	A	A					C		C
Approach Vol, veh/h		652			933						141	
Approach Delay, s/veh		14.6			2.3						24.4	
Approach LOS		B			A						C	
Timer												
Assigned Phs		2		1	6							4
Phs Duration (G+Y+Rc), s		29.5		13.8	43.3							9.2
Change Period (Y+Rc), s		4.5		5.0	4.5							4.0
Max Green Setting (Gmax), s		28.5		12.0	45.5							16.0
Max Q Clear Time (g_c+I1), s		8.5		8.3	2.0							4.3
Green Ext Time (p_c), s		2.6		0.5	2.7							0.4
Intersection Summary												
HCM 2010 Ctrl Delay				8.8								
HCM 2010 LOS				A								
Notes												

Intersection

Intersection Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	28	1	0	26	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	1	0	27	1	2

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	31
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1582
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1582
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A



















Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1011	-	-	1582	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.009	-	-	0	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 16: I-57 NB Offramp/I-57 NB Onramp & IL 149

2032 Design Year - No Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	99	449	0	0	751	99	59	0	130	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow veh/h/ln	175.9	181.0	0.0	0.0	186.3	179.2	190.0	175.9	181.0			
Lanes	1	2	0	0	2	1	0	1	1			
Cap, veh/h	497	2334	0	0	1529	625	232	0	213			
Arrive On Green	0.21	1.00	0.00	0.00	0.41	0.41	0.14	0.00	0.14			
Sat Flow, veh/h	1675	3619	0	0	3725	1524	1675	0	1538			
Grp Volume(v), veh/h	110	499	0	0	834	110	66	0	144			
Grp Sat Flow(s),veh/h/ln	1675	1810	0	0	1863	1524	1675	0	1538			
Q Serve(g_s), s	1.1	0.0	0.0	0.0	6.7	1.8	1.4	0.0	3.5			
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.0	6.7	1.8	1.4	0.0	3.5			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	497	2334	0	0	1529	625	232	0	213			
V/C Ratio(X)	0.22	0.21	0.00	0.00	0.55	0.18	0.28	0.00	0.68			
Avail Cap(c_a), veh/h	831	4202	0	0	2709	1108	684	0	628			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.97	0.97	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.4	0.0	0.0	0.0	8.8	7.3	15.1	0.0	16.1			
Incr Delay (d2), s/veh	0.2	0.2	0.0	0.0	1.4	0.6	0.7	0.0	3.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile Back of Q (95%), veh/ln	0.4	0.1	0.0	0.0	4.5	1.1	0.9	0.0	2.3			
Lane Grp Delay (d), s/veh	4.7	0.2	0.0	0.0	10.2	8.0	15.8	0.0	19.8			
Lane Grp LOS	A	A			B	A	B		B			
Approach Vol, veh/h		609			944			210				
Approach Delay, s/veh		1.0			9.9			18.5				
Approach LOS		A			A			B				
Timer												
Assigned Phs	5	2			6			8				
Phs Duration (G+Y+Rc), s	9.2	29.8			20.6			9.4				
Change Period (Y+Rc), s	5.0	4.5			4.5			4.0				
Max Green Setting (Gmax), s	12.0	45.5			28.5			16.0				
Max Q Clear Time (g_c+I1), s	3.1	2.0			8.7			5.5				
Green Ext Time (p_c), s	0.2	9.1			7.4			0.5				
Intersection Summary												
HCM 2010 Ctrl Delay					7.9							
HCM 2010 LOS					A							
Notes												

Intersection

Intersection Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	28	2	0	25	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	2	0	26	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	32
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1580
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1580
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	950	-	-	1580	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.003	-	-	0	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	579	0	0	850	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	609	0	0	895	0	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	895	0	0	609
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	2.218	-	-	2.22
Pot Capacity-1 Maneuver	758	-	-	966
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	758	-	-	966
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	0	758	-	-	966	-	-	0
HCM Lane V/C Ratio	+	-	-	-	-	-	-	+
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A			A			A
HCM 95th %tile Q(veh)	+	0	-	-	0	-	-	+

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	528	13	17	861	3	30	5	40	0	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	629	15	20	1025	4	36	6	48	0	4	14

Major/Minor

	Major1	Major2	Minor1	Minor2
Conflicting Flow All	1029	0	0	644
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	2.218	-	-	2.218
Pot Capacity-1 Maneuver	675	-	-	941
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	675	-	-	941
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach

	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	91.4	25.3
HCM LOS			F	D

Minor Lane / Major Mvmt

























	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	675	-	-	941	-	-	195
HCM Lane V/C Ratio	0.738	0.007	-	-	0.022	-	-	0.092
HCM Control Delay (s)	91.4	10.371	-	-	8.91	-	-	25.3
HCM Lane LOS	F	B			A			D
HCM 95th %tile Q(veh)	4.134	0.021	-	-	0.066	-	-	0.298

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
30: IL 37 & IL 149

2032 Design Year - No Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	102	416	128	91	514	77	180	188	90	104	175	181
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	163.8	184.5	184.5	188.1	188.1	190.0	186.3	180.9	190.0	184.5	185.3	190.0
Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Cap, veh/h	247	705	599	325	705	605	302	479	222	342	361	307
Arrive On Green	0.07	0.38	0.38	0.06	0.37	0.37	0.08	0.20	0.20	0.07	0.19	0.19
Sat Flow, veh/h	1560	1845	1568	1792	1881	1615	1774	2341	1085	1757	1853	1575
Grp Volume(v), veh/h	124	507	156	111	627	94	220	175	164	127	213	221
Grp Sat Flow(s),veh/h/ln	1560	1845	1568	1792	1881	1615	1774	1809	1618	1757	1853	1575
Q Serve(g_s), s	3.4	16.9	4.9	2.7	22.6	2.8	5.8	6.2	6.5	4.1	7.6	9.5
Cycle Q Clear(g_c), s	3.4	16.9	4.9	2.7	22.6	2.8	5.8	6.2	6.5	4.1	7.6	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.67	1.00		1.00
Lane Grp Cap(c), veh/h	247	705	599	325	705	605	302	370	331	342	361	307
V/C Ratio(X)	0.50	0.72	0.26	0.34	0.89	0.16	0.73	0.47	0.50	0.37	0.59	0.72
Avail Cap(c_a), veh/h	248	756	643	339	771	662	302	626	560	342	624	530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	19.0	15.3	14.4	21.2	15.0	24.0	25.3	25.4	21.3	26.5	27.2
Incr Delay (d2), s/veh	5.6	6.2	1.1	0.2	15.6	0.5	12.7	0.4	0.4	0.2	0.6	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	3.2	12.8	3.5	1.9	18.5	2.0	3.6	4.8	4.5	3.0	6.1	6.6
Lane Grp Delay (d), s/veh	22.0	25.3	16.4	14.6	36.7	15.5	36.7	25.6	25.9	21.5	27.0	28.4
Lane Grp LOS	C	C	B	B	D	B	D	C	C	C	C	C
Approach Vol, veh/h		787			832			559			561	
Approach Delay, s/veh		23.0			31.4			30.1			26.3	
Approach LOS		C			C			C			C	
Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	9.8	32.9		9.3	32.4		10.5	20.3		9.8	19.6	
Change Period (Y+Rc), s	4.8	5.3		4.8	5.3		4.7	5.5		4.7	5.5	
Max Green Setting (Gmax), s	5.0	29.6		5.0	29.6		5.8	25.0		5.1	24.3	
Max Q Clear Time (g_c+I1), s	5.4	18.9		4.7	24.6		7.8	8.5		6.1	11.5	
Green Ext Time (p_c), s	0.0	4.1		0.0	2.5		0.0	2.8		0.0	2.6	
Intersection Summary												
HCM 2010 Ctrl Delay				27.7								
HCM 2010 LOS				C								
Notes												

Intersection

Intersection Delay, s/veh 0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	346	7	26	497	9	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	13	0	0	6	29	9
Mvmt Flow	376	8	28	540	10	46

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	384
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.2
Pot Capacity-1 Maneuver	-	-	1186
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1186
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	13.1
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	501	-	-	1186	-
HCM Lane V/C Ratio	0.111	-	-	0.024	-
HCM Control Delay (s)	13.1	-	-	8.109	0
HCM Lane LOS	B			A	A
HCM 95th %tile Q(veh)	0.371	-	-	0.073	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	20	16	39	10	10	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	15	0	0	0	0
Mvmt Flow	24	20	48	12	12	32

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	110	54	0
Stage 1	54	-	-
Stage 2	56	-	-
Follow-up Headway	3.5	3.435	-
Pot Capacity-1 Maneuver	892	978	-
Stage 1	974	-	-
Stage 2	972	-	-
Time blocked-Platoon, %			-
Mov Capacity-1 Maneuver	885	978	-
Mov Capacity-2 Maneuver	885	-	-
Stage 1	974	-	-
Stage 2	964	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	2
HCM LOS	A		






















Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	924	1556	-
HCM Lane V/C Ratio	-	-	0.048	0.008	-
HCM Control Delay (s)	-	-	9.1	7.332	0
HCM Lane LOS			A	A	A
HCM 95th %tile Q(veh)	-	-	0.149	0.024	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined













HCM 2010 Signalized Intersection Summary
6: Frankfort Plaza/Key Gray Blvd & IL 149

2032 Design Year - No Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	29	283	67	309	377	52	76	26	314	190	39	32
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	180.6	190.0	188.1	187.7	190.0	190.0	187.2	188.1	188.1	190.0	190.0
Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Cap, veh/h	498	571	0	589	814	0	378	112	617	408	471	0
Arrive On Green	0.02	0.32	0.00	0.28	0.87	0.00	0.25	0.25	0.00	0.25	0.25	0.00
Sat Flow, veh/h	1810	1806	0	1792	1877	0	1021	451	1599	1391	1900	0
Grp Volume(v), veh/h	30	295	0	322	393	0	106	0	0	198	41	0
Grp Sat Flow(s),veh/h/ln	1810	1806	0	1792	1877	0	1472	0	1599	1391	1900	0
Q Serve(g_s), s	0.6	6.7	0.0	4.6	2.4	0.0	2.1	0.0	0.0	6.8	0.8	0.0
Cycle Q Clear(g_c), s	0.6	6.7	0.0	4.6	2.4	0.0	2.9	0.0	0.0	9.7	0.8	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.75		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	498	571	0	589	814	0	490	0	617	408	471	0
V/C Ratio(X)	0.06	0.52	0.00	0.55	0.48	0.00	0.22	0.00	0.00	0.49	0.09	0.00
Avail Cap(c_a), veh/h	856	824	0	733	857	0	738	0	887	642	792	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	14.1	0.0	6.3	2.1	0.0	15.3	0.0	0.0	19.3	14.6	0.0
Incr Delay (d2), s/veh	0.1	3.3	0.0	0.8	2.0	0.0	0.2	0.0	0.0	0.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.4	5.5	0.0	1.9	1.8	0.0	1.6	0.0	0.0	3.8	0.6	0.0
Lane Grp Delay (d), s/veh	11.3	17.4	0.0	7.1	4.1	0.0	15.5	0.0	0.0	20.1	14.6	0.0
Lane Grp LOS	B	B		A	A		B			C	B	
Approach Vol, veh/h		325			715			106			239	
Approach Delay, s/veh		16.8			5.5			15.5			19.2	
Approach LOS		B			A			B			B	
Timer												
Assigned Phs	5	2		1	6			8			4	
Phs Duration (G+Y+Rc), s	6.0	20.9		11.9	26.9			17.5			17.5	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0			5.0			5.0	
Max Green Setting (Gmax), s	11.0	23.0		11.0	23.0			21.0			21.0	
Max Q Clear Time (g_c+I1), s	2.6	8.7		6.6	4.4			4.9			11.7	
Green Ext Time (p_c), s	0.0	7.2		0.4	8.6			1.2			0.9	
Intersection Summary												
HCM 2010 Ctrl Delay				11.3								
HCM 2010 LOS				B								
Notes												

HCM 2010 Signalized Intersection Summary
 10: I-57 SB Onramp/I-57 SB Offramp & IL 149

2032 Design Year - No Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑						↖	↗
Volume (veh/h)	0	630	95	198	719	0	0	0	0	87	0	78
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow veh/h/ln	0.0	184.5	188.1	182.7	186.3	0.0				190.0	184.5	182.7
Lanes	0	2	1	1	2	0				0	1	1
Cap, veh/h	0	1856	804	571	2676	0				194	0	172
Arrive On Green	0.00	0.17	0.17	0.23	1.00	0.00				0.11	0.00	0.11
Sat Flow, veh/h	0	3689	1599	1740	3725	0				1757	0	1553
Grp Volume(v), veh/h	0	685	103	215	782	0				95	0	85
Grp Sat Flow(s),veh/h/ln	0	1845	1599	1740	1863	0				1757	0	1553
Q Serve(g_s), s	0.0	8.2	2.7	2.4	0.0	0.0				2.5	0.0	2.6
Cycle Q Clear(g_c), s	0.0	8.2	2.7	2.4	0.0	0.0				2.5	0.0	2.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1856	804	571	2676	0				194	0	172
V/C Ratio(X)	0.00	0.37	0.13	0.38	0.29	0.00				0.49	0.00	0.49
Avail Cap(c_a), veh/h	0	2116	917	792	3411	0				566	0	500
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.7	11.4	4.2	0.0	0.0				20.8	0.0	20.8
Incr Delay (d2), s/veh	0.0	0.6	0.3	0.4	0.3	0.0				1.9	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	0.0	6.8	1.6	0.8	0.2	0.0				2.0	0.0	1.8
Lane Grp Delay (d), s/veh	0.0	14.3	11.8	4.5	0.3	0.0				22.7	0.0	23.0
Lane Grp LOS		B	B	A	A					C		C
Approach Vol, veh/h		788			997						180	
Approach Delay, s/veh		14.0			1.2						22.8	
Approach LOS		B			A						C	
Timer												
Assigned Phs		2		1	6							4
Phs Duration (G+Y+Rc), s		29.5		10.7	40.2							9.5
Change Period (Y+Rc), s		4.5		5.0	4.5							4.0
Max Green Setting (Gmax), s		28.5		12.0	45.5							16.0
Max Q Clear Time (g_c+I1), s		10.2		4.4	2.0							4.6
Green Ext Time (p_c), s		9.9		0.3	14.5							0.5
Intersection Summary												
HCM 2010 Ctrl Delay				8.3								
HCM 2010 LOS				A								
Notes												

Intersection

Intersection Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	19	1	1	35	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	1	1	37	1	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	21
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1595
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1595
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.6
HCM LOS			A



















Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	998	-	-	1595	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.6	-	-	7.259	0
HCM Lane LOS	A			A	A
HCM 95th %tile Q(veh)	0.006	-	-	0.002	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 16: I-57 NB Offramp/I-57 NB Onramp & IL 149

2032 Design Year - No Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	627	0	0	764	69	126	0	275	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow veh/h/ln	179.2	186.3	0.0	0.0	186.3	177.6	190.0	179.2	184.5			
Lanes	1	2	0	0	2	1	0	1	1			
Cap, veh/h	409	2127	0	0	1485	601	390	0	358			
Arrive On Green	0.14	1.00	0.00	0.00	0.40	0.40	0.23	0.00	0.23			
Sat Flow, veh/h	1707	3725	0	0	3725	1509	1707	0	1568			
Grp Volume(v), veh/h	66	660	0	0	804	73	133	0	289			
Grp Sat Flow(s),veh/h/ln	1707	1863	0	0	1863	1509	1707	0	1568			
Q Serve(g_s), s	0.9	0.0	0.0	0.0	8.2	1.5	3.2	0.0	8.7			
Cycle Q Clear(g_c), s	0.9	0.0	0.0	0.0	8.2	1.5	3.2	0.0	8.7			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	409	2127	0	0	1485	601	390	0	358			
V/C Ratio(X)	0.16	0.31	0.00	0.00	0.54	0.12	0.34	0.00	0.81			
Avail Cap(c_a), veh/h	697	3402	0	0	2093	848	514	0	472			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.95	0.95	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	6.8	0.0	0.0	0.0	11.5	9.5	16.1	0.0	18.2			
Incr Delay (d2), s/veh	0.2	0.4	0.0	0.0	1.4	0.4	0.5	0.0	7.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile Back of Q (95%), veh/ln	0.5	0.2	0.0	0.0	5.8	0.9	2.2	0.0	6.6			
Lane Grp Delay (d), s/veh	7.0	0.4	0.0	0.0	12.9	9.9	16.6	0.0	25.8			
Lane Grp LOS	A	A			B	A	B		C			
Approach Vol, veh/h		726			877			422				
Approach Delay, s/veh		1.0			12.7			22.9				
Approach LOS		A			B			C				
Timer												
Assigned Phs	5	2			6			8				
Phs Duration (G+Y+Rc), s	8.6	33.5			24.9			16.4				
Change Period (Y+Rc), s	5.0	5.0			5.0			5.0				
Max Green Setting (Gmax), s	12.0	45.5			28.0			15.0				
Max Q Clear Time (g_c+I1), s	2.9	2.0			10.2			10.7				
Green Ext Time (p_c), s	0.1	14.2			9.6			0.7				
Intersection Summary												
HCM 2010 Ctrl Delay					10.6							
HCM 2010 LOS					B							
Notes												

Intersection

Intersection Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	18	2	1	35	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	2	1	37	1	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	21
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	-	2.218
Pot Capacity-1 Maneuver	-	-	1595
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1595
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.8
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	947	-	-	1595	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.8	-	-	7.259	0
HCM Lane LOS	A			A	A
HCM 95th %tile Q(veh)	0.003	-	-	0.002	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	902	0	0	833	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	949	0	0	877	0	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	877	0	0	949
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	2.218	-	-	2.22
Pot Capacity-1 Maneuver	770	-	-	719
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	770	-	-	719
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	0	770	-	-	719	-	-	0
HCM Lane V/C Ratio	+	-	-	-	-	-	-	+
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A			A			A
HCM 95th %tile Q(veh)	+	0	-	-	0	-	-	+

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	888	37	50	895	7	15	0	23	4	8	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	13	915	38	52	923	7	15	0	24	4	8	11

Major/Minor

	Major1	Major2	Minor1	Minor2
Conflicting Flow All	930	0	0	954
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	2.209	-	-	2.209
Pot Capacity-1 Maneuver	740	-	-	724
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	740	-	-	724
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach

	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	90.7	66.9
HCM LOS			F	F

Minor Lane / Major Mvmt

























	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	78	740	-	-	724	-	-	81
HCM Lane V/C Ratio	0.502	0.018	-	-	0.071	-	-	0.293
HCM Control Delay (s)	90.7	9.955	-	-	10.353	-	-	66.9
HCM Lane LOS	F	A			B			F
HCM 95th %tile Q(veh)	2.11	0.055	-	-	0.229	-	-	1.079

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

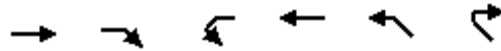
HCM 2010 Signalized Intersection Summary
30: IL 37 & IL 149

2032 Design Year - No Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	185	466	218	103	390	80	253	244	121	103	227	163
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	184.5	184.5	186.3	190.0	186.3	186.3	190.0	188.7	190.0	188.1	186.0	190.0
Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Cap, veh/h	370	585	502	296	531	452	398	559	268	376	372	257
Arrive On Green	0.10	0.32	0.32	0.07	0.29	0.29	0.12	0.23	0.23	0.07	0.18	0.18
Sat Flow, veh/h	1757	1845	1583	1810	1863	1583	1810	2413	1158	1792	2054	1416
Grp Volume(v), veh/h	187	471	220	104	394	81	256	191	177	104	206	188
Grp Sat Flow(s),veh/h/ln	1757	1845	1583	1810	1863	1583	1810	1887	1683	1792	1860	1610
Q Serve(g_s), s	4.4	14.9	7.0	2.5	12.2	2.5	6.7	5.5	5.8	2.9	6.5	6.9
Cycle Q Clear(g_c), s	4.4	14.9	7.0	2.5	12.2	2.5	6.7	5.5	5.8	2.9	6.5	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		0.88
Lane Grp Cap(c), veh/h	370	585	502	296	531	452	398	437	390	376	337	292
V/C Ratio(X)	0.51	0.81	0.44	0.35	0.74	0.18	0.64	0.44	0.46	0.28	0.61	0.64
Avail Cap(c_a), veh/h	380	821	705	319	782	665	398	760	678	421	702	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	19.9	17.2	15.7	20.6	17.1	16.5	20.9	21.0	19.2	24.0	24.1
Incr Delay (d2), s/veh	3.9	11.3	2.8	0.3	9.0	0.9	6.7	0.3	0.3	0.1	0.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (95%), veh/ln	3.6	12.6	5.1	1.8	10.5	1.7	6.1	4.2	4.0	2.2	5.2	4.7
Lane Grp Delay (d), s/veh	18.0	31.2	20.0	16.0	29.6	18.0	23.2	21.1	21.3	19.3	24.6	25.0
Lane Grp LOS	B	C	C	B	C	B	C	C	C	B	C	C
Approach Vol, veh/h		878			579			624			498	
Approach Delay, s/veh		25.6			25.5			22.0			23.7	
Approach LOS		C			C			C			C	
Timer												
Assigned Phs	5	2		1	6		3	8		7	4	
Phs Duration (G+Y+Rc), s	11.0	25.4		9.0	23.4		12.1	20.2		8.9	17.0	
Change Period (Y+Rc), s	4.8	5.3		4.8	5.3		4.7	5.5		4.7	5.5	
Max Green Setting (Gmax), s	6.6	28.3		5.0	26.7		7.4	25.6		5.8	24.0	
Max Q Clear Time (g_c+I1), s	6.4	16.9		4.5	14.2		8.7	7.8		4.9	8.9	
Green Ext Time (p_c), s	0.0	3.3		0.0	3.4		0.0	2.8		0.0	2.7	
Intersection Summary												
HCM 2010 Ctrl Delay				24.4								
HCM 2010 LOS				C								
Notes												

Lanes, Volumes, Timings
1: Burlington & IL 149

2032 Design Year - Build
AM Peak Hour



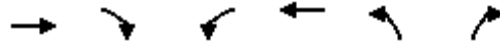
Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑			↑		
Volume (vph)	416	148	0	380	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965					
Flt Protected						
Satd. Flow (prot)	1699	0	0	1792	0	0
Flt Permitted						
Satd. Flow (perm)	1699	0	0	1792	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	1214			901	931	
Travel Time (s)	27.6			20.5	21.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	2%	2%	6%	2%	2%
Adj. Flow (vph)	438	156	0	400	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	0	400	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
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	34.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	416	1	36	245	135	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	115		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.978	
Fl _t Protected			0.950		0.960	
Satd. Flow (prot)	1728	0	1703	1792	1696	0
Fl _t Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1696	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					14	
Link Speed (mph)	30			30	30	
Link Distance (ft)	901			1058	332	
Travel Time (s)	20.5			24.0	7.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	6%	6%	5%	6%
Adj. Flow (vph)	438	1	38	258	142	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	439	0	38	258	170	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	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
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

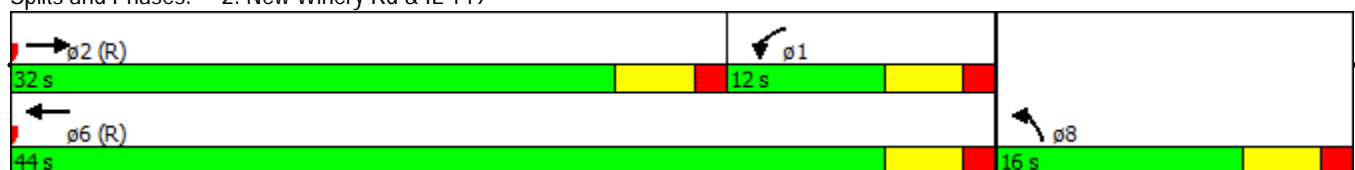


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2		1	6	8	
Switch Phase						
Minimum Initial (s)	7.0		7.0	10.0	7.0	
Minimum Split (s)	12.0		12.0	15.0	12.0	
Total Split (s)	32.0		12.0	44.0	16.0	
Total Split (%)	53.3%		20.0%	73.3%	26.7%	
Maximum Green (s)	27.0		7.0	39.0	11.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
Act Effect Green (s)	38.4		7.1	43.4	10.0	
Actuated g/C Ratio	0.64		0.12	0.72	0.17	
v/c Ratio	0.40		0.19	0.20	0.58	
Control Delay	10.4		24.5	1.7	23.4	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	10.4		24.5	1.7	23.4	
LOS	B		C	A	C	
Approach Delay	10.4			4.6	23.4	
Approach LOS	B			A	C	
Queue Length 50th (ft)	60		15	10	37	
Queue Length 95th (ft)	188		m36	4	101	
Internal Link Dist (ft)	821			978	252	
Turn Bay Length (ft)			115			
Base Capacity (vph)	1119		201	1303	330	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.39		0.19	0.20	0.52	

Intersection Summary

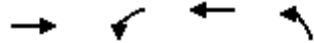
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 10.9
 Intersection LOS: B
 Intersection Capacity Utilization 47.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



Phasings
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	WBL	WBT	NBL
Protected Phases	2	1	6	8
Permitted Phases				
Minimum Initial (s)	7.0	7.0	10.0	7.0
Minimum Split (s)	12.0	12.0	15.0	12.0
Total Split (s)	32.0	12.0	44.0	16.0
Total Split (%)	53.3%	20.0%	73.3%	26.7%
Maximum Green (s)	27.0	7.0	39.0	11.0
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	C-Min	None	C-Min	None
Walk Time (s)				
Flash Dont Walk (s)				
Pedestrian Calls (#/hr)				
90th %ile Green (s)	27.0	7.0	39.0	11.0
90th %ile Term Code	Coord	Max	Coord	Max
70th %ile Green (s)	24.9	7.6	37.5	12.5
70th %ile Term Code	Coord	Gap	Coord	Gap
50th %ile Green (s)	39.3	0.0	39.3	10.7
50th %ile Term Code	Coord	Skip	Coord	Gap
30th %ile Green (s)	41.0	0.0	41.0	9.0
30th %ile Term Code	Coord	Skip	Coord	Gap
10th %ile Green (s)	55.0	0.0	55.0	0.0
10th %ile Term Code	Coord	Skip	Coord	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

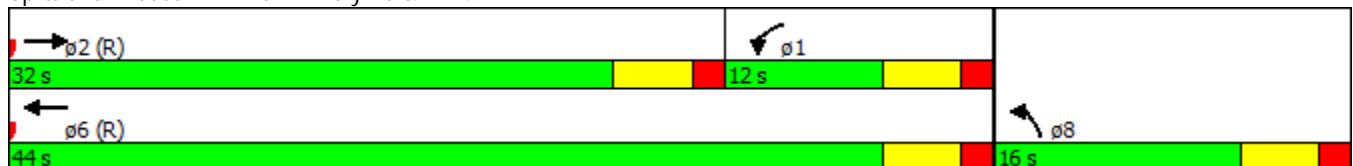


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Volume (vph)	416	1	36	245	135	27
Satd. Flow (prot)	1728	0	1703	1792	1696	0
Flt Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1696	0
Satd. Flow (RTOR)					14	
Lane Group Flow (vph)	439	0	38	258	170	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Total Split (s)	32.0		12.0	44.0	16.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Act Effect Green (s)	38.4		7.1	43.4	10.0	
Actuated g/C Ratio	0.64		0.12	0.72	0.17	
v/c Ratio	0.40		0.19	0.20	0.58	
Control Delay	10.4		24.5	1.7	23.4	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	10.4		24.5	1.7	23.4	
LOS	B		C	A	C	
Approach Delay	10.4			4.6	23.4	
Approach LOS	B			A	C	
Queue Length 50th (ft)	60		15	10	37	
Queue Length 95th (ft)	188		m36	4	101	
Internal Link Dist (ft)	821			978	252	
Turn Bay Length (ft)			115			
Base Capacity (vph)	1119		201	1303	330	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.39		0.19	0.20	0.52	

Intersection Summary












Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 10.9
 Intersection LOS: B
 Intersection Capacity Utilization 47.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



HCM 2010 Signalized Intersection Summary
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Volume (veh/h)	416	1	36	245	135	27		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	172.8	190.0	179.2	179.2	180.7	190.0		
Adj Flow Rate, veh/h	438	1	38	258	142	28		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	10	10	6	6	0	0		
Cap, veh/h	605	1	105	994	226	45		
Arrive On Green	0.35	0.35	0.06	0.55	0.16	0.16		
Sat Flow, veh/h	1723	4	1707	1792	1402	276		
Grp Volume(v), veh/h	0	439	38	258	171	0		
Grp Sat Flow(s),veh/h/ln	0	1727	1707	1792	1688	0		
Q Serve(g_s), s	0.0	7.8	0.8	2.6	3.3	0.0		
Cycle Q Clear(g_c), s	0.0	7.8	0.8	2.6	3.3	0.0		
Prop In Lane		0.00	1.00		0.83	0.16		
Lane Grp Cap(c), veh/h	0	606	105	994	272	0		
V/C Ratio(X)	0.00	0.72	0.36	0.26	0.63	0.00		
Avail Cap(c_a), veh/h	0	1324	339	1985	527	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.93	0.93	1.00	0.00		
Uniform Delay (d), s/veh	0.0	9.9	15.9	4.1	13.8	0.0		
Incr Delay (d2), s/veh	0.0	7.4	1.9	0.6	2.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.0	8.5	0.7	2.6	3.1	0.0		
LnGrp Delay(d),s/veh	0.0	17.3	17.8	4.7	16.2	0.0		
LnGrp LOS		B	B	A	B			
Approach Vol, veh/h	439			296	171			
Approach Delay, s/veh	17.3			6.4	16.1			
Approach LOS	B			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	32.0	17.4				49.3		10.7
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	7.0	27.0				39.0		11.0
Max Q Clear Time (g_c+I1), s	2.8	9.8				4.6		5.3
Green Ext Time (p_c), s	0.6	2.6				1.7		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			13.5					
HCM 2010 LOS			B					
Notes								
User approved volume balancing among the lanes for turning movement.								

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	435	78	268	234	91	40	27	171	105	28	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	155		0	160		160	215		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.977			0.958				0.850		0.932	
Flt Protected	0.950			0.950				0.971		0.950		
Satd. Flow (prot)	1719	1742	0	1736	1674	0	0	1809	1524	1626	1644	0
Flt Permitted	0.295			0.397				0.785		0.435		
Satd. Flow (perm)	534	1742	0	725	1674	0	0	1462	1524	745	1644	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			34				218			24
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1058			538			598				782
Travel Time (s)		24.0			12.2			13.6				17.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	4%	4%	11%	3%	0%	5%	6%	11%	5%	11%
Adj. Flow (vph)	55	458	82	282	246	96	42	28	180	111	29	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	540	0	282	342	0	0	70	180	111	53	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)		12			12			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
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	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
Detector 1 Queue (s)	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
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	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt		NA
Protected Phases	5	2		1	6			8	1	7		4
Permitted Phases	2			6			8		8	4		

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour

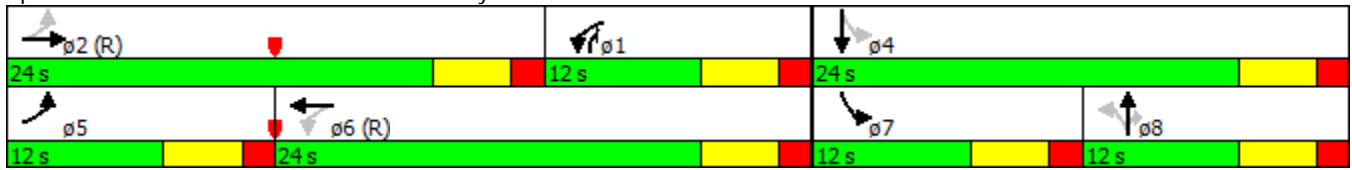


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8	1	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	12.0	15.0		12.0	15.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	24.0		12.0	24.0		12.0	12.0	12.0	12.0	24.0	
Total Split (%)	20.0%	40.0%		20.0%	40.0%		20.0%	20.0%	20.0%	20.0%	40.0%	
Maximum Green (s)	7.0	19.0		7.0	19.0		7.0	7.0	7.0	7.0	19.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	26.2	26.2		31.0	32.0		7.0	11.2	14.2	14.2		
Actuated g/C Ratio	0.44	0.44		0.52	0.53		0.12	0.19	0.24	0.24		
v/c Ratio	0.15	0.70		0.57	0.38		0.41	0.39	0.40	0.13		
Control Delay	11.0	21.8		16.1	5.3		32.5	3.7	21.0	10.4		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	11.0	21.8		16.1	5.3		32.5	3.7	21.0	10.4		
LOS	B	C		B	A		C	A	C	B		
Approach Delay		20.8			10.2		11.8				17.6	
Approach LOS		C			B		B				B	
Queue Length 50th (ft)	15	196		37	36		24	0	29	7		
Queue Length 95th (ft)	m21	#343		#95	50		58	17	62	28		
Internal Link Dist (ft)		978			458		518			702		
Turn Bay Length (ft)	150			155				160	215			
Base Capacity (vph)	371	769		492	908		170	461	278	537		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.15	0.70		0.57	0.38		0.41	0.39	0.40	0.10		

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.0 Intersection LOS: B
 Intersection Capacity Utilization 67.5% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



Phasings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8	1	7	4
Permitted Phases	2		6		8		8	4	
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	24.0	12.0	24.0	12.0	12.0	12.0	12.0	24.0
Total Split (%)	20.0%	40.0%	20.0%	40.0%	20.0%	20.0%	20.0%	20.0%	40.0%
Maximum Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	6.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
70th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
50th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
50th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
30th %ile Green (s)	0.0	31.0	7.0	43.0	0.0	0.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Max	Coord	Skip	Skip	Max	Max	Hold
10th %ile Green (s)	0.0	43.0	7.0	55.0	0.0	0.0	7.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Max	Coord	Skip	Skip	Max	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues
3: Frankfort Plaza/Ken Gray Blvd & IL 149

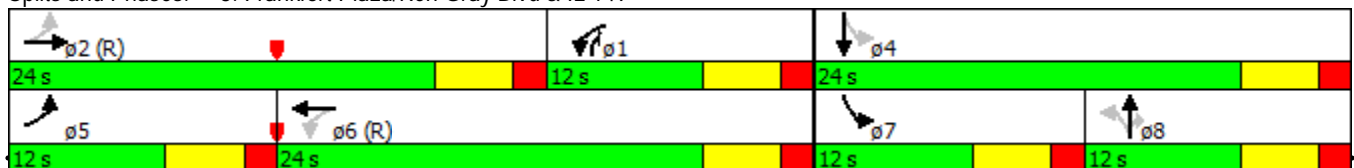
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗	↖	↗	
Volume (vph)	52	435	78	268	234	91	40	27	171	105	28	23
Satd. Flow (prot)	1719	1742	0	1736	1674	0	0	1809	1524	1626	1644	0
Flt Permitted	0.295			0.397				0.785		0.435		
Satd. Flow (perm)	534	1742	0	725	1674	0	0	1462	1524	745	1644	0
Satd. Flow (RTOR)		16			34				218		24	
Lane Group Flow (vph)	55	540	0	282	342	0	0	70	180	111	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	12.0	24.0		12.0	24.0		12.0	12.0	12.0	12.0	24.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Act Effect Green (s)	26.2	26.2		31.0	32.0			7.0	11.2	14.2	14.2	
Actuated g/C Ratio	0.44	0.44		0.52	0.53			0.12	0.19	0.24	0.24	
v/c Ratio	0.15	0.70		0.57	0.38			0.41	0.39	0.40	0.13	
Control Delay	11.0	21.8		16.1	5.3			32.5	3.7	21.0	10.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	11.0	21.8		16.1	5.3			32.5	3.7	21.0	10.4	
LOS	B	C		B	A			C	A	C	B	
Approach Delay		20.8			10.2			11.8			17.6	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	15	196		37	36			24	0	29	7	
Queue Length 95th (ft)	m21	#343		#95	50			58	17	62	28	
Internal Link Dist (ft)		978			458			518			702	
Turn Bay Length (ft)	150			155					160	215		
Base Capacity (vph)	371	769		492	908			170	461	278	537	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.15	0.70		0.57	0.38			0.41	0.39	0.40	0.10	

Intersection Summary





















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.0 Intersection LOS: B
 Intersection Capacity Utilization 67.5% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



HCM 2010 Signalized Intersection Summary
 3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	435	78	268	234	91	40	27	171	105	28	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	181.0	178.3	190.0	182.7	174.7	190.0	190.0	186.3	179.2	171.2	176.4	190.0
Adj Flow Rate, veh/h	55	458	82	282	246	96	42	28	180	111	29	24
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	7	7	4	11	11	5	5	6	11	5	5
Cap, veh/h	249	476	85	330	445	174	186	99	361	372	271	224
Arrive On Green	0.14	0.65	0.65	0.12	0.37	0.37	0.12	0.12	0.12	0.10	0.30	0.30
Sat Flow, veh/h	1723	1473	264	1740	1197	467	741	837	1524	1630	894	740
Grp Volume(v), veh/h	55	0	540	282	0	342	70	0	180	111	0	53
Grp Sat Flow(s),veh/h/ln	1723	0	1737	1740	0	1665	1578	0	1524	1630	0	1633
Q Serve(g_s), s	1.3	0.0	17.1	5.1	0.0	9.6	0.9	0.0	1.5	3.2	0.0	1.4
Cycle Q Clear(g_c), s	1.3	0.0	17.1	5.1	0.0	9.6	2.2	0.0	1.5	3.2	0.0	1.4
Prop In Lane	1.00		0.15	1.00		0.28	0.60		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	249	0	561	330	0	618	284	0	361	372	0	495
V/C Ratio(X)	0.22	0.00	0.96	0.86	0.00	0.55	0.25	0.00	0.50	0.30	0.00	0.11
Avail Cap(c_a), veh/h	333	0	561	330	0	618	286	0	363	403	0	528
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	10.1	24.0	0.0	14.6	23.8	0.0	6.7	17.8	0.0	14.8
Incr Delay (d2), s/veh	0.4	0.0	28.3	19.3	0.0	3.5	0.4	0.0	1.1	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.2	0.0	17.6	10.2	0.0	8.6	2.0	0.0	2.6	2.6	0.0	1.1
LnGrp Delay(d),s/veh	16.3	0.0	38.4	43.3	0.0	18.2	24.2	0.0	7.8	18.3	0.0	14.9
LnGrp LOS	B		D	D		B	C		A	B		B
Approach Vol, veh/h		595			624			250				164
Approach Delay, s/veh		36.4			29.5			12.4				17.2
Approach LOS		D			C			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.2	24.0		22.8	9.1	28.0	10.9	12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	19.0		19.0	7.0	19.0	7.0	7.0				
Max Q Clear Time (g_c+I1), s	7.1	19.1		3.4	3.3	11.6	5.2	4.2				
Green Ext Time (p_c), s	0.0	0.0		1.1	0.0	3.0	0.0	0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			28.1									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
4: IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	96	615	593	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			1	0	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1787	1759	1776	1863	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1759	1776	1863	0	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		538	290		442	
Travel Time (s)		12.2	6.6		8.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	8%	7%	2%	2%	2%
Adj. Flow (vph)	101	647	624	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	101	647	624	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↘	↑	↗
Volume (vph)	0	501	114	222	479	0	0	0	0	10	287	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	220		0	0		0	300		300
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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
Fr _t			0.850									0.850
Fl _t Protected				0.950						0.950		
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Fl _t Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		503			842			306			1286	
Travel Time (s)		11.4			19.1			4.6			19.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	3%	4%	2%	2%	2%	2%	2%	14%	2%	7%
Adj. Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
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)		12			12			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
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		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
Detector 1 Queue (s)		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
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

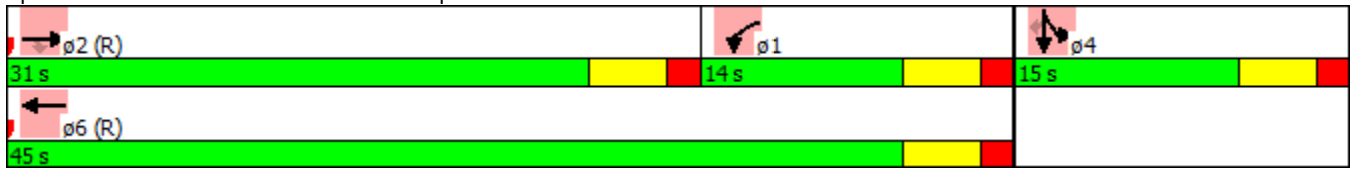


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		25.0	25.0	7.0	25.0					7.0	7.0	7.0
Minimum Split (s)		30.0	30.0	12.0	30.0					15.0	15.0	15.0
Total Split (s)		31.0	31.0	14.0	45.0					15.0	15.0	15.0
Total Split (%)		51.7%	51.7%	23.3%	75.0%					25.0%	25.0%	25.0%
Maximum Green (s)		26.0	26.0	9.0	40.0					10.0	10.0	10.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		25.0	25.0	10.0	40.0					10.0	10.0	10.0
Actuated g/C Ratio		0.42	0.42	0.17	0.67					0.17	0.17	0.17
v/c Ratio		0.37	0.17	0.81	0.21					0.04	0.97	0.22
Control Delay		7.1	1.1	35.6	1.2					21.6	74.8	3.7
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		7.1	1.1	35.6	1.2					21.6	74.8	3.7
LOS		A	A	D	A					C	E	A
Approach Delay		6.0			12.1						58.8	
Approach LOS		A			B						E	
Queue Length 50th (ft)		31	0	84	12					3	110	0
Queue Length 95th (ft)		51	m0	#185	2					15	#246	15
Internal Link Dist (ft)		423			762			226			1206	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1489	751	289	2359					263	310	357
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.35	0.16	0.81	0.21					0.04	0.97	0.22

Intersection Summary

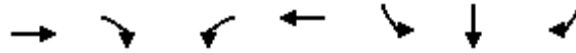
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 20.2 Intersection LOS: C
 Intersection Capacity Utilization 60.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149



Phasings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	25.0	25.0	7.0	25.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	12.0	30.0	15.0	15.0	15.0
Total Split (s)	31.0	31.0	14.0	45.0	15.0	15.0	15.0
Total Split (%)	51.7%	51.7%	23.3%	75.0%	25.0%	25.0%	25.0%
Maximum Green (s)	26.0	26.0	9.0	40.0	10.0	10.0	10.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
30th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
10th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
10th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
5: SB C-D/SB Off Ramp & IL 149

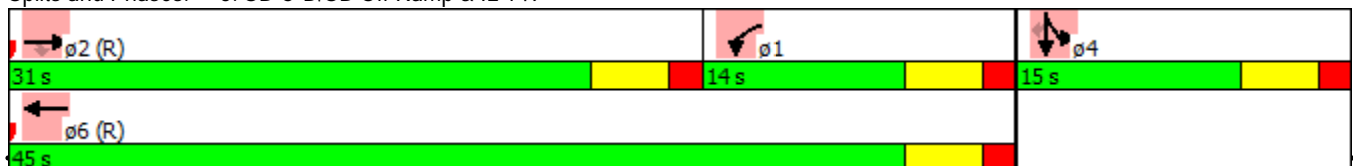
2032 Design Year - Build
AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↘	↑	↗
Volume (vph)	0	501	114	222	479	0	0	0	0	10	287	76
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Satd. Flow (RTOR)			127									127
Lane Group Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Total Split (s)		31.0	31.0	14.0	45.0					15.0	15.0	15.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Act Effect Green (s)		25.0	25.0	10.0	40.0					10.0	10.0	10.0
Actuated g/C Ratio		0.42	0.42	0.17	0.67					0.17	0.17	0.17
v/c Ratio		0.37	0.17	0.81	0.21					0.04	0.97	0.22
Control Delay		7.1	1.1	35.6	1.2					21.6	74.8	3.7
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		7.1	1.1	35.6	1.2					21.6	74.8	3.7
LOS		A	A	D	A					C	E	A
Approach Delay		6.0			12.1						58.8	
Approach LOS		A			B						E	
Queue Length 50th (ft)		31	0	84	12					3	110	0
Queue Length 95th (ft)		51	m0	#185	2					15	#246	15
Internal Link Dist (ft)		423			762			226			1206	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1489	751	289	2359					263	310	357
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.35	0.16	0.81	0.21					0.04	0.97	0.22

Intersection Summary













Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 20.2 Intersection LOS: C
 Intersection Capacity Utilization 60.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149
























HCM 2010 Signalized Intersection Summary
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖	↑	↗
Volume (veh/h)	0	501	114	222	479	0	0	0	0	10	287	76
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	184.5	182.7	186.3	0.0				166.7	186.3	177.6
Adj Flow Rate, veh/h	0	527	0	234	504	0				11	302	0
Adj No. of Lanes	0	2	1	1	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	4	2	0				14	2	7
Cap, veh/h	0	1457	664	265	2339	0				269	316	256
Arrive On Green	0.00	0.42	0.00	0.31	1.00	0.00				0.17	0.17	0.00
Sat Flow, veh/h	0	3529	1568	1740	3632	0				1587	1863	1509
Grp Volume(v), veh/h	0	527	0	234	504	0				11	302	0
Grp Sat Flow(s),veh/h/ln	0	1719	1568	1740	1770	0				1587	1863	1509
Q Serve(g_s), s	0.0	6.2	0.0	7.5	0.0	0.0				0.3	9.5	0.0
Cycle Q Clear(g_c), s	0.0	6.2	0.0	7.5	0.0	0.0				0.3	9.5	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1457	664	265	2339	0				269	316	256
V/C Ratio(X)	0.00	0.36	0.00	0.88	0.22	0.00				0.04	0.96	0.00
Avail Cap(c_a), veh/h	0	1515	691	265	2399	0				269	316	256
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.6	0.0	20.0	0.0	0.0				20.5	24.3	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	25.9	0.2	0.0				0.1	39.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.4	0.0	9.2	0.1	0.0				0.3	13.0	0.0
LnGrp Delay(d),s/veh	0.0	12.3	0.0	45.9	0.2	0.0				20.6	63.3	0.0
LnGrp LOS		B		D	A					C	E	
Approach Vol, veh/h		527			738						313	
Approach Delay, s/veh		12.3			14.7						61.8	
Approach LOS		B			B						E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	15.0	30.0		15.0		45.0						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	9.0	26.0		10.0		40.0						
Max Q Clear Time (g_c+I1), s	9.5	8.2		11.5		2.0						
Green Ext Time (p_c), s	0.0	3.3		0.0		4.5						
Intersection Summary												
HCM 2010 Ctrl Delay			23.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	109	428	0	0	625	76	46	234	2	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		200	225		225	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			127			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		842			517			1563			1224	
Travel Time (s)		19.1			11.8			23.7			18.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	5%	2%	2%	2%	7%	3%	4%	5%	2%	2%	2%
Adj. Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	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)		12			12			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
Number of Detectors	1	2			2	1	1	2	1			
Detector Template	Left	Thru			Thru	Right	Left	Thru	Right			
Leading Detector (ft)	20	100			100	20	20	100	20			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	20	6	20			
Detector 1 Type	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			
Detector 1 Queue (s)	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			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

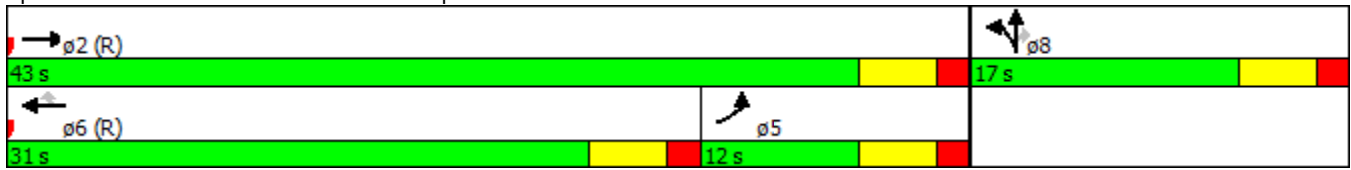


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	25.0			25.0	25.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	30.0			30.0	30.0	12.0	12.0	12.0			
Total Split (s)	12.0	43.0			31.0	31.0	17.0	17.0	17.0			
Total Split (%)	20.0%	71.7%			51.7%	51.7%	28.3%	28.3%	28.3%			
Maximum Green (s)	7.0	38.0			26.0	26.0	12.0	12.0	12.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag			Lead		Lead						
Lead-Lag Optimize?	Yes			Yes		Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effct Green (s)	7.8	38.8			28.4	28.4	11.2	11.2	11.2			
Actuated g/C Ratio	0.13	0.65			0.47	0.47	0.19	0.19	0.19			
v/c Ratio	0.53	0.20			0.39	0.10	0.15	0.72	0.01			
Control Delay	22.0	2.2			7.5	1.8	22.5	37.6	0.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	22.0	2.2			7.5	1.8	22.5	37.6	0.0			
LOS	C	A			A	A	C	D	A			
Approach Delay		6.2			6.9			34.9				
Approach LOS		A			A			C				
Queue Length 50th (ft)	29	10			87	3	16	94	0			
Queue Length 95th (ft)	#71	16			96	m9	41	#172	m0			
Internal Link Dist (ft)		762			437			1483			1144	
Turn Bay Length (ft)	260					200	225		225			
Base Capacity (vph)	216	2223			1715	796	350	365	409			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.53	0.20			0.38	0.10	0.14	0.67	0.00			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 59 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.9
 Intersection LOS: B
 Intersection Capacity Utilization 60.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



Phasings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour



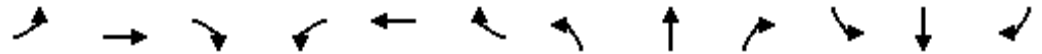
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	25.0	25.0	25.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	30.0	30.0	12.0	12.0	12.0
Total Split (s)	12.0	43.0	31.0	31.0	17.0	17.0	17.0
Total Split (%)	20.0%	71.7%	51.7%	51.7%	28.3%	28.3%	28.3%
Maximum Green (s)	7.0	38.0	26.0	26.0	12.0	12.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
50th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
30th %ile Green (s)	8.0	38.6	25.6	25.6	11.4	11.4	11.4
30th %ile Term Code	Max	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	41.4	41.4	41.4	8.6	8.6	8.6
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 59 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
 AM Peak Hour

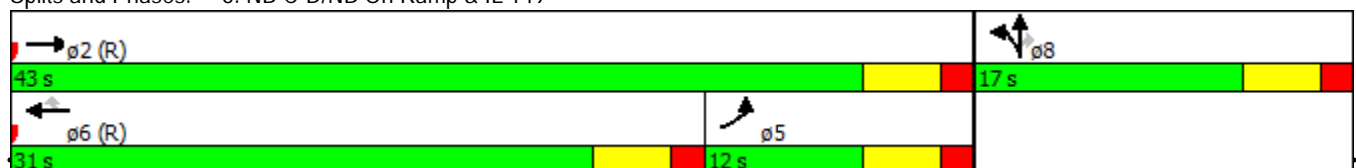


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	428	0	0	625	76	46	234	2	0	0	0
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Satd. Flow (RTOR)							127			127		
Lane Group Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases							6			8		
Total Split (s)	12.0	43.0			31.0	31.0	17.0	17.0	17.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Act Effct Green (s)	7.8	38.8			28.4	28.4	11.2	11.2	11.2			
Actuated g/C Ratio	0.13	0.65			0.47	0.47	0.19	0.19	0.19			
v/c Ratio	0.53	0.20			0.39	0.10	0.15	0.72	0.01			
Control Delay	22.0	2.2			7.5	1.8	22.5	37.6	0.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	22.0	2.2			7.5	1.8	22.5	37.6	0.0			
LOS	C	A			A	A	C	D	A			
Approach Delay					6.2		6.9			34.9		
Approach LOS					A		A			C		
Queue Length 50th (ft)	29	10			87	3	16	94	0			
Queue Length 95th (ft)	#71	16			96	m9	41	#172	m0			
Internal Link Dist (ft)	762				437			1483			1144	
Turn Bay Length (ft)	260							200		225		225
Base Capacity (vph)	216	2223			1715	796	350	365	409			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.53	0.20			0.38	0.10	0.14	0.67	0.00			

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 59 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.9
 Intersection LOS: B
 Intersection Capacity Utilization 60.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



HCM 2010 Signalized Intersection Summary
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (veh/h)	109	428	0	0	625	76	46	234	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	175.9	181.0	0.0	0.0	186.3	177.6	184.5	182.7	181.0			
Adj Flow Rate, veh/h	115	451	0	0	658	0	48	246	0			
Adj No. of Lanes	1	2	0	0	2	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	8	5	0	0	2	7	3	4	5			
Cap, veh/h	176	2227	0	0	1601	683	301	313	263			
Arrive On Green	0.21	1.00	0.00	0.00	0.60	0.00	0.06	0.06	0.00			
Sat Flow, veh/h	1675	3529	0	0	3632	1509	1757	1827	1538			
Grp Volume(v), veh/h	115	451	0	0	658	0	48	246	0			
Grp Sat Flow(s),veh/h/ln	1675	1719	0	0	1770	1509	1757	1827	1538			
Q Serve(g_s), s	3.5	0.0	0.0	0.0	5.4	0.0	1.4	7.3	0.0			
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	5.4	0.0	1.4	7.3	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	176	2227	0	0	1601	683	301	313	263			
V/C Ratio(X)	0.65	0.20	0.00	0.00	0.41	0.00	0.16	0.79	0.00			
Avail Cap(c_a), veh/h	212	2364	0	0	1665	710	381	397	334			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.33	1.33	0.33	0.33	0.33			
Upstream Filter(I)	0.94	0.94	0.00	0.00	1.00	0.00	0.99	0.99	0.00			
Uniform Delay (d), s/veh	20.9	0.0	0.0	0.0	7.1	0.0	22.3	25.1	0.0			
Incr Delay (d2), s/veh	5.0	0.2	0.0	0.0	0.8	0.0	0.2	7.8	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	3.2	0.1	0.0	0.0	5.0	0.0	1.3	7.8	0.0			
LnGrp Delay(d),s/veh	25.9	0.2	0.0	0.0	7.9	0.0	22.5	32.9	0.0			
LnGrp LOS	C	A			A		C	C				
Approach Vol, veh/h		566			658			294				
Approach Delay, s/veh		5.4			7.9			31.2				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		45.5			15.5	30.0		14.5				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		38.0			7.0	26.0		12.0				
Max Q Clear Time (g_c+I1), s		2.0			5.5	7.4		9.3				
Green Ext Time (p_c), s		3.7			0.5	4.4		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay				11.5								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	349	36	110	683	27	18	1	77	1	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		115	200		115	115		115	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.986			0.994			0.892			0.981	
Flt Protected	0.950			0.950				0.991			0.993	
Satd. Flow (prot)	1770	1789	0	1770	1852	0	0	1647	0	0	1815	0
Flt Permitted	0.950			0.950				0.932			0.961	
Satd. Flow (perm)	1770	1789	0	1770	1852	0	0	1549	0	0	1756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			5			81			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		511			1030			591			583	
Travel Time (s)		11.6			23.4			13.4			13.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	18	367	38	116	719	28	19	1	81	1	5	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	405	0	116	747	0	0	101	0	0	7	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

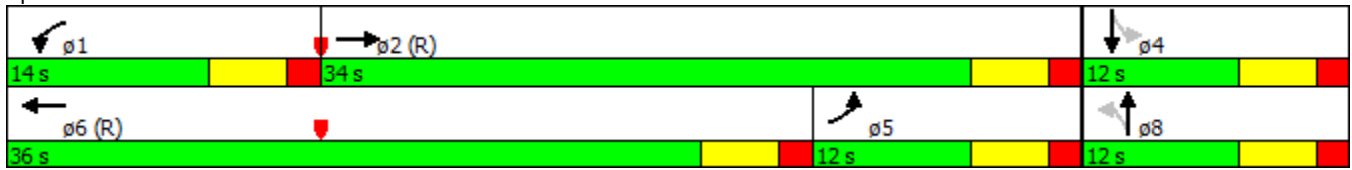


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0		12.0	12.0	
Total Split (s)	12.0	34.0		14.0	36.0		12.0	12.0		12.0	12.0	
Total Split (%)	20.0%	56.7%		23.3%	60.0%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	7.0	29.0		9.0	31.0		7.0	7.0		7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effect Green (s)	7.0	34.9		8.7	43.8		7.2	7.2		7.2	7.2	
Actuated g/C Ratio	0.12	0.58		0.14	0.73		0.12	0.12		0.12	0.12	
v/c Ratio	0.09	0.39		0.45	0.55		0.39	0.39		0.39	0.39	
Control Delay	13.9	2.8		31.9	3.0		9.4	9.4		9.4	9.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.9	2.8		31.9	3.0		9.4	9.4		9.4	9.4	
LOS	B	A		C	A		A	A		A	A	
Approach Delay		3.3			6.9		9.4	9.4		9.4	9.4	
Approach LOS		A			A		A	A		A	A	
Queue Length 50th (ft)	4	21		33	14		2	2		2	2	
Queue Length 95th (ft)	21	35		m56	#33		m29	m29		12	12	
Internal Link Dist (ft)		431			950		511	511		503	503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	206	1061		276	1354		256	256		210	210	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.38		0.42	0.55		0.39	0.39		0.39	0.39	

Intersection Summary

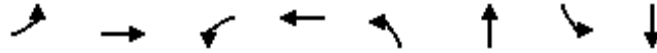
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 36 (60%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.1
 Intersection LOS: A
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



Phasings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	34.0	14.0	36.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	56.7%	23.3%	60.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Walk Time (s)								
Flash Dont Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max
70th %ile Green (s)	0.0	26.6	10.6	42.2	7.8	7.8	7.8	7.8
70th %ile Term Code	Skip	Coord	Gap	Coord	Gap	Gap	Hold	Hold
50th %ile Green (s)	0.0	28.8	9.2	43.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
30th %ile Green (s)	0.0	30.2	7.8	43.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 36 (60%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

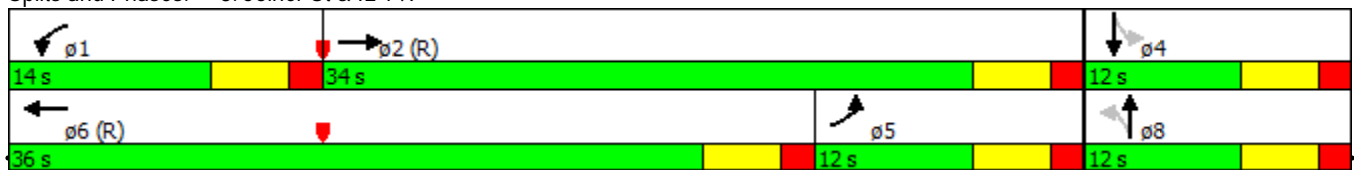


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	349	36	110	683	27	18	1	77	1	5	1
Satd. Flow (prot)	1770	1789	0	1770	1852	0	0	1647	0	0	1815	0
Flt Permitted	0.950			0.950				0.932			0.961	
Satd. Flow (perm)	1770	1789	0	1770	1852	0	0	1549	0	0	1756	0
Satd. Flow (RTOR)		12			5			81			1	
Lane Group Flow (vph)	18	405	0	116	747	0	0	101	0	0	7	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Total Split (s)	12.0	34.0		14.0	36.0		12.0	12.0		12.0	12.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Act Effect Green (s)	7.0	34.9		8.7	43.8			7.2			7.2	
Actuated g/C Ratio	0.12	0.58		0.14	0.73			0.12			0.12	
v/c Ratio	0.09	0.39		0.45	0.55			0.39			0.03	
Control Delay	13.9	2.8		31.9	3.0			9.4			22.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.9	2.8		31.9	3.0			9.4			22.6	
LOS	B	A		C	A			A			C	
Approach Delay		3.3			6.9			9.4			22.6	
Approach LOS		A			A			A			C	
Queue Length 50th (ft)	4	21		33	14			2			2	
Queue Length 95th (ft)	21	35		m56	#33			m29			12	
Internal Link Dist (ft)		431			950			511			503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	206	1061		276	1354			256			210	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.38		0.42	0.55			0.39			0.03	

Intersection Summary



















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 36 (60%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 6.1
 Intersection LOS: A
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



HCM 2010 Signalized Intersection Summary
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	349	36	110	683	27	18	1	77	1	5	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	181.4	190.0	186.3	186.3	190.0	190.0	186.3	190.0	190.0	186.3	190.0
Adj Flow Rate, veh/h	18	367	38	116	719	28	19	1	81	1	5	1
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	791	82	196	871	34	105	12	136	92	152	27
Arrive On Green	0.04	0.16	0.16	0.15	0.65	0.65	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1774	1617	167	1774	1781	69	198	114	1263	103	1418	253
Grp Volume(v), veh/h	18	0	405	116	0	747	101	0	0	7	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1785	1774	0	1851	1575	0	0	1774	0	0
Q Serve(g_s), s	0.5	0.0	10.5	3.1	0.0	15.6	1.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	10.5	3.1	0.0	15.6	3.1	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.04	0.19		0.80	0.14		0.14
Lane Grp Cap(c), veh/h	196	0	872	196	0	905	253	0	0	271	0	0
V/C Ratio(X)	0.09	0.00	0.46	0.59	0.00	0.83	0.40	0.00	0.00	0.03	0.00	0.00
Avail Cap(c_a), veh/h	243	0	1012	312	0	1122	298	0	0	322	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.74	0.00	0.74	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.2	0.0	15.4	20.7	0.0	7.3	21.7	0.0	0.0	20.5	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	1.8	2.1	0.0	6.5	1.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	9.5	2.9	0.0	13.4	2.6	0.0	0.0	0.2	0.0	0.0
LnGrp Delay(d),s/veh	22.4	0.0	17.1	22.8	0.0	13.8	22.8	0.0	0.0	20.5	0.0	0.0
LnGrp LOS	C		B	C		B	C			C		
Approach Vol, veh/h		423			863			101			7	
Approach Delay, s/veh		17.4			15.0			22.8			20.5	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	38.9		10.5	19.5	30.0		10.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	29.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	5.1	12.5		2.2	2.5	17.6		5.1				
Green Ext Time (p_c), s	0.1	2.3		0.2	1.0	4.5		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			16.3									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	386	6	144	765	3	7	38	155	1	40	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	0		115	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
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		0.998			0.999				0.850			0.927
Flt Protected	0.950			0.950				0.993				0.999
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1850	1583	0	1725	0
Flt Permitted	0.950			0.950				0.957				0.995
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1783	1583	0	1718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2							163			51
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1030			1325			920				481
Travel Time (s)		23.4			30.1			20.9				10.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	36	406	6	152	805	3	7	40	163	1	42	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	412	0	152	808	0	0	47	163	0	94	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)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
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	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	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
Detector 1 Queue (s)	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
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	NA		Prot	NA		Perm	NA	Perm	Perm		NA
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

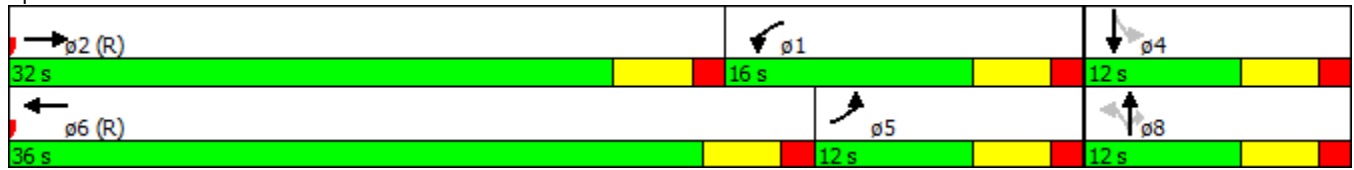


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	32.0		16.0	36.0		12.0	12.0	12.0	12.0	12.0	
Total Split (%)	20.0%	53.3%		26.7%	60.0%		20.0%	20.0%	20.0%	20.0%	20.0%	
Maximum Green (s)	7.0	27.0		11.0	31.0		7.0	7.0	7.0	7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	7.0	33.5		10.3	41.6			7.0	7.0		7.0	
Actuated g/C Ratio	0.12	0.56		0.17	0.69			0.12	0.12		0.12	
v/c Ratio	0.17	0.41		0.50	0.63			0.23	0.50		0.38	
Control Delay	24.0	4.5		28.0	12.4			28.7	14.5		18.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	24.0	4.5		28.0	12.4			28.7	14.5		18.7	
LOS	C	A		C	B			C	B		B	
Approach Delay		6.0			14.8			17.7			18.7	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	14	23		50	110			14	0		14	
Queue Length 95th (ft)	m34	38		96	#445			37	47		52	
Internal Link Dist (ft)		950			1245			840			401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	208	1030		343	1290			208	328		245	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.17	0.40		0.44	0.63			0.23	0.50		0.38	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 58 (97%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.1 Intersection LOS: B
 Intersection Capacity Utilization 65.4% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149



Phasings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8			4
Permitted Phases					8		8	4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	32.0	16.0	36.0	12.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	53.3%	26.7%	60.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	27.0	11.0	31.0	7.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lead	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	25.7	12.3	31.0	7.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	7.0	25.0	13.0	31.0	7.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Max	Coord	Hold	Coord	Max	Max	Max	Max	Max
50th %ile Green (s)	0.0	27.6	10.4	43.0	7.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	29.3	8.7	43.0	7.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 58 (97%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

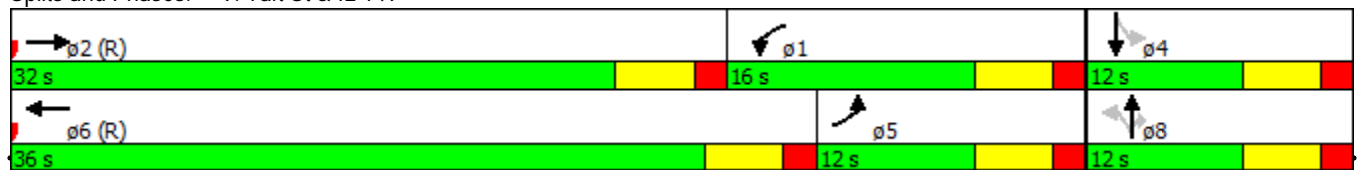


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	386	6	144	765	3	7	38	155	1	40	48
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1850	1583	0	1725	0
Flt Permitted	0.950			0.950				0.957			0.995	
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1783	1583	0	1718	0
Satd. Flow (RTOR)		2							163		51	
Lane Group Flow (vph)	36	412	0	152	808	0	0	47	163	0	94	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Total Split (s)	12.0	32.0		16.0	36.0		12.0	12.0	12.0	12.0	12.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Act Effect Green (s)	7.0	33.5		10.3	41.6			7.0	7.0		7.0	
Actuated g/C Ratio	0.12	0.56		0.17	0.69			0.12	0.12		0.12	
v/c Ratio	0.17	0.41		0.50	0.63			0.23	0.50		0.38	
Control Delay	24.0	4.5		28.0	12.4			28.7	14.5		18.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	24.0	4.5		28.0	12.4			28.7	14.5		18.7	
LOS	C	A		C	B			C	B		B	
Approach Delay		6.0			14.8			17.7			18.7	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	14	23		50	110			14	0		14	
Queue Length 95th (ft)	m34	38		96	#445			37	47		52	
Internal Link Dist (ft)		950			1245			840			401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	208	1030		343	1290			208	328		245	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.17	0.40		0.44	0.63			0.23	0.50		0.38	

Intersection Summary




















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 58 (97%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.1
 Intersection LOS: B
 Intersection Capacity Utilization 65.4%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149



























HCM 2010 Signalized Intersection Summary
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	386	6	144	765	3	7	38	155	1	40	48
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	188.1	181.1	190.0	186.3	186.3	190.0	190.0	186.3	186.3	190.0	186.3	190.0
Adj Flow Rate, veh/h	36	406	6	152	805	3	7	40	163	1	42	51
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	835	12	209	917	3	93	223	208	69	101	121
Arrive On Green	0.03	0.15	0.15	0.12	0.49	0.49	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1792	1780	26	1774	1855	7	116	1696	1583	6	770	921
Grp Volume(v), veh/h	36	0	412	152	0	808	47	0	163	94	0	0
Grp Sat Flow(s),veh/h/ln	1792	0	1806	1774	0	1862	1812	0	1583	1697	0	0
Q Serve(g_s), s	1.0	0.0	11.1	4.4	0.0	20.7	0.0	0.0	5.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	0.0	11.1	4.4	0.0	20.7	1.2	0.0	5.3	2.7	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.15		1.00	0.01		0.54
Lane Grp Cap(c), veh/h	166	0	848	209	0	920	316	0	208	291	0	0
V/C Ratio(X)	0.22	0.00	0.49	0.73	0.00	0.88	0.15	0.00	0.78	0.32	0.00	0.00
Avail Cap(c_a), veh/h	235	0	915	366	0	1083	316	0	208	291	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.9	0.0	16.6	22.7	0.0	12.0	20.6	0.0	22.4	21.3	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	1.8	4.8	0.0	11.6	0.2	0.0	17.5	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.0	9.9	4.4	0.0	19.3	1.1	0.0	6.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.5	27.5	0.0	23.7	20.8	0.0	39.9	21.9	0.0	0.0
LnGrp LOS	C		B	C		C	C		D	C		
Approach Vol, veh/h		448			960			210			94	
Approach Delay, s/veh		19.0			24.3			35.6			21.9	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.0	30.0		12.0	16.7	31.3		12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	27.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	6.4	13.1		4.7	3.0	22.7		7.3				
Green Ext Time (p_c), s	0.2	2.1		0.3	0.2	3.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	112	458	49	91	607	77	62	213	90	104	175	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		200	180		180	115		0	125		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
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
Fr _t			0.850			0.850		0.955			0.914	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1845	1568	1787	1881	1615	1770	3280	0	1752	3217	0
Fl _t Permitted	0.160			0.301			0.377			0.526		
Satd. Flow (perm)	264	1845	1568	566	1881	1615	702	3280	0	970	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			154		78			249	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		365			1195			2431			1384	
Travel Time (s)		8.3			27.2			47.4			27.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	15%	3%	3%	1%	1%	0%	2%	6%	3%	3%	2%	3%
Adj. Flow (vph)	118	482	52	96	639	81	65	224	95	109	184	249
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	482	52	96	639	81	65	319	0	109	433	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
AM Peak Hour

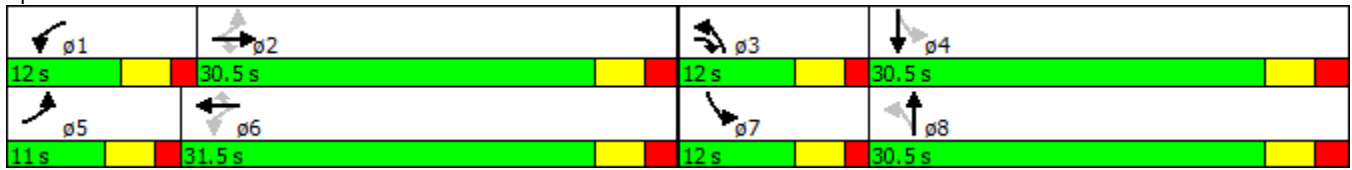


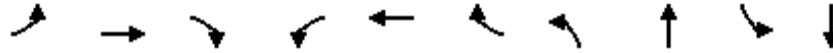
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	3	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	30.3	12.0	12.0	30.3	30.3	12.0	30.5		12.0	30.5	
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5		12.0	30.5	
Total Split (%)	12.9%	35.9%	14.1%	14.1%	37.1%	37.1%	14.1%	35.9%		14.1%	35.9%	
Maximum Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	25.0		7.3	25.0	
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3		1.5	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	None	None	Min	Min	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		18.0			18.0	18.0		18.0			17.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	31.8	26.7	39.1	33.0	27.3	27.3	16.6	10.6		17.0	10.7	
Actuated g/C Ratio	0.48	0.40	0.59	0.50	0.41	0.41	0.25	0.16		0.26	0.16	
v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.23	0.54		0.33	0.59	
Control Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
LOS	B	C	A	B	C	A	B	C		B	B	
Approach Delay		21.5			26.9			22.9			16.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	24	178	0	19	258	0	19	51		33	38	
Queue Length 95th (ft)	56	#344	6	45	#499	4	44	88		66	79	
Internal Link Dist (ft)		285			1115			2351			1304	
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	254	744	981	422	776	757	301	1339		339	1418	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.22	0.24		0.32	0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 66.1
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 22.4
 Intersection LOS: C
 Intersection Capacity Utilization 71.7%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: IL 37 & IL 149





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Protected Phases	5	2	3	1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.3	12.0	12.0	30.3	30.3	12.0	30.5	12.0	30.5
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5	12.0	30.5
Total Split (%)	12.9%	35.9%	14.1%	14.1%	37.1%	37.1%	14.1%	35.9%	14.1%	35.9%
Maximum Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	25.0	7.3	25.0
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3	1.5	2.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0		7.0
Flash Dont Walk (s)		18.0			18.0	18.0		18.0		17.0
Pedestrian Calls (#/hr)		0			0	0		0		0
90th %ile Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	15.0	7.3	15.0
90th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Hold	Max	Gap
70th %ile Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	12.0	7.3	12.0
70th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap	Max	Hold
50th %ile Green (s)	6.2	25.2	7.2	7.2	26.2	26.2	7.2	10.5	7.3	10.6
50th %ile Term Code	Max	Max	Gap	Max	Max	Max	Gap	Gap	Max	Hold
30th %ile Green (s)	6.2	25.8	6.5	6.6	26.2	26.2	6.5	9.2	7.3	10.0
30th %ile Term Code	Max	Hold	Gap	Gap	Max	Max	Gap	Gap	Max	Hold
10th %ile Green (s)	0.0	26.2	0.0	0.0	26.2	26.2	0.0	6.6	0.0	6.6
10th %ile Term Code	Skip	Hold	Skip	Skip	Max	Max	Skip	Gap	Skip	Hold

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 66.1
 Control Type: Actuated-Uncoordinated
 90th %ile Actuated Cycle: 75
 70th %ile Actuated Cycle: 72
 50th %ile Actuated Cycle: 70.5
 30th %ile Actuated Cycle: 69.2
 10th %ile Actuated Cycle: 43.6

Queues
10: IL 37 & IL 149

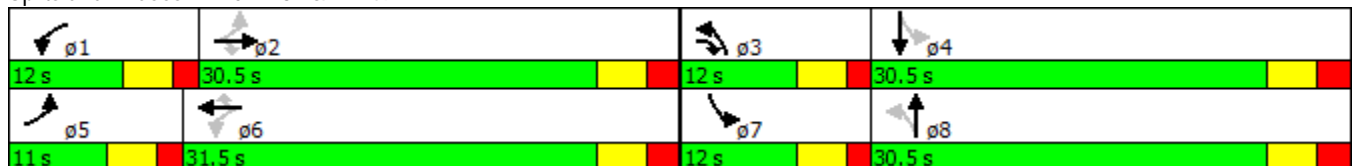
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	112	458	49	91	607	77	62	213	90	104	175	237
Satd. Flow (prot)	1570	1845	1568	1787	1881	1615	1770	3280	0	1752	3217	0
Flt Permitted	0.160			0.301			0.377			0.526		
Satd. Flow (perm)	264	1845	1568	566	1881	1615	702	3280	0	970	3217	0
Satd. Flow (RTOR)			94			154		78			249	
Lane Group Flow (vph)	118	482	52	96	639	81	65	319	0	109	433	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5		12.0	30.5	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Act Effect Green (s)	31.8	26.7	39.1	33.0	27.3	27.3	16.6	10.6		17.0	10.7	
Actuated g/C Ratio	0.48	0.40	0.59	0.50	0.41	0.41	0.25	0.16		0.26	0.16	
v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.23	0.54		0.33	0.59	
Control Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
LOS	B	C	A	B	C	A	B	C		B	B	
Approach Delay		21.5			26.9			22.9			16.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	24	178	0	19	258	0	19	51		33	38	
Queue Length 95th (ft)	56	#344	6	45	#499	4	44	88		66	79	
Internal Link Dist (ft)		285			1115			2351			1304	
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	254	744	981	422	776	757	301	1339		339	1418	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.22	0.24		0.32	0.31	

Intersection Summary

























Cycle Length: 85
 Actuated Cycle Length: 66.1
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 22.4
 Intersection LOS: C
 Intersection Capacity Utilization 71.7%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: IL 37 & IL 149



HCM 2010 Signalized Intersection Summary
 10: IL 37 & IL 149

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	112	458	49	91	607	77	62	213	90	104	175	237
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1652	1845	1845	1881	1881	1900	1863	1808	1900	1845	1852	1900
Adj Flow Rate, veh/h	118	482	52	96	639	81	65	224	95	109	184	249
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	15	3	3	1	1	0	2	6	6	3	2	2
Cap, veh/h	233	684	662	341	684	588	272	500	206	353	399	357
Arrive On Green	0.07	0.37	0.37	0.06	0.36	0.36	0.05	0.21	0.21	0.07	0.23	0.23
Sat Flow, veh/h	1573	1845	1568	1792	1881	1615	1774	2376	976	1757	1760	1574
Grp Volume(v), veh/h	118	482	52	96	639	81	65	160	159	109	184	249
Grp Sat Flow(s),veh/h/ln	1573	1845	1568	1792	1881	1615	1774	1717	1635	1757	1760	1574
Q Serve(g_s), s	3.2	15.6	1.4	2.3	22.9	2.3	2.0	5.7	5.9	3.3	6.3	10.1
Cycle Q Clear(g_c), s	3.2	15.6	1.4	2.3	22.9	2.3	2.0	5.7	5.9	3.3	6.3	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	233	684	662	341	684	588	272	362	344	353	399	357
V/C Ratio(X)	0.51	0.70	0.08	0.28	0.93	0.14	0.24	0.44	0.46	0.31	0.46	0.70
Avail Cap(c_a), veh/h	266	684	662	417	705	605	366	614	585	418	629	563
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	18.7	12.1	14.1	21.4	14.9	20.4	24.0	24.1	19.7	23.3	24.8
Incr Delay (d2), s/veh	1.7	3.3	0.1	0.4	19.2	0.1	0.4	0.8	1.0	0.5	0.8	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.5	8.5	0.6	1.1	15.4	1.1	1.0	2.8	2.8	1.7	3.2	4.7
LnGrp Delay(d),s/veh	18.3	22.0	12.1	14.5	40.6	15.0	20.8	24.9	25.1	20.2	24.2	27.3
LnGrp LOS	B	C	B	B	D	B	C	C	C	C	C	C
Approach Vol, veh/h		652			816			384			542	
Approach Delay, s/veh		20.5			35.0			24.3			24.8	
Approach LOS		C			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	31.2	8.3	21.4	9.5	30.7	9.4	20.2				
Change Period (Y+Rc), s	* 4.8	* 5.3	* 4.7	5.5	* 4.8	* 5.3	* 4.7	5.5				
Max Green Setting (Gmax), s	* 7.2	* 25	* 7.3	25.0	* 6.2	* 26	* 7.3	25.0				
Max Q Clear Time (g_c+I1), s	4.3	17.6	4.0	12.1	5.2	24.9	5.3	7.9				
Green Ext Time (p_c), s	0.0	4.5	0.0	3.7	0.0	0.6	0.0	4.2				
Intersection Summary												
HCM 2010 Ctrl Delay			27.0									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 11: Winery Rd/New Winery Rd & Burlington

2032 Design Year - Build
 AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖		↖		↖			↕	
Volume (vph)	0	137	11	1	0	123	0	39	1	7	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	1		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.990				0.850		0.997				
Flt Protected				0.950							0.988	
Satd. Flow (prot)	0	1795	0	1770	0	1509	0	1857	0	0	1763	0
Flt Permitted				0.950							0.988	
Satd. Flow (perm)	0	1795	0	1770	0	1509	0	1857	0	0	1763	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		931			1144			1777			332	
Travel Time (s)		21.2			26.0			34.6			6.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	7%	2%	2%	2%	2%	8%	2%
Adj. Flow (vph)	0	144	12	1	0	129	0	41	1	7	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	1	0	129	0	42	0	0	28	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
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	28.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection										
Int Delay, s/veh	0									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	137	11	1	0	123	0	39	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	5	2	2	2	7	2	2	2
Mvmt Flow	0	144	12	1	0	129	0	41	1

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	0	0	0	156	0	0	161	152	150
Stage 1	-	-	-	-	-	-	150	150	-
Stage 2	-	-	-	-	-	-	11	2	-
Critical Hdwy	-	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	-	1424	-	-	804	740	896
Stage 1	-	-	-	-	-	-	853	773	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	1424	-	-	-	739	896
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	739	-
Stage 1	-	-	-	-	-	-	853	773	-
Stage 2	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	-
HCM LOS	-	-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-	1424	-	-	-
HCM Lane V/C Ratio	-	-	-	-	0.001	-	-	-
HCM Control Delay (s)	-	0	-	-	7.5	-	-	-
HCM Lane LOS	-	A	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	7	20	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	8	2
Mvmt Flow	7	21	0

Major/Minor **Minor2**

Conflicting Flow All	171	158	0
Stage 1	0	2	-
Stage 2	171	156	-
Critical Hdwy	7.12	6.58	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	6.12	5.58	-
Follow-up Hdwy	3.518	4.072	-
Pot Cap-1 Maneuver	792	723	-
Stage 1	-	-	-
Stage 2	831	757	-
Platoon blocked, %			
Mov Cap-1 Maneuver	757	722	-
Mov Cap-2 Maneuver	757	722	-
Stage 1	-	-	-
Stage 2	786	757	-

Approach **SB**






















HCM Control Delay, s

HCM LOS -

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
12: Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	152	6	59	168	50	6	1	54	29	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		115	115		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.995			0.965				0.850		0.925	
Flt Protected	0.950			0.950				0.959		0.950		
Satd. Flow (prot)	1770	1819	0	1787	1741	0	0	1786	1583	1770	1723	0
Flt Permitted	0.950			0.950				0.959		0.950		
Satd. Flow (perm)	1770	1819	0	1787	1741	0	0	1786	1583	1770	1723	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1144			919			730			505	
Travel Time (s)		26.0			20.9			14.2			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	1%	6%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	14	160	6	62	177	53	6	1	57	31	1	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	166	0	62	230	0	0	7	57	31	2	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	33.5%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	13	152	6	59	168	50	6	1	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	4	2	1	6	3	2	2	2
Mvmt Flow	14	160	6	62	177	53	6	1	57

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	229	0	0	166	0	0	519	545	163
Stage 1	-	-	-	-	-	-	191	191	-
Stage 2	-	-	-	-	-	-	328	354	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1339	-	-	1418	-	-	467	446	882
Stage 1	-	-	-	-	-	-	811	742	-
Stage 2	-	-	-	-	-	-	685	630	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1339	-	-	1418	-	-	446	422	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	422	-
Stage 1	-	-	-	-	-	-	803	734	-
Stage 2	-	-	-	-	-	-	653	602	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	1.6	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	442	882	1339	-	-	1418	-	-	419	573
HCM Lane V/C Ratio	0.017	0.064	0.01	-	-	0.044	-	-	0.073	0.004
HCM Control Delay (s)	13.3	9.4	7.7	-	-	7.7	-	-	14.3	11.3
HCM Lane LOS	B	A	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0.1	0.2	0	-	-	0.1	-	-	0.2	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	29	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	31	1	1

Major/Minor	Minor2		
Conflicting Flow All	518	521	203
Stage 1	327	327	-
Stage 2	191	194	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	468	460	838
Stage 1	686	648	-
Stage 2	811	740	-
Platoon blocked, %			
Mov Cap-1 Maneuver	419	435	838
Mov Cap-2 Maneuver	419	435	-
Stage 1	679	620	-
Stage 2	750	732	-

Approach SB

HCM Control Delay, s	14.1
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	143	85	280	191	50	78	1	257	58	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	250		115	115		0	115		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
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			0.850			0.850			0.850		0.985	
Flt Protected	0.950			0.950				0.953			0.958	
Satd. Flow (prot)	1770	1827	1583	1805	1810	1599	0	1775	1509	0	1775	0
Flt Permitted	0.950			0.950				0.677			0.695	
Satd. Flow (perm)	1770	1827	1583	1805	1810	1599	0	1261	1509	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			127			309		8	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		919			705			592			629	
Travel Time (s)		20.9			16.0			11.5			12.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	0%	5%	1%	2%	1%	7%	1%	0%	1%
Adj. Flow (vph)	7	151	89	295	201	53	82	1	271	61	1	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	151	89	295	201	53	0	83	271	0	70	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)		12			12			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
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	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	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
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	
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	
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	
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	
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	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		Free	4		

Lanes, Volumes, Timings
 13: Russell Rd & Burlington

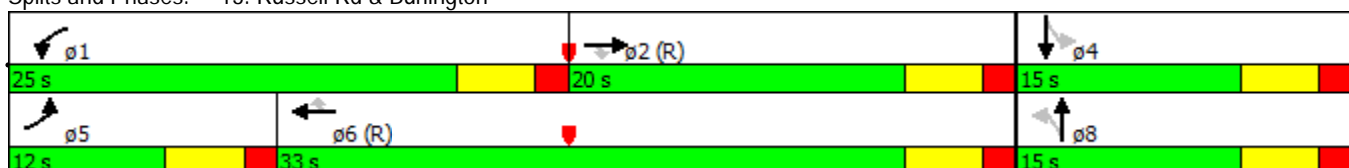
2032 Design Year - Build
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0	
Total Split (s)	12.0	20.0	20.0	25.0	33.0	33.0	15.0	15.0		15.0	15.0	
Total Split (%)	20.0%	33.3%	33.3%	41.7%	55.0%	55.0%	25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	7.0	15.0	15.0	20.0	28.0	28.0	10.0	10.0		10.0	10.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None	
Act Effect Green (s)	7.0	23.4	23.4	14.9	41.9	41.9		9.1	60.0		9.1	
Actuated g/C Ratio	0.12	0.39	0.39	0.25	0.70	0.70		0.15	1.00		0.15	
v/c Ratio	0.03	0.21	0.12	0.66	0.16	0.05		0.43	0.18		0.35	
Control Delay	24.0	17.2	0.3	18.2	6.7	1.9		29.9	0.3		25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	24.0	17.2	0.3	18.2	6.7	1.9		29.9	0.3		25.0	
LOS	C	B	A	B	A	A		C	A		C	
Approach Delay		11.3			12.4			7.2			25.0	
Approach LOS		B			B			A			C	
Queue Length 50th (ft)	2	38	0	53	5	0		28	0		20	
Queue Length 95th (ft)	12	91	0	93	108	m5		62	0		51	
Internal Link Dist (ft)		839			625			512			549	
Turn Bay Length (ft)	150		150	250		115						
Base Capacity (vph)	206	719	755	601	1269	1159		218	1509		229	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.03	0.21	0.12	0.49	0.16	0.05		0.38	0.18		0.31	

Intersection Summary
 Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.4 Intersection LOS: B
 Intersection Capacity Utilization 46.8% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Russell Rd & Burlington



Phasings
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2		1	6			8			4
Permitted Phases			2			6	8		Free	4	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0
Total Split (s)	12.0	20.0	20.0	25.0	33.0	33.0	15.0	15.0		15.0	15.0
Total Split (%)	20.0%	33.3%	33.3%	41.7%	55.0%	55.0%	25.0%	25.0%		25.0%	25.0%
Maximum Green (s)	7.0	15.0	15.0	20.0	28.0	28.0	10.0	10.0		10.0	10.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None
Walk Time (s)											
Flash Dont Walk (s)											
Pedestrian Calls (#/hr)											
90th %ile Green (s)	7.0	14.0	14.0	20.0	27.0	27.0	11.0	11.0		11.0	11.0
90th %ile Term Code	Max	Coord	Coord	Max	Coord	Coord	Max	Max		Max	Max
70th %ile Green (s)	0.0	16.9	16.9	17.2	39.1	39.1	10.9	10.9		10.9	10.9
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
50th %ile Green (s)	0.0	20.8	20.8	15.0	40.8	40.8	9.2	9.2		9.2	9.2
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
30th %ile Green (s)	0.0	24.8	24.8	12.7	42.5	42.5	7.5	7.5		7.5	7.5
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
10th %ile Green (s)	0.0	40.6	40.6	9.4	55.0	55.0	0.0	0.0		0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑	↘	↙	↑	↘		↑	↘		↕	
Volume (vph)	7	143	85	280	191	50	78	1	257	58	1	8
Satd. Flow (prot)	1770	1827	1583	1805	1810	1599	0	1775	1509	0	1775	0
Flt Permitted	0.950			0.950				0.677			0.695	
Satd. Flow (perm)	1770	1827	1583	1805	1810	1599	0	1261	1509	0	1288	0
Satd. Flow (RTOR)			218			127			309		8	
Lane Group Flow (vph)	7	151	89	295	201	53	0	83	271	0	70	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8		Free	4		
Total Split (s)	12.0	20.0	20.0	25.0	33.0	33.0	15.0	15.0		15.0	15.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Act Effect Green (s)	7.0	23.4	23.4	14.9	41.9	41.9		9.1	60.0		9.1	
Actuated g/C Ratio	0.12	0.39	0.39	0.25	0.70	0.70		0.15	1.00		0.15	
v/c Ratio	0.03	0.21	0.12	0.66	0.16	0.05		0.43	0.18		0.35	
Control Delay	24.0	17.2	0.3	18.2	6.7	1.9		29.9	0.3		25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	24.0	17.2	0.3	18.2	6.7	1.9		29.9	0.3		25.0	
LOS	C	B	A	B	A	A		C	A		C	
Approach Delay		11.3			12.4			7.2			25.0	
Approach LOS		B			B			A			C	
Queue Length 50th (ft)	2	38	0	53	5	0		28	0		20	
Queue Length 95th (ft)	12	91	0	93	108	m5		62	0		51	
Internal Link Dist (ft)		839			625			512			549	
Turn Bay Length (ft)	150		150	250		115						
Base Capacity (vph)	206	719	755	601	1269	1159		218	1509		229	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.03	0.21	0.12	0.49	0.16	0.05		0.38	0.18		0.31	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.4

Intersection LOS: B

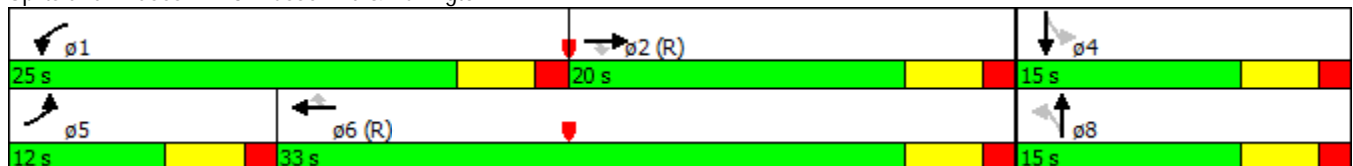
Intersection Capacity Utilization 46.8%

ICU Level of Service A

Analysis Period (min) 15






















m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Russell Rd & Burlington






















HCM 2010 Signalized Intersection Summary
 13: Russell Rd & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	143	85	280	191	50	78	1	257	58	1	8
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1827	1863	1900	1810	1881	1900	1863	1776	1900	1881	1900
Adj Flow Rate, veh/h	7	151	0	295	201	0	82	1	0	61	1	8
Adj No. of Lanes	1	1	1	1	1	1	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	4	2	0	5	1	1	1	7	0	0	0
Cap, veh/h	23	804	697	366	1139	1007	281	3	162	254	10	20
Arrive On Green	0.01	0.44	0.00	0.07	0.21	0.00	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1774	1827	1583	1810	1810	1599	1503	25	1509	1322	96	183
Grp Volume(v), veh/h	7	151	0	295	201	0	83	0	0	70	0	0
Grp Sat Flow(s),veh/h/ln	1774	1827	1583	1810	1810	1599	1529	0	1509	1601	0	0
Q Serve(g_s), s	0.2	3.0	0.0	9.6	5.5	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	3.0	0.0	9.6	5.5	0.0	2.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.99		1.00	0.87		0.11
Lane Grp Cap(c), veh/h	23	804	697	366	1139	1007	284	0	162	285	0	0
V/C Ratio(X)	0.31	0.19	0.00	0.81	0.18	0.00	0.29	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	207	804	697	603	1139	1007	367	0	252	370	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.91	0.91	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.3	10.2	0.0	26.8	11.0	0.0	25.1	0.0	0.0	24.9	0.0	0.0
Incr Delay (d2), s/veh	7.4	0.5	0.0	3.9	0.3	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.2	1.6	0.0	5.2	2.8	0.0	1.3	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	36.7	10.8	0.0	30.7	11.3	0.0	25.6	0.0	0.0	25.3	0.0	0.0
LnGrp LOS	D	B		C	B		C			C		
Approach Vol, veh/h		158			496			83			70	
Approach Delay, s/veh		11.9			22.8			25.6			25.3	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.1	31.4		11.5	5.8	42.8		11.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	15.0		10.0	7.0	28.0		10.0				
Max Q Clear Time (g_c+I1), s	11.6	5.0		4.2	2.2	7.5		4.8				
Green Ext Time (p_c), s	0.6	1.4		0.3	0.0	2.0		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			21.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
14: SB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	292	166	146	446	0	0	0	0	153	395	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	300		300
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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
Fr _t			0.850									0.850
Fl _t Protected				0.950						0.950		
Satd. Flow (prot)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599
Fl _t Permitted				0.950						0.950		
Satd. Flow (perm)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			175									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		705			764			936			1000	
Travel Time (s)		16.0			17.4			14.2			15.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	6%	2%	2%	2%	2%	2%	2%	2%	3%	1%
Adj. Flow (vph)	0	307	175	154	469	0	0	0	0	161	416	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	307	175	154	469	0	0	0	0	161	416	79
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)		12			12			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
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		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
Detector 1 Queue (s)		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
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4

Lanes, Volumes, Timings
14: SB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

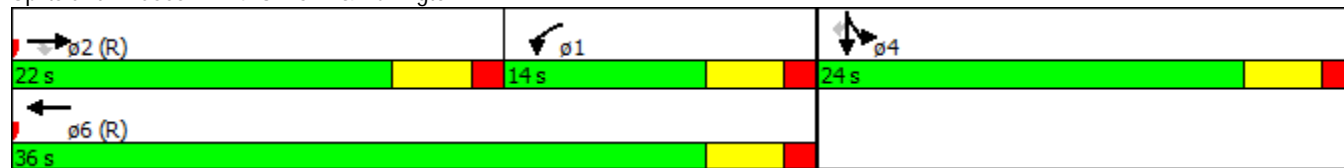


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0
Total Split (s)		22.0	22.0	14.0	36.0					24.0	24.0	24.0
Total Split (%)		36.7%	36.7%	23.3%	60.0%					40.0%	40.0%	40.0%
Maximum Green (s)		17.0	17.0	9.0	31.0					19.0	19.0	19.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		21.5	21.5	8.8	32.9					17.1	17.1	17.1
Actuated g/C Ratio		0.36	0.36	0.15	0.55					0.28	0.28	0.28
v/c Ratio		0.47	0.27	0.59	0.46					0.32	0.79	0.14
Control Delay		17.8	3.5	26.7	5.7					8.9	19.7	0.8
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		17.8	3.5	26.7	5.7					8.9	19.7	0.8
LOS		B	A	C	A					A	B	A
Approach Delay		12.6			10.9						14.8	
Approach LOS		B			B						B	
Queue Length 50th (ft)		102	0	56	63					14	66	0
Queue Length 95th (ft)		117	19	#96	31					m17	m78	m0
Internal Link Dist (ft)		625			684			856			920	
Turn Bay Length (ft)				250						300		300
Base Capacity (vph)		654	663	271	1020					560	584	593
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.47	0.26	0.57	0.46					0.29	0.71	0.13

Intersection Summary

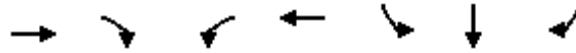
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.8 Intersection LOS: B
 Intersection Capacity Utilization 56.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB C-D & Burlington



Phasings
14: SB C-D & Burlington

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Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	22.0	22.0	14.0	36.0	24.0	24.0	24.0
Total Split (%)	36.7%	36.7%	23.3%	60.0%	40.0%	40.0%	40.0%
Maximum Green (s)	17.0	17.0	9.0	31.0	19.0	19.0	19.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	17.0	17.0	9.0	31.0	19.0	19.0	19.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	17.0	17.0	9.0	31.0	19.0	19.0	19.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	16.0	16.0	10.0	31.0	19.0	19.0	19.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	19.9	19.9	8.9	33.8	16.2	16.2	16.2
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
10th %ile Green (s)	37.6	37.6	0.0	37.6	12.4	12.4	12.4
10th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
14: SB C-D & Burlington

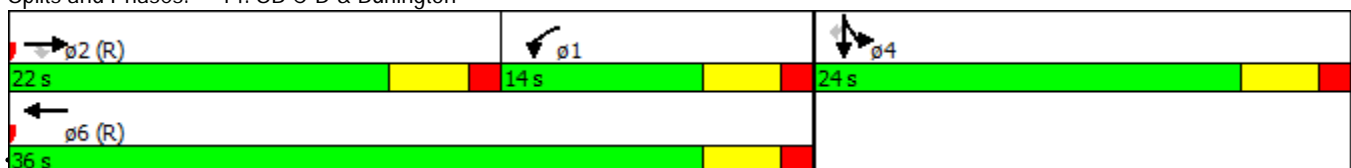
2032 Design Year - Build
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑					↖	↑	↗
Volume (vph)	0	292	166	146	446	0	0	0	0	153	395	75
Satd. Flow (prot)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599
Satd. Flow (RTOR)			175									127
Lane Group Flow (vph)	0	307	175	154	469	0	0	0	0	161	416	79
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Total Split (s)		22.0	22.0	14.0	36.0					24.0	24.0	24.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Act Effect Green (s)		21.5	21.5	8.8	32.9					17.1	17.1	17.1
Actuated g/C Ratio		0.36	0.36	0.15	0.55					0.28	0.28	0.28
v/c Ratio		0.47	0.27	0.59	0.46					0.32	0.79	0.14
Control Delay		17.8	3.5	26.7	5.7					8.9	19.7	0.8
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		17.8	3.5	26.7	5.7					8.9	19.7	0.8
LOS		B	A	C	A					A	B	A
Approach Delay		12.6			10.9						14.8	
Approach LOS		B			B						B	
Queue Length 50th (ft)		102	0	56	63					14	66	0
Queue Length 95th (ft)		117	19	#96	31					m17	m78	m0
Internal Link Dist (ft)		625			684			856			920	
Turn Bay Length (ft)				250						300		300
Base Capacity (vph)		654	663	271	1020					560	584	593
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.47	0.26	0.57	0.46					0.29	0.71	0.13

Intersection Summary




















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.8 Intersection LOS: B
 Intersection Capacity Utilization 56.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB C-D & Burlington






















HCM 2010 Signalized Intersection Summary
 14: SB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	292	166	146	446	0	0	0	0	153	395	75
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	179.2	186.3	186.3	0.0				186.3	184.5	188.1
Adj Flow Rate, veh/h	0	307	0	154	469	0				161	416	0
Adj No. of Lanes	0	1	1	1	1	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	6	2	2	0				2	3	1
Cap, veh/h	0	427	360	242	909	0				499	519	450
Arrive On Green	0.00	0.08	0.00	0.27	0.98	0.00				0.28	0.28	0.00
Sat Flow, veh/h	0	1810	1524	1774	1863	0				1774	1845	1599
Grp Volume(v), veh/h	0	307	0	154	469	0				161	416	0
Grp Sat Flow(s),veh/h/ln	0	1810	1524	1774	1863	0				1774	1845	1599
Q Serve(g_s), s	0.0	7.2	0.0	3.3	0.5	0.0				3.1	9.1	0.0
Cycle Q Clear(g_c), s	0.0	7.2	0.0	3.3	0.5	0.0				3.1	9.1	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	427	360	242	909	0				499	519	450
V/C Ratio(X)	0.00	0.72	0.00	0.64	0.52	0.00				0.32	0.80	0.00
Avail Cap(c_a), veh/h	0	710	598	368	1332	0				778	809	701
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.99	0.00	0.86	0.86	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	18.6	0.0	14.8	0.3	0.0				12.3	14.4	0.0
Incr Delay (d2), s/veh	0.0	9.8	0.0	2.4	1.8	0.0				0.4	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	8.3	0.0	3.1	1.1	0.0				2.8	8.6	0.0
LnGrp Delay(d),s/veh	0.0	28.4	0.0	17.2	2.1	0.0				12.7	17.7	0.0
LnGrp LOS		C		B	A					B	B	
Approach Vol, veh/h		307			623						577	
Approach Delay, s/veh		28.4			5.8						16.3	
Approach LOS		C			A						B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	27.6	15.2		17.2		42.8						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	9.0	17.0		19.0		31.0						
Max Q Clear Time (g_c+I1), s	5.3	9.2		11.1		2.5						
Green Ext Time (p_c), s	1.2	1.1		1.1		3.7						
Intersection Summary												
HCM 2010 Ctrl Delay			14.4									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
15: NB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	382	0	0	397	115	195	76	159	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	250		250	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			167			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		764			772			743			1563	
Travel Time (s)		17.4			17.5			11.3			23.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	3%	2%	2%	2%	2%	2%	2%	1%	2%	2%	2%
Adj. Flow (vph)	66	402	0	0	418	121	205	80	167	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	402	0	0	418	121	205	80	167	0	0	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)		12			12			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
Number of Detectors	1	2			2	1	1	2	1			
Detector Template	Left	Thru			Thru	Right	Left	Thru	Right			
Leading Detector (ft)	20	100			100	20	20	100	20			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	20	6	20			
Detector 1 Type	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			
Detector 1 Queue (s)	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			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			

Lanes, Volumes, Timings
15: NB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

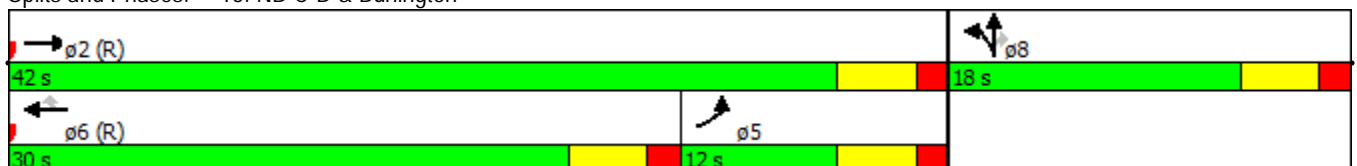


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	15.0			15.0	15.0	12.0	12.0	12.0			
Total Split (s)	12.0	42.0			30.0	30.0	18.0	18.0	18.0			
Total Split (%)	20.0%	70.0%			50.0%	50.0%	30.0%	30.0%	30.0%			
Maximum Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag			Lead			Lead					
Lead-Lag Optimize?	Yes			Yes			Yes					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.5	38.7			31.0	31.0	11.3	11.3	11.3			
Actuated g/C Ratio	0.12	0.64			0.52	0.52	0.19	0.19	0.19			
v/c Ratio	0.32	0.34			0.43	0.14	0.62	0.23	0.38			
Control Delay	15.8	3.4			10.3	2.2	22.4	11.7	5.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	15.8	3.4			10.3	2.2	22.4	11.7	5.5			
LOS	B	A			B	A	C	B	A			
Approach Delay		5.2			8.5			14.3				
Approach LOS		A			A			B				
Queue Length 50th (ft)	12	17			77	1	23	6	1			
Queue Length 95th (ft)	m37	5			132	9	m43	m11	m4			
Internal Link Dist (ft)		684			692			663			1483	
Turn Bay Length (ft)	200						250		250			
Base Capacity (vph)	204	1194			977	890	386	406	479			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.32	0.34			0.43	0.14	0.53	0.20	0.35			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 9.2
 Intersection LOS: A
 Intersection Capacity Utilization 56.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB C-D & Burlington



Phasings
15: NB C-D & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	12.0	12.0	12.0
Total Split (s)	12.0	42.0	30.0	30.0	18.0	18.0	18.0
Total Split (%)	20.0%	70.0%	50.0%	50.0%	30.0%	30.0%	30.0%
Maximum Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	8.9	36.5	22.6	22.6	13.5	13.5	13.5
70th %ile Term Code	Gap	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	7.8	37.9	25.1	25.1	12.1	12.1	12.1
50th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Gap
30th %ile Green (s)	0.0	39.8	39.8	39.8	10.2	10.2	10.2
30th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	42.5	42.5	42.5	7.5	7.5	7.5
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
15: NB C-D & Burlington

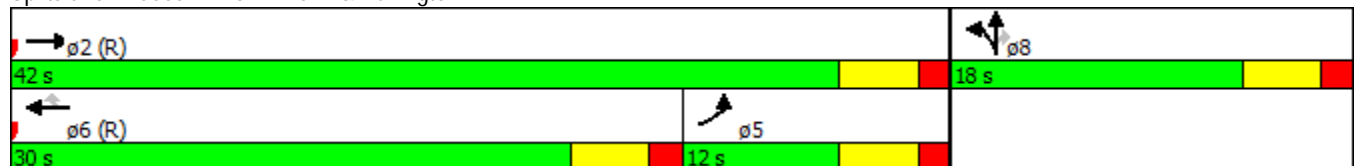
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	382	0	0	397	115	195	76	159	0	0	0
Satd. Flow (prot)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Satd. Flow (RTOR)						127			167			
Lane Group Flow (vph)	66	402	0	0	418	121	205	80	167	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Total Split (s)	12.0	42.0			30.0	30.0	18.0	18.0	18.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Act Effct Green (s)	7.5	38.7			31.0	31.0	11.3	11.3	11.3			
Actuated g/C Ratio	0.12	0.64			0.52	0.52	0.19	0.19	0.19			
v/c Ratio	0.32	0.34			0.43	0.14	0.62	0.23	0.38			
Control Delay	15.8	3.4			10.3	2.2	22.4	11.7	5.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	15.8	3.4			10.3	2.2	22.4	11.7	5.5			
LOS	B	A			B	A	C	B	A			
Approach Delay		5.2			8.5			14.3				
Approach LOS		A			A			B				
Queue Length 50th (ft)	12	17			77	1	23	6	1			
Queue Length 95th (ft)	m37	5			132	9	m43	m11	m4			
Internal Link Dist (ft)		684			692			663			1483	
Turn Bay Length (ft)	200						250		250			
Base Capacity (vph)	204	1194			977	890	386	406	479			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.32	0.34			0.43	0.14	0.53	0.20	0.35			

Intersection Summary




















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 9.2
 Intersection LOS: A
 Intersection Capacity Utilization 56.7%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB C-D & Burlington



HCM 2010 Signalized Intersection Summary
 15: NB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	382	0	0	397	115	195	76	159	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	171.2	184.5	0.0	0.0	186.3	186.3	186.3	186.3	188.1			
Adj Flow Rate, veh/h	66	402	0	0	418	0	205	80	0			
Adj No. of Lanes	1	1	0	0	1	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	11	3	0	0	2	2	2	2	1			
Cap, veh/h	154	977	0	0	546	464	331	347	298			
Arrive On Green	0.19	1.00	0.00	0.00	0.59	0.00	0.19	0.19	0.00			
Sat Flow, veh/h	1630	1845	0	0	1863	1583	1774	1863	1599			
Grp Volume(v), veh/h	66	402	0	0	418	0	205	80	0			
Grp Sat Flow(s),veh/h/ln	1630	1845	0	0	1863	1583	1774	1863	1599			
Q Serve(g_s), s	1.3	0.0	0.0	0.0	5.9	0.0	3.7	1.3	0.0			
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.0	5.9	0.0	3.7	1.3	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	154	977	0	0	546	464	331	347	298			
V/C Ratio(X)	0.43	0.41	0.00	0.00	0.77	0.00	0.62	0.23	0.00			
Avail Cap(c_a), veh/h	324	1938	0	0	1322	1124	655	688	590			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	0.95	0.00	0.68	0.68	0.00			
Uniform Delay (d), s/veh	13.4	0.0	0.0	0.0	6.4	0.0	13.2	12.2	0.0			
Incr Delay (d2), s/veh	1.7	1.2	0.0	0.0	9.4	0.0	1.3	0.2	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.1	0.6	0.0	0.0	7.6	0.0	3.5	1.2	0.0			
LnGrp Delay(d),s/veh	15.1	1.2	0.0	0.0	15.8	0.0	14.5	12.4	0.0			
LnGrp LOS	B	A			B		B	B				
Approach Vol, veh/h		468			418			285				
Approach Delay, s/veh		3.1			15.8			13.9				
Approach LOS		A			B			B				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		48.4			33.1	15.3		11.6				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		37.0			7.0	25.0		13.0				
Max Q Clear Time (g_c+I1), s		2.0			3.3	7.9		5.7				
Green Ext Time (p_c), s		2.9			0.9	2.4		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay				10.3								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	227	90	31	218	64	80	18	28	60	20	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		125	250		0	0		0	0		150
Storage Lanes	1		1	1		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
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			0.850		0.966			0.909				0.850
Flt Protected	0.950			0.950			0.950				0.964	
Satd. Flow (prot)	1770	1863	1583	1770	1799	0	1770	1693	0	0	1796	1583
Flt Permitted	0.950			0.950			0.702				0.749	
Satd. Flow (perm)	1770	1863	1583	1770	1799	0	1308	1693	0	0	1395	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		24			29				225
Link Speed (mph)		30			30			30				30
Link Distance (ft)		772			711			323				546
Travel Time (s)		17.5			16.2			7.3				12.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	236	239	95	33	229	67	84	19	29	63	21	225
Shared Lane Traffic (%)												
Lane Group Flow (vph)	236	239	95	33	296	0	84	48	0	0	84	225
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)		12			12			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
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		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
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
Detector 1 Queue (s)	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
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	NA	Perm	Prot	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			8			4	5
Permitted Phases			2				8		4			4
Detector Phase	5	2	2	1	6		8	8	4	4		5

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		10.0	10.0		10.0	10.0	7.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0		20.0	20.0		20.0	20.0	12.0
Total Split (s)	19.0	28.0	28.0	12.0	21.0		20.0	20.0		20.0	20.0	19.0
Total Split (%)	31.7%	46.7%	46.7%	20.0%	35.0%		33.3%	33.3%		33.3%	33.3%	31.7%
Maximum Green (s)	14.0	23.0	23.0	7.0	16.0		15.0	15.0		15.0	15.0	14.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead							Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
Act Effect Green (s)	12.2	38.1	38.1	7.3	25.0		10.8	10.8			10.8	25.0
Actuated g/C Ratio	0.20	0.64	0.64	0.12	0.42		0.18	0.18			0.18	0.42
v/c Ratio	0.66	0.20	0.09	0.15	0.39		0.36	0.15			0.34	0.29
Control Delay	28.8	8.0	2.6	30.1	4.5		25.9	12.7			26.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	28.8	8.0	2.6	30.1	4.5		25.9	12.7			26.7	3.2
LOS	C	A	A	C	A		C	B			C	A
Approach Delay		15.7			7.1			21.1			9.6	
Approach LOS		B			A			C			A	
Queue Length 50th (ft)	77	13	0	9	10		27	6			28	8
Queue Length 95th (ft)	137	109	17	28	43		60	28			62	34
Internal Link Dist (ft)		692			631			243			466	
Turn Bay Length (ft)	200		125	250								150
Base Capacity (vph)	416	1183	1051	215	764		327	445			348	788
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.57	0.20	0.09	0.15	0.39		0.26	0.11			0.24	0.29

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.7
 Intersection LOS: B
 Intersection Capacity Utilization 51.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 16: Joiner St & Burlington

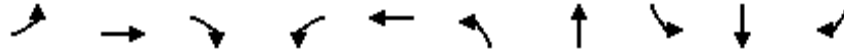


KDP

Timing Plan: Alt 3

Phasings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2		1	6		8		4	5
Permitted Phases			2			8		4		4
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	12.0	20.0	20.0	12.0	20.0	20.0	20.0	20.0	20.0	12.0
Total Split (s)	19.0	28.0	28.0	12.0	21.0	20.0	20.0	20.0	20.0	19.0
Total Split (%)	31.7%	46.7%	46.7%	20.0%	35.0%	33.3%	33.3%	33.3%	33.3%	31.7%
Maximum Green (s)	14.0	23.0	23.0	7.0	16.0	15.0	15.0	15.0	15.0	14.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead					Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	14.0	23.6	23.6	8.3	17.9	13.1	13.1	13.1	13.1	14.0
90th %ile Term Code	Max	Coord	Coord	Gap	Coord	Gap	Gap	Hold	Hold	Max
70th %ile Green (s)	14.6	26.9	26.9	7.3	19.6	10.8	10.8	10.8	10.8	14.6
70th %ile Term Code	Max	Coord	Coord	Gap	Coord	Gap	Gap	Hold	Hold	Max
50th %ile Green (s)	13.1	40.0	40.0	0.0	21.9	10.0	10.0	10.0	10.0	13.1
50th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Min	Min	Min	Min	Gap
30th %ile Green (s)	11.1	40.0	40.0	0.0	23.9	10.0	10.0	10.0	10.0	11.1
30th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Min	Min	Hold	Hold	Gap
10th %ile Green (s)	8.1	55.0	55.0	0.0	41.9	0.0	0.0	0.0	0.0	8.1
10th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	227	90	31	218	64	80	18	28	60	20	214
Satd. Flow (prot)	1770	1863	1583	1770	1799	0	1770	1693	0	0	1796	1583
Flt Permitted	0.950			0.950			0.702				0.749	
Satd. Flow (perm)	1770	1863	1583	1770	1799	0	1308	1693	0	0	1395	1583
Satd. Flow (RTOR)			127		24			29				225
Lane Group Flow (vph)	236	239	95	33	296	0	84	48	0	0	84	225
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			8			4	5
Permitted Phases			2				8			4		4
Total Split (s)	19.0	28.0	28.0	12.0	21.0		20.0	20.0		20.0	20.0	19.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	5.0
Act Effect Green (s)	12.2	38.1	38.1	7.3	25.0		10.8	10.8			10.8	25.0
Actuated g/C Ratio	0.20	0.64	0.64	0.12	0.42		0.18	0.18			0.18	0.42
v/c Ratio	0.66	0.20	0.09	0.15	0.39		0.36	0.15			0.34	0.29
Control Delay	28.8	8.0	2.6	30.1	4.5		25.9	12.7			26.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	28.8	8.0	2.6	30.1	4.5		25.9	12.7			26.7	3.2
LOS	C	A	A	C	A		C	B			C	A
Approach Delay		15.7			7.1			21.1			9.6	
Approach LOS		B			A			C			A	
Queue Length 50th (ft)	77	13	0	9	10		27	6			28	8
Queue Length 95th (ft)	137	109	17	28	43		60	28			62	34
Internal Link Dist (ft)		692			631			243			466	
Turn Bay Length (ft)	200		125	250								150
Base Capacity (vph)	416	1183	1051	215	764		327	445			348	788
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.57	0.20	0.09	0.15	0.39		0.26	0.11			0.24	0.29

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 12.7
 Intersection LOS: B
 Intersection Capacity Utilization 51.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 16: Joiner St & Burlington





















HCM 2010 Signalized Intersection Summary
 16: Joiner St & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	224	227	90	31	218	64	80	18	28	60	20	214
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	190.0	190.0	186.3	186.3
Adj Flow Rate, veh/h	236	239	95	33	229	0	84	19	29	63	21	225
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	682	580	94	434	0	373	154	235	374	105	662
Arrive On Green	0.31	0.61	0.61	0.05	0.23	0.00	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1863	0	1129	666	1017	982	452	1583
Grp Volume(v), veh/h	236	239	95	33	229	0	84	0	48	84	0	225
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	0	1129	0	1683	1435	0	1583
Q Serve(g_s), s	5.1	2.7	1.1	0.8	4.6	0.0	2.8	0.0	1.0	1.2	0.0	0.0
Cycle Q Clear(g_c), s	5.1	2.7	1.1	0.8	4.6	0.0	5.0	0.0	1.0	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.60	0.75		1.00
Lane Grp Cap(c), veh/h	331	682	580	94	434	0	373	0	390	479	0	662
V/C Ratio(X)	0.71	0.35	0.16	0.35	0.53	0.00	0.23	0.00	0.12	0.18	0.00	0.34
Avail Cap(c_a), veh/h	578	997	848	289	694	0	505	0	588	650	0	848
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.8	5.8	5.5	19.6	14.4	0.0	15.5	0.0	13.1	13.5	0.0	8.5
Incr Delay (d2), s/veh	2.7	1.3	0.6	2.2	4.5	0.0	0.3	0.0	0.1	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	2.8	1.0	0.8	5.2	0.0	1.6	0.0	0.8	1.5	0.0	3.3
LnGrp Delay(d),s/veh	16.5	7.2	6.1	21.8	19.0	0.0	15.8	0.0	13.2	13.7	0.0	8.8
LnGrp LOS	B	A	A	C	B		B		B	B		A
Approach Vol, veh/h		570			262			132			309	
Approach Delay, s/veh		10.8			19.3			14.9			10.1	
Approach LOS		B			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	37.8		14.9	30.1	15.0		14.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	23.0		15.0	14.0	16.0		15.0				
Max Q Clear Time (g_c+I1), s	2.8	4.7		4.1	7.1	6.6		7.0				
Green Ext Time (p_c), s	0.0	2.3		1.4	1.5	0.8		1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			12.8									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
17: Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	307	0	0	306	11	0	0	0	11	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.995							0.950
Flt Protected	0.950											0.969
Satd. Flow (prot)	1770	1863	0	1863	1853	0	0	1863	0	0	1715	0
Flt Permitted	0.950											0.969
Satd. Flow (perm)	1770	1863	0	1863	1853	0	0	1863	0	0	1715	0
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		711			534			179			296	
Travel Time (s)		16.2			12.1			3.5			6.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	323	0	0	322	12	0	0	0	12	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	323	0	0	334	0	0	0	0	0	19	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)		12			12			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%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	307	0	0	306	11	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	323	0	0	322	12	0	0	0

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	334	0	0	323	0	0	672	674	323
Stage 1	-	-	-	-	-	-	340	340	-
Stage 2	-	-	-	-	-	-	332	334	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1225	-	-	1237	-	-	370	376	718
Stage 1	-	-	-	-	-	-	675	639	-
Stage 2	-	-	-	-	-	-	681	643	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1225	-	-	1237	-	-	364	374	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	364	374	-
Stage 1	-	-	-	-	-	-	671	635	-
Stage 2	-	-	-	-	-	-	674	643	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1225	-	-	1237	-	-	455
HCM Lane V/C Ratio	-	0.007	-	-	-	-	-	0.042
HCM Control Delay (s)	0	8	-	-	0	-	-	13.3
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	11	0	7
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	12	0	7

Major/Minor

Minor2

Conflicting Flow All	668	668	328
Stage 1	328	328	-
Stage 2	340	340	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	372	379	713
Stage 1	685	647	-
Stage 2	675	639	-
Platoon blocked, %			
Mov Cap-1 Maneuver	370	377	713
Mov Cap-2 Maneuver	370	377	-
Stage 1	681	647	-
Stage 2	671	635	-

Approach

SB

HCM Control Delay, s	13.3
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	259	1	227	244	1	1	90	223	1	102	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		150	115		115
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
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		0.999			0.999				0.850			0.850
Flt Protected	0.950			0.950				0.999				
Satd. Flow (prot)	1770	1861	0	1770	1861	0	0	1861	1583	0	1863	1583
Flt Permitted	0.950			0.950				0.996			0.997	
Satd. Flow (perm)	1770	1861	0	1770	1861	0	0	1855	1583	0	1857	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)									235			127
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		534			684			690			921	
Travel Time (s)		12.1			15.5			15.7			20.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	273	1	239	257	1	1	95	235	1	107	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	274	0	239	258	0	0	96	235	0	108	77
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)		12			12			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
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		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
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
Detector 1 Queue (s)	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
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	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases							8		8	4		4
Detector Phase	5	2		1	6		8	8	1	4	4	5

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour

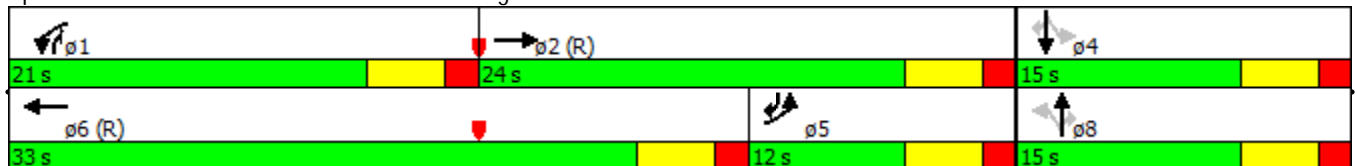


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	12.0	24.0		21.0	33.0		15.0	15.0	21.0	15.0	15.0	12.0
Total Split (%)	20.0%	40.0%		35.0%	55.0%		25.0%	25.0%	35.0%	25.0%	25.0%	20.0%
Maximum Green (s)	7.0	19.0		16.0	28.0		10.0	10.0	16.0	10.0	10.0	7.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead				Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	14.0	25.2		12.8	27.4			10.0	24.8		10.0	26.0
Actuated g/C Ratio	0.23	0.42		0.21	0.46			0.17	0.41		0.17	0.43
v/c Ratio	0.15	0.35		0.64	0.30			0.31	0.30		0.35	0.10
Control Delay	14.8	13.2		20.4	8.7			26.9	1.5		15.5	0.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	14.8	13.2		20.4	8.7			26.9	1.5		15.5	0.6
LOS	B	B		C	A			C	A		B	A
Approach Delay		13.5			14.3			8.9			9.3	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	16	70		53	42			34	0		16	0
Queue Length 95th (ft)	42	133		m97	m100			61	0		29	0
Internal Link Dist (ft)		454			604			610			841	
Turn Bay Length (ft)	200			200					150			115
Base Capacity (vph)	412	782		472	1067			310	864		310	758
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.15	0.35		0.51	0.24			0.31	0.27		0.35	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 55 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 12.1 Intersection LOS: B
 Intersection Capacity Utilization 48.3% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: North Rd/Taft St & Burlington



Phasings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2	1	6		8	1		4	5
Permitted Phases					8		8	4		4
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	12.0	24.0	21.0	33.0	15.0	15.0	21.0	15.0	15.0	12.0
Total Split (%)	20.0%	40.0%	35.0%	55.0%	25.0%	25.0%	35.0%	25.0%	25.0%	20.0%
Maximum Green (s)	7.0	19.0	16.0	28.0	10.0	10.0	16.0	10.0	10.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead			Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	15.8	18.9	16.0	19.1	10.1	10.1	16.0	10.1	10.1	15.8
90th %ile Term Code	Hold	Coord	Max	Coord	Max	Max	Max	Max	Max	Hold
70th %ile Green (s)	15.9	19.7	15.2	19.0	10.1	10.1	15.2	10.1	10.1	15.9
70th %ile Term Code	Hold	Coord	Gap	Coord	Hold	Hold	Gap	Gap	Gap	Hold
50th %ile Green (s)	15.6	21.8	13.2	19.4	10.0	10.0	13.2	10.0	10.0	15.6
50th %ile Term Code	Hold	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Hold
30th %ile Green (s)	15.6	23.8	11.2	19.4	10.0	10.0	11.2	10.0	10.0	15.6
30th %ile Term Code	Hold	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Hold
10th %ile Green (s)	0.0	41.8	8.2	55.0	0.0	0.0	8.2	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Gap	Coord	Skip	Skip	Gap	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 55 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues 18: North Rd/Taft St & Burlington

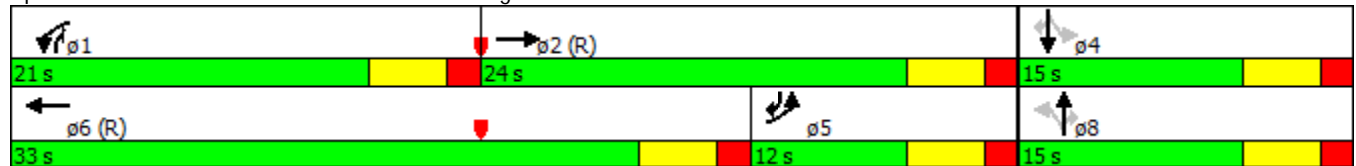
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	259	1	227	244	1	1	90	223	1	102	73
Satd. Flow (prot)	1770	1861	0	1770	1861	0	0	1861	1583	0	1863	1583
Flt Permitted	0.950			0.950				0.996			0.997	
Satd. Flow (perm)	1770	1861	0	1770	1861	0	0	1855	1583	0	1857	1583
Satd. Flow (RTOR)									235			127
Lane Group Flow (vph)	62	274	0	239	258	0	0	96	235	0	108	77
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases							8		8	4		4
Total Split (s)	12.0	24.0		21.0	33.0		15.0	15.0	21.0	15.0	15.0	12.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	5.0
Act Effct Green (s)	14.0	25.2		12.8	27.4			10.0	24.8		10.0	26.0
Actuated g/C Ratio	0.23	0.42		0.21	0.46			0.17	0.41		0.17	0.43
v/c Ratio	0.15	0.35		0.64	0.30			0.31	0.30		0.35	0.10
Control Delay	14.8	13.2		20.4	8.7			26.9	1.5		15.5	0.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	14.8	13.2		20.4	8.7			26.9	1.5		15.5	0.6
LOS	B	B		C	A			C	A		B	A
Approach Delay		13.5			14.3			8.9			9.3	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	16	70		53	42			34	0		16	0
Queue Length 95th (ft)	42	133		m97	m100			61	0		29	0
Internal Link Dist (ft)		454			604			610			841	
Turn Bay Length (ft)	200			200					150			115
Base Capacity (vph)	412	782		472	1067			310	864		310	758
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.15	0.35		0.51	0.24			0.31	0.27		0.35	0.10

Intersection Summary





















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 55 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 12.1
 Intersection LOS: B
 Intersection Capacity Utilization 48.3%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: North Rd/Taft St & Burlington



HCM 2010 Signalized Intersection Summary
 18: North Rd/Taft St & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	59	259	1	227	244	1	1	90	223	1	102	73
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	62	273	1	239	257	1	1	95	235	1	107	77
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	704	774	3	294	346	1	61	309	527	61	309	892
Arrive On Green	0.13	0.14	0.14	0.17	0.19	0.19	0.05	0.05	0.05	0.17	0.17	0.17
Sat Flow, veh/h	1774	1855	7	1774	1854	7	5	1855	1583	4	1855	1583
Grp Volume(v), veh/h	62	0	274	239	0	258	96	0	235	108	0	77
Grp Sat Flow(s),veh/h/ln	1774	0	1862	1774	0	1861	1860	0	1583	1859	0	1583
Q Serve(g_s), s	1.8	0.0	8.0	7.8	0.0	7.9	0.0	0.0	7.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.8	0.0	8.0	7.8	0.0	7.9	3.0	0.0	7.1	3.1	0.0	0.0
Prop In Lane	1.00		0.00	1.00		0.00	0.01		1.00	0.01		1.00
Lane Grp Cap(c), veh/h	704	0	777	294	0	347	371	0	527	370	0	892
V/C Ratio(X)	0.09	0.00	0.35	0.81	0.00	0.74	0.26	0.00	0.45	0.29	0.00	0.09
Avail Cap(c_a), veh/h	704	0	777	473	0	869	371	0	527	370	0	892
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	18.5	24.1	0.0	23.0	25.0	0.0	17.8	22.1	0.0	6.0
Incr Delay (d2), s/veh	0.1	0.0	1.3	5.5	0.0	13.4	0.4	0.0	0.6	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.9	0.0	4.4	4.2	0.0	5.3	1.6	0.0	3.2	1.6	0.0	0.6
LnGrp Delay(d),s/veh	16.6	0.0	19.8	29.7	0.0	36.4	25.4	0.0	18.4	22.5	0.0	6.1
LnGrp LOS	B		B	C		D	C		B	C		A
Approach Vol, veh/h		336			497			331			185	
Approach Delay, s/veh		19.2			33.2			20.4			15.7	
Approach LOS		B			C			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	30.0		15.0	28.8	16.2		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	16.0	19.0		10.0	7.0	28.0		10.0				
Max Q Clear Time (g_c+I1), s	9.8	10.0		5.1	3.8	9.9		9.1				
Green Ext Time (p_c), s	0.4	1.2		1.0	0.5	1.3		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
20: Winery Rd & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	24	19	23	38	7	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940		0.916			
Flt Protected	0.973					0.958
Satd. Flow (prot)	1704	0	1706	0	0	1785
Flt Permitted	0.973					0.958
Satd. Flow (perm)	1704	0	1706	0	0	1785
Link Speed (mph)	30		35			35
Link Distance (ft)	864		1335			1777
Travel Time (s)	19.6		26.0			34.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	20	24	40	7	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	64	0	0	8
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
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)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	24	19	23	38	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	20	24	40	7	1

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	60	44	0
Stage 1	44	-	-
Stage 2	16	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	947	1026	1538
Stage 1	978	-	-
Stage 2	1007	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	942	1026	1538
Mov Cap-2 Maneuver	942	-	-
Stage 1	978	-	-
Stage 2	1002	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	6.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	977	1538	-
HCM Lane V/C Ratio	-	-	0.046	0.005	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lanes, Volumes, Timings
21: North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1	47	43	82	87	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.911			
Flt Protected		0.999			0.950	
Satd. Flow (prot)	0	1759	1697	0	1641	0
Flt Permitted		0.999			0.950	
Satd. Flow (perm)	0	1759	1697	0	1641	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		864	1145		473	
Travel Time (s)		19.6	26.0		9.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	8%	2%	2%	10%	2%
Adj. Flow (vph)	1	49	45	86	92	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	50	131	0	92	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.8%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	47	43	82	87	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	8	2	2	10	2
Mvmt Flow	1	49	45	86	92	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	132	0	88
Stage 1	-	-	88
Stage 2	-	-	52
Critical Hdwy	4.12	-	6.5
Critical Hdwy Stg 1	-	-	5.5
Critical Hdwy Stg 2	-	-	5.5
Follow-up Hdwy	2.218	-	3.59
Pot Cap-1 Maneuver	1453	-	970
Stage 1	-	-	916
Stage 2	-	-	950
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1453	-	970
Mov Cap-2 Maneuver	-	-	833
Stage 1	-	-	916
Stage 2	-	-	949

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1453	-	-	-	833
HCM Lane V/C Ratio	0.001	-	-	-	0.11
HCM Control Delay (s)	7.5	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Lanes, Volumes, Timings
22: Russell Rd & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕		↕	↕	
Volume (vph)	1	137	1	9	142	85	1	1	11	78	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		200	0		0	120		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.999				0.850		0.884				0.925
Flt Protected					0.997			0.996		0.950		
Satd. Flow (prot)	0	1826	0	0	1792	1223	0	1640	0	1556	1740	0
Flt Permitted					0.997			0.996		0.950		
Satd. Flow (perm)	0	1826	0	0	1792	1223	0	1640	0	1556	1740	0
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1145			717			1310				577
Travel Time (s)		26.0			16.3			25.5				11.2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	4%	1%	1%	6%	32%	2%	2%	2%	16%	1%	1%
Adj. Flow (vph)	1	144	1	9	149	89	1	1	12	82	1	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	146	0	0	158	89	0	14	0	82	2	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		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection										
Int Delay, s/veh	2.5									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	1	137	1	9	142	85	1	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yeild	-	-	None
Storage Length	-	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	4	1	1	6	32	2	2	2
Mvmt Flow	1	144	1	9	149	89	1	1	12

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	149	0	0	145	0	0	316	315	145
Stage 1	-	-	-	-	-	-	147	147	-
Stage 2	-	-	-	-	-	-	169	168	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1439	-	-	1443	-	-	637	601	902
Stage 1	-	-	-	-	-	-	856	775	-
Stage 2	-	-	-	-	-	-	833	759	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1439	-	-	1443	-	-	632	596	902
Mov Cap-2 Maneuver	-	-	-	-	-	-	632	596	-
Stage 1	-	-	-	-	-	-	855	774	-
Stage 2	-	-	-	-	-	-	825	754	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	841	1439	-	-	1443	-	-	594	718
HCM Lane V/C Ratio	0.016	0.001	-	-	0.007	-	-	0.138	0.003
HCM Control Delay (s)	9.4	7.5	0	-	7.5	0	-	12	10
HCM Lane LOS	A	A	A	-	A	A	-	B	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.5	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	78	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	120	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	16	1	1
Mvmt Flow	82	1	1

Major/Minor

	Minor2		
Conflicting Flow All	321	315	149
Stage 1	168	168	-
Stage 2	153	147	-
Critical Hdwy	7.26	6.51	6.21
Critical Hdwy Stg 1	6.26	5.51	-
Critical Hdwy Stg 2	6.26	5.51	-
Follow-up Hdwy	3.644	4.009	3.309
Pot Cap-1 Maneuver	606	602	900
Stage 1	802	761	-
Stage 2	817	777	-
Platoon blocked, %			
Mov Cap-1 Maneuver	594	597	900
Mov Cap-2 Maneuver	594	597	-
Stage 1	801	756	-
Stage 2	805	776	-




















Approach

	SB
HCM Control Delay, s	12
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
 23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
 AM Peak Hour

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	151	75	225	190	0	0	0	0	13	648	46	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		175	250		0	0		0	400		400	
Storage Lanes	0		1	1		0	0		0	1		1	
Taper Length (ft)	100			100			100			100			
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	
Fr _t			0.850										0.850
Fl _t Protected				0.950							0.950		
Satd. Flow (prot)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292	
Fl _t Permitted				0.950							0.950		
Satd. Flow (perm)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292	
Right Turn on Red			Yes				Yes				Yes		Yes
Satd. Flow (RTOR)			127										127
Link Speed (mph)		30				30				45			45
Link Distance (ft)		717				759				1218			936
Travel Time (s)		16.3				17.3				18.5			14.2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	2%	4%	17%	2%	13%	2%	2%	2%	2%	1%	2%	25%	
Adj. Flow (vph)	0	159	79	237	200	0	0	0	0	14	682	48	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	159	79	237	200	0	0	0	0	14	682	48	
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)		12				12				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	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		2	1	1	2					1	2	1	
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right	
Leading Detector (ft)		100	20	20	100					20	100	20	
Trailing Detector (ft)		0	0	0	0					0	0	0	
Detector 1 Position(ft)		0	0	0	0					0	0	0	
Detector 1 Size(ft)		6	20	20	6					20	6	20	
Detector 1 Type		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	
Detector 1 Queue (s)		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	
Detector 2 Position(ft)		94			94							94	
Detector 2 Size(ft)		6			6							6	
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex	
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0							0.0	
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm	
Protected Phases		2		1	6					4	4		
Permitted Phases			2									4	

Lanes, Volumes, Timings
23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
AM Peak Hour

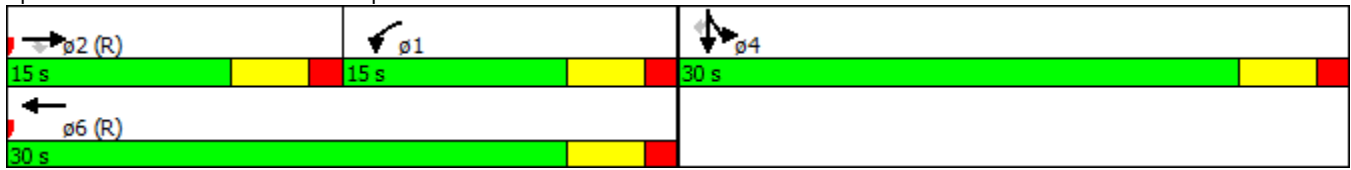


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0
Total Split (s)		15.0	15.0	15.0	30.0					30.0	30.0	30.0
Total Split (%)		25.0%	25.0%	25.0%	50.0%					50.0%	50.0%	50.0%
Maximum Green (s)		10.0	10.0	10.0	25.0					25.0	25.0	25.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		11.0	11.0	9.9	25.9					24.1	24.1	24.1
Actuated g/C Ratio		0.18	0.18	0.16	0.43					0.40	0.40	0.40
v/c Ratio		0.48	0.22	0.81	0.28					0.02	0.91	0.08
Control Delay		28.1	3.6	43.8	7.0					4.5	26.3	0.4
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		28.1	3.6	43.8	7.0					4.5	26.3	0.4
LOS		C	A	D	A					A	C	A
Approach Delay		20.0			27.0						24.2	
Approach LOS		B			C						C	
Queue Length 50th (ft)		53	0	84	31					0	108	0
Queue Length 95th (ft)		104	15	#196	21					m3	#392	m0
Internal Link Dist (ft)		637			679			1138			856	
Turn Bay Length (ft)			175	250						400		400
Base Capacity (vph)		334	356	295	724					744	776	612
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.48	0.22	0.80	0.28					0.02	0.88	0.08

Intersection Summary

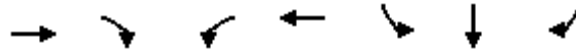
Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	30 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	24.4
Intersection LOS:	C
Intersection Capacity Utilization:	67.4%
ICU Level of Service:	C
Analysis Period (min):	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
m	Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: SB On Ramp/SB C-D & North Rd



Phasings
23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	15.0	15.0	15.0	30.0	30.0	30.0	30.0
Total Split (%)	25.0%	25.0%	25.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	10.0	10.0	10.0	25.0	25.0	25.0	25.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	10.0	10.0	10.0	25.0	25.0	25.0	25.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	10.0	10.0	10.0	25.0	25.0	25.0	25.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	10.0	10.0	10.0	25.0	25.0	25.0	25.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	10.0	10.0	10.0	25.0	25.0	25.0	25.0
30th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
10th %ile Green (s)	15.0	15.0	9.3	29.3	20.7	20.7	20.7
10th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 30 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues 23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑					↖	↑	↗
Volume (vph)	0	151	75	225	190	0	0	0	0	13	648	46
Satd. Flow (prot)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292
Satd. Flow (RTOR)			127									127
Lane Group Flow (vph)	0	159	79	237	200	0	0	0	0	14	682	48
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Total Split (s)		15.0	15.0	15.0	30.0					30.0	30.0	30.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Act Effect Green (s)		11.0	11.0	9.9	25.9					24.1	24.1	24.1
Actuated g/C Ratio		0.18	0.18	0.16	0.43					0.40	0.40	0.40
v/c Ratio		0.48	0.22	0.81	0.28					0.02	0.91	0.08
Control Delay		28.1	3.6	43.8	7.0					4.5	26.3	0.4
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		28.1	3.6	43.8	7.0					4.5	26.3	0.4
LOS		C	A	D	A					A	C	A
Approach Delay		20.0			27.0						24.2	
Approach LOS		B			C						C	
Queue Length 50th (ft)		53	0	84	31					0	108	0
Queue Length 95th (ft)		104	15	#196	21					m3	#392	m0
Internal Link Dist (ft)		637			679			1138			856	
Turn Bay Length (ft)			175	250						400		400
Base Capacity (vph)		334	356	295	724					744	776	612
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.48	0.22	0.80	0.28					0.02	0.88	0.08

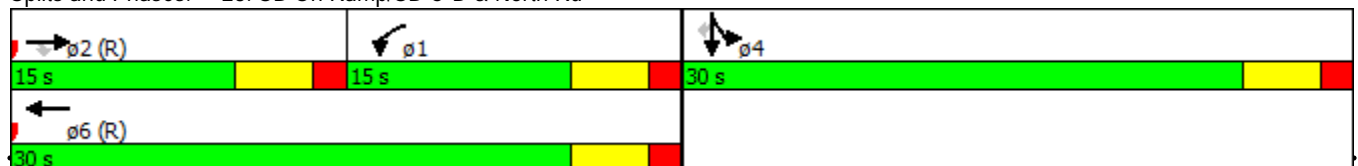
Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 30 (50%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 24.4
 Intersection LOS: C
 Intersection Capacity Utilization 67.4%
 ICU Level of Service C
 Analysis Period (min) 15

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




















m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: SB On Ramp/SB C-D & North Rd






















HCM 2010 Signalized Intersection Summary
 23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	151	75	225	190	0	0	0	0	13	648	46
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	182.7	162.4	186.3	168.1	0.0				188.1	186.3	152.0
Adj Flow Rate, veh/h	0	159	0	237	200	0				14	682	0
Adj No. of Lanes	0	1	1	1	1	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	4	17	2	13	0				1	2	25
Cap, veh/h	0	315	238	291	711	0				726	755	523
Arrive On Green	0.00	0.17	0.00	0.05	0.14	0.00				0.13	0.13	0.00
Sat Flow, veh/h	0	1827	1380	1774	1681	0				1792	1863	1292
Grp Volume(v), veh/h	0	159	0	237	200	0				14	682	0
Grp Sat Flow(s),veh/h/ln	0	1827	1380	1774	1681	0				1792	1863	1292
Q Serve(g_s), s	0.0	4.6	0.0	7.7	6.2	0.0				0.4	20.9	0.0
Cycle Q Clear(g_c), s	0.0	4.6	0.0	7.7	6.2	0.0				0.4	20.9	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	315	238	291	711	0				726	755	523
V/C Ratio(X)	0.00	0.51	0.00	0.81	0.28	0.00				0.02	0.90	0.00
Avail Cap(c_a), veh/h	0	315	238	306	724	0				771	802	556
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	1.00	0.00	0.94	0.94	0.00				0.74	0.74	0.00
Uniform Delay (d), s/veh	0.0	21.8	0.0	26.6	17.1	0.0				15.1	24.0	0.0
Incr Delay (d2), s/veh	0.0	5.7	0.0	14.0	0.9	0.0				0.0	10.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.0	0.0	8.4	5.5	0.0				0.3	18.0	0.0
LnGrp Delay(d),s/veh	0.0	27.5	0.0	40.6	18.0	0.0				15.1	34.3	0.0
LnGrp LOS		C		D	B					B	C	
Approach Vol, veh/h		159			437						696	
Approach Delay, s/veh		27.5			30.3						33.9	
Approach LOS		C			C						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	16.5	15.0		28.5		31.5						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	10.0	10.0		25.0		25.0						
Max Q Clear Time (g_c+I1), s	9.7	6.6		22.9		8.2						
Green Ext Time (p_c), s	0.1	0.2		0.6		1.7						
Intersection Summary												
HCM 2010 Ctrl Delay				31.9								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	122	0	0	337	14	78	374	216	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	0		250	300		300	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			227			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		759			509			1060			743	
Travel Time (s)		17.3			11.6			16.1			11.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	2%	2%	2%	2%	2%	32%	1%	1%	2%	2%	2%
Adj. Flow (vph)	44	128	0	0	355	15	82	394	227	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	128	0	0	355	15	82	394	227	0	0	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)		12			12			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
Number of Detectors	1	2			2	1	1	2	1			
Detector Template	Left	Thru			Thru	Right	Left	Thru	Right			
Leading Detector (ft)	20	100			100	20	20	100	20			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	20	6	20			
Detector 1 Type	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			
Detector 1 Queue (s)	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			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			

Lanes, Volumes, Timings
 24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
 AM Peak Hour

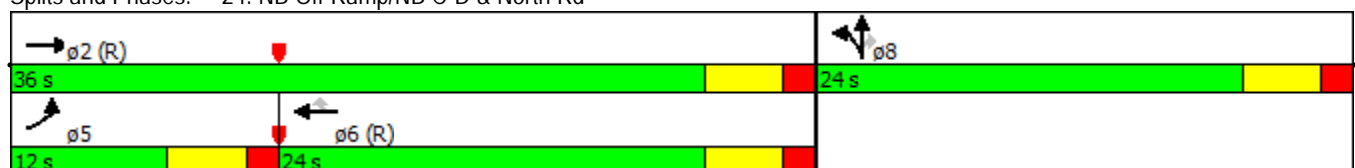


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	15.0			15.0	15.0	12.0	12.0	12.0			
Total Split (s)	12.0	36.0			24.0	24.0	24.0	24.0	24.0			
Total Split (%)	20.0%	60.0%			40.0%	40.0%	40.0%	40.0%	40.0%			
Maximum Green (s)	7.0	31.0			19.0	19.0	19.0	19.0	19.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lead				Lag				Lag			
Lead-Lag Optimize?	Yes				Yes				Yes			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.0	33.4			28.6	28.6	16.6	16.6	16.6			
Actuated g/C Ratio	0.12	0.56			0.48	0.48	0.28	0.28	0.28			
v/c Ratio	0.22	0.12			0.40	0.02	0.22	0.76	0.37			
Control Delay	13.0	8.7			6.7	0.1	17.1	29.5	4.6			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	13.0	8.7			6.7	0.1	17.1	29.5	4.6			
LOS	B	A			A	A	B	C	A			
Approach Delay		9.8			6.4			20.0				
Approach LOS		A			A			C				
Queue Length 50th (ft)	2	2			13	0	22	124	0			
Queue Length 95th (ft)	m39	97			95	m0	49	205	40			
Internal Link Dist (ft)		679			429			980			663	
Turn Bay Length (ft)	250					250	300		300			
Base Capacity (vph)	196	1038			889	822	433	597	662			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.22	0.12			0.40	0.02	0.19	0.66	0.34			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 14.6
 Intersection LOS: B
 Intersection Capacity Utilization 67.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: NB Off Ramp/NB C-D & North Rd



Phasings
24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	12.0	12.0	12.0
Total Split (s)	12.0	36.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	20.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Maximum Green (s)	7.0	31.0	19.0	19.0	19.0	19.0	19.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	7.0	31.0	19.0	19.0	19.0	19.0	19.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	7.0	30.7	18.7	18.7	19.3	19.3	19.3
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	0.0	31.8	31.8	31.8	18.2	18.2	18.2
50th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap
30th %ile Green (s)	0.0	34.9	34.9	34.9	15.1	15.1	15.1
30th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	38.5	38.5	38.5	11.5	11.5	11.5
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
24: NB Off Ramp/NB C-D & North Rd

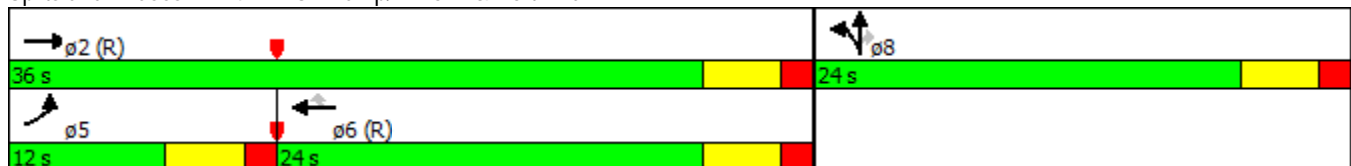
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	42	122	0	0	337	14	78	374	216	0	0	0	
Satd. Flow (prot)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0	
Flt Permitted	0.950						0.950						
Satd. Flow (perm)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0	
Satd. Flow (RTOR)							127			227			
Lane Group Flow (vph)	44	128	0	0	355	15	82	394	227	0	0	0	
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm				
Protected Phases	5	2			6		8	8					
Permitted Phases							6			8			
Total Split (s)	12.0	36.0			24.0	24.0	24.0	24.0	24.0				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0				
Act Effct Green (s)	7.0	33.4			28.6	28.6	16.6	16.6	16.6				
Actuated g/C Ratio	0.12	0.56			0.48	0.48	0.28	0.28	0.28				
v/c Ratio	0.22	0.12			0.40	0.02	0.22	0.76	0.37				
Control Delay	13.0	8.7			6.7	0.1	17.1	29.5	4.6				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0				
Total Delay	13.0	8.7			6.7	0.1	17.1	29.5	4.6				
LOS	B	A			A	A	B	C	A				
Approach Delay					9.8					6.4			
Approach LOS					A					A			
Queue Length 50th (ft)	2	2			13	0	22	124	0				
Queue Length 95th (ft)	m39	97			95	m0	49	205	40				
Internal Link Dist (ft)					679					429			
Turn Bay Length (ft)	250					250	300				300		
Base Capacity (vph)	196	1038			889	822	433	597	662				
Starvation Cap Reductn	0	0			0	0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0	0				
Reduced v/c Ratio	0.22	0.12			0.40	0.02	0.19	0.66	0.34				

Intersection Summary




















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 14.6
 Intersection LOS: B
 Intersection Capacity Utilization 67.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: NB Off Ramp/NB C-D & North Rd

























HCM 2010 Signalized Intersection Summary
 24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	42	122	0	0	337	14	78	374	216	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	177.6	186.3	0.0	0.0	186.3	186.3	143.9	188.1	188.1			
Adj Flow Rate, veh/h	44	128	0	0	355	0	82	394	0			
Adj No. of Lanes	1	1	0	0	1	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	2	0	0	2	2	32	1	1			
Cap, veh/h	234	957	0	0	490	416	358	491	418			
Arrive On Green	0.05	0.17	0.00	0.00	0.26	0.00	0.26	0.26	0.00			
Sat Flow, veh/h	1691	1863	0	0	1863	1583	1371	1881	1599			
Grp Volume(v), veh/h	44	128	0	0	355	0	82	394	0			
Grp Sat Flow(s),veh/h/ln	1691	1863	0	0	1863	1583	1371	1881	1599			
Q Serve(g_s), s	1.1	2.6	0.0	0.0	7.7	0.0	2.1	8.7	0.0			
Cycle Q Clear(g_c), s	1.1	2.6	0.0	0.0	7.7	0.0	2.1	8.7	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	234	957	0	0	490	416	358	491	418			
V/C Ratio(X)	0.19	0.13	0.00	0.00	0.72	0.00	0.23	0.80	0.00			
Avail Cap(c_a), veh/h	266	1299	0	0	796	677	586	804	683			
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	1.00	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	18.8	10.1	0.0	0.0	14.9	0.0	12.9	15.4	0.0			
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.0	9.0	0.0	0.3	3.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.0	2.5	0.0	0.0	8.9	0.0	1.5	8.5	0.0			
LnGrp Delay(d),s/veh	19.2	10.3	0.0	0.0	23.9	0.0	13.2	18.5	0.0			
LnGrp LOS	B	B			C		B	B				
Approach Vol, veh/h		172			355			476				
Approach Delay, s/veh		12.6			23.9			17.6				
Approach LOS		B			C			B				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		43.4			11.2	32.2		16.6				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		31.0			7.0	19.0		19.0				
Max Q Clear Time (g_c+I1), s		4.6			3.1	9.7		10.7				
Green Ext Time (p_c), s		3.0			0.0	2.0		0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			19.0									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
28: Joiner St

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	0	137	111	0	29	147	42	117	31	46	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	115		115	115		115
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.850			0.850				0.850		0.946	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1762	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1762	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		624			647			546			666	
Travel Time (s)		14.2			14.7			12.4			15.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	0	144	117	0	31	155	44	123	33	48	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	144	0	117	31	0	155	44	123	33	75	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)		12			12			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	39.4%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	24	0	137	111	0	29	147	42	117
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	Yeild	-	-	Yeild	-	-	Yeild
Storage Length	115	-	-	115	-	-	115	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	0	144	117	0	31	155	44	123

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	468	468	48	468	468	44	48	0	0
Stage 1	114	114	-	354	354	-	-	-	-
Stage 2	354	354	-	114	114	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	505	493	1021	505	493	1026	1559	-	-
Stage 1	891	801	-	663	630	-	-	-	-
Stage 2	663	630	-	891	801	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	446	435	1021	394	435	1026	1559	-	-
Mov Cap-2 Maneuver	446	435	-	394	435	-	-	-	-
Stage 1	802	784	-	597	567	-	-	-	-
Stage 2	579	567	-	749	784	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	9.2	16.8	3.6
HCM LOS	A	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	446	1200	394	497	1564	-	-
HCM Lane V/C Ratio	0.099	-	-	0.057	0.12	0.297	0.061	0.021	-	-
HCM Control Delay (s)	7.6	-	-	13.6	8.4	17.9	12.7	7.4	-	-
HCM Lane LOS	A	-	-	B	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0.4	1.2	0.2	0.1	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	31	46	26
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	33	48	27

Major/Minor

Major2

Conflicting Flow All	44	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1564	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1564	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach





















SB

HCM Control Delay, s	2.2
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	222	124	2	132	2	203	191	5	5	176	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	0		0	200		0	115		115
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850		0.998			0.996			0.935	
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1857	0	1770	3525	0	1770	3309	0
Flt Permitted	0.490				0.995		0.950			0.950		
Satd. Flow (perm)	913	1863	1583	0	1850	0	1770	3525	0	1770	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		1			4			143	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1021			1076			1404			2431	
Travel Time (s)		23.2			24.5			27.4			47.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	143	234	131	2	139	2	214	201	5	5	185	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	234	131	0	143	0	214	206	0	5	328	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)		12			12			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
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5		8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	5	8	8		5	2		1	6	

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour

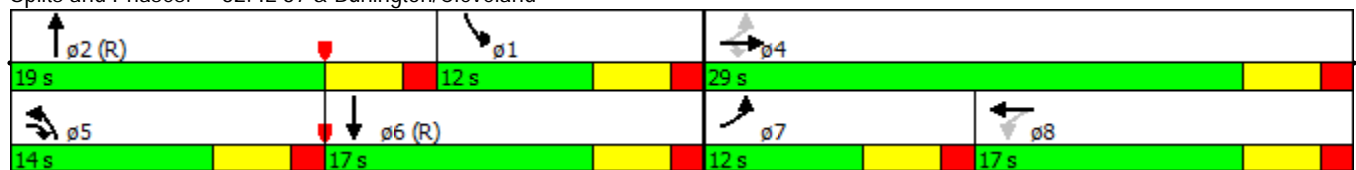


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	12.0	12.0		7.0	12.0		7.0	12.0	
Minimum Split (s)	12.0	17.0	12.0	17.0	17.0		12.0	17.0		12.0	17.0	
Total Split (s)	12.0	29.0	14.0	17.0	17.0		14.0	19.0		12.0	17.0	
Total Split (%)	20.0%	48.3%	23.3%	28.3%	28.3%		23.3%	31.7%		20.0%	28.3%	
Maximum Green (s)	7.0	24.0	9.0	12.0	12.0		9.0	14.0		7.0	12.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effect Green (s)	21.6	21.6	35.6		12.0		9.0	25.6		7.4	14.4	
Actuated g/C Ratio	0.36	0.36	0.59		0.20		0.15	0.43		0.12	0.24	
v/c Ratio	0.33	0.35	0.13		0.39		0.81	0.14		0.02	0.36	
Control Delay	9.5	9.4	0.4		24.3		51.2	13.6		22.8	12.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	9.4	0.4		24.3		51.2	13.6		22.8	12.9	
LOS	A	A	A		C		D	B		C	B	
Approach Delay		7.1			24.3			32.8			13.1	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)	18	30	0		45		76	22		2	30	
Queue Length 95th (ft)	38	55	0		90		#177	58		10	62	
Internal Link Dist (ft)		941			996			1324			2351	
Turn Bay Length (ft)	200		200				200			115		
Base Capacity (vph)	428	745	992		370		265	1529		218	905	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.33	0.31	0.13		0.39		0.81	0.13		0.02	0.36	

Intersection Summary

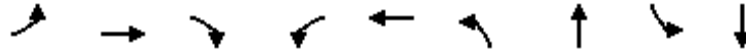
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 5 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 17.9
 Intersection LOS: B
 Intersection Capacity Utilization 59.6%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 32: IL 37 & Burlington/Cleveland



Phasings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	7	4	5		8	5	2	1	6
Permitted Phases	4		4	8					
Minimum Initial (s)	7.0	12.0	7.0	12.0	12.0	7.0	12.0	7.0	12.0
Minimum Split (s)	12.0	17.0	12.0	17.0	17.0	12.0	17.0	12.0	17.0
Total Split (s)	12.0	29.0	14.0	17.0	17.0	14.0	19.0	12.0	17.0
Total Split (%)	20.0%	48.3%	23.3%	28.3%	28.3%	23.3%	31.7%	20.0%	28.3%
Maximum Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	14.0	7.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	12.0	9.0	12.0
90th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Hold	Coord
70th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
70th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
50th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
50th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
30th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
30th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
10th %ile Green (s)	0.0	12.0	8.8	12.0	12.0	8.8	38.0	0.0	24.2
10th %ile Term Code	Skip	Min	Gap	Hold	Hold	Gap	Coord	Skip	Coord

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 5 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour

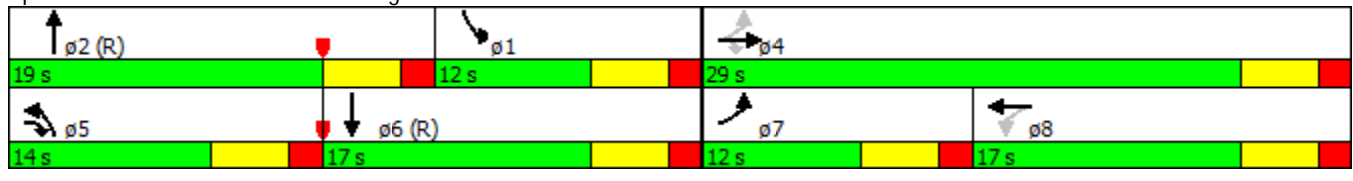


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	222	124	2	132	2	203	191	5	5	176	136
Satd. Flow (prot)	1770	1863	1583	0	1857	0	1770	3525	0	1770	3309	0
Flt Permitted	0.490				0.995		0.950			0.950		
Satd. Flow (perm)	913	1863	1583	0	1850	0	1770	3525	0	1770	3309	0
Satd. Flow (RTOR)			131		1			4			143	
Lane Group Flow (vph)	143	234	131	0	143	0	214	206	0	5	328	0
Turn Type	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5		8		5	2		1	6	
Permitted Phases	4		4	8								
Total Split (s)	12.0	29.0	14.0	17.0	17.0		14.0	19.0		12.0	17.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	21.6	21.6	35.6		12.0		9.0	25.6		7.4	14.4	
Actuated g/C Ratio	0.36	0.36	0.59		0.20		0.15	0.43		0.12	0.24	
v/c Ratio	0.33	0.35	0.13		0.39		0.81	0.14		0.02	0.36	
Control Delay	9.5	9.4	0.4		24.3		51.2	13.6		22.8	12.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	9.4	0.4		24.3		51.2	13.6		22.8	12.9	
LOS	A	A	A		C		D	B		C	B	
Approach Delay		7.1			24.3			32.8			13.1	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)	18	30	0		45		76	22		2	30	
Queue Length 95th (ft)	38	55	0		90		#177	58		10	62	
Internal Link Dist (ft)		941			996			1324			2351	
Turn Bay Length (ft)	200		200				200			115		
Base Capacity (vph)	428	745	992		370		265	1529		218	905	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.33	0.31	0.13		0.39		0.81	0.13		0.02	0.36	

Intersection Summary





















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 5 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 17.9 Intersection LOS: B
 Intersection Capacity Utilization 59.6% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 32: IL 37 & Burlington/Cleveland






















HCM 2010 Signalized Intersection Summary
 32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	136	222	124	2	132	2	203	191	5	5	176	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	143	234	131	2	139	2	214	201	5	5	185	143
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	586	725	848	62	364	5	259	706	18	285	419	306
Arrive On Green	0.11	0.39	0.39	0.20	0.20	0.20	0.15	0.20	0.20	0.16	0.21	0.21
Sat Flow, veh/h	1774	1863	1583	7	1820	26	1774	3529	88	1774	1952	1428
Grp Volume(v), veh/h	143	234	131	143	0	0	214	101	105	5	167	161
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1853	0	0	1774	1770	1847	1774	1770	1611
Q Serve(g_s), s	3.5	5.3	2.5	0.0	0.0	0.0	7.0	2.9	2.9	0.1	4.9	5.2
Cycle Q Clear(g_c), s	3.5	5.3	2.5	4.0	0.0	0.0	7.0	2.9	2.9	0.1	4.9	5.2
Prop In Lane	1.00		1.00	0.01		0.01	1.00		0.05	1.00		0.89
Lane Grp Cap(c), veh/h	586	725	848	431	0	0	259	354	369	285	380	346
V/C Ratio(X)	0.24	0.32	0.15	0.33	0.00	0.00	0.83	0.28	0.29	0.02	0.44	0.47
Avail Cap(c_a), veh/h	605	745	865	431	0	0	266	413	431	285	380	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	14.2	12.8	7.1	20.8	0.0	0.0	24.9	20.4	20.4	21.2	20.4	20.6
Incr Delay (d2), s/veh	0.2	0.3	0.1	0.4	0.0	0.0	18.4	2.0	1.9	0.0	3.2	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.7	2.7	1.1	2.1	0.0	0.0	4.8	1.6	1.7	0.1	2.7	2.7
LnGrp Delay(d),s/veh	14.5	13.1	7.1	21.2	0.0	0.0	43.3	22.4	22.3	21.2	23.6	24.5
LnGrp LOS	B	B	A	C			D	C	C	C	C	C
Approach Vol, veh/h		508			143			420			333	
Approach Delay, s/veh		11.9			21.2			33.0			24.0	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.6	17.0		28.4	13.8	17.9	11.4	17.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	14.0		24.0	9.0	12.0	7.0	12.0				
Max Q Clear Time (g_c+I1), s	2.1	4.9		7.3	9.0	7.2	5.5	6.0				
Green Ext Time (p_c), s	0.8	0.6		2.4	0.0	0.8	0.1	1.4				
Intersection Summary												
HCM 2010 Ctrl Delay			22.0									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
35: North Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	283	0	0	329	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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												
Flt Protected												
Satd. Flow (prot)	1863	1863	0	1863	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	1863	1863	0	1863	1863	0	0	1863	0	0	1863	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		416			690			408			170	
Travel Time (s)		9.5			15.7			7.9			3.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	298	0	0	346	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	0	0	346	0	0	0	0	0	0	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)		12			12			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	20.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	283	0	0	329	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	298	0	0	346	0	0	0	0

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	346	0	0	298	0	0	644	644	298
Stage 1	-	-	-	-	-	-	298	298	-
Stage 2	-	-	-	-	-	-	346	346	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1213	-	-	1263	-	-	386	391	741
Stage 1	-	-	-	-	-	-	711	667	-
Stage 2	-	-	-	-	-	-	670	635	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1213	-	-	1263	-	-	386	391	741
Mov Cap-2 Maneuver	-	-	-	-	-	-	386	391	-
Stage 1	-	-	-	-	-	-	711	667	-
Stage 2	-	-	-	-	-	-	670	635	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1213	-	-	1263	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	0	0	0






















Major/Minor	Minor2		
Conflicting Flow All	644	644	346
Stage 1	346	346	-
Stage 2	298	298	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	386	391	697
Stage 1	670	635	-
Stage 2	711	667	-
Platoon blocked, %			
Mov Cap-1 Maneuver	386	391	697
Mov Cap-2 Maneuver	386	391	-
Stage 1	670	635	-
Stage 2	711	667	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	A

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
38: Russell Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	1	36	42	1	135	39	0	46	143	1	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	115		0	115		200
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
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		0.854				0.850		0.850				0.850
Flt Protected	0.950				0.953		0.950			0.950		
Satd. Flow (prot)	1770	1591	0	0	1421	1468	1703	1049	0	1787	1900	1615
Flt Permitted	0.950				0.953		0.950			0.950		
Satd. Flow (perm)	1770	1591	0	0	1421	1468	1703	1049	0	1787	1900	1615
Link Speed (mph)		35			35			35			30	
Link Distance (ft)		440			593			577			592	
Travel Time (s)		8.6			11.6			11.2			13.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	28%	2%	10%	6%	2%	54%	1%	0%	0%
Adj. Flow (vph)	211	1	38	44	1	142	41	0	48	151	1	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	39	0	0	45	142	41	48	0	151	1	234
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)		12			12			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	39.0%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	200	1	36	42	1	135	39	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Yield
Storage Length	0	-	-	-	-	0	115	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	28	2	10	6	2	54
Mvmt Flow	211	1	38	44	1	142	41	0	48

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	385	384	1	404	384	0	1	0	0
Stage 1	302	302	-	82	82	-	-	-	-
Stage 2	83	82	-	322	302	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.38	6.52	6.3	4.16	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.38	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.38	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.752	4.018	3.39	2.254	-	-
Pot Cap-1 Maneuver	573	550	1084	514	550	-	1596	-	-
Stage 1	707	664	-	866	827	-	-	-	-
Stage 2	925	827	-	638	664	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	536	1084	486	536	-	1596	-	-
Mov Cap-2 Maneuver	-	536	-	486	536	-	-	-	-
Stage 1	689	664	-	844	806	-	-	-	-
Stage 2	900	806	-	615	664	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	-	-	3.4
HCM LOS	-	-	-

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1596	-	-	-	1055	487	-	-	-	-
HCM Lane V/C Ratio	0.026	-	-	-	0.037	0.093	-	-	-	-
HCM Control Delay (s)	7.3	-	-	-	8.5	13.1	-	-	-	-
HCM Lane LOS	A	-	-	-	A	B	-	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.3	-	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	143	1	222
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	1	0	0
Mvmt Flow	151	1	234

Major/Minor	Major2		
Conflicting Flow All	0	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.11	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.209	-	-
Pot Cap-1 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
42: Taft St & Jones St

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	39	1	1	1	1	1	1	175	1	1	151	39
Ideal Flow (vphp)	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		0.997			0.955			0.999			0.972	
Flt Protected		0.954			0.984							
Satd. Flow (prot)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Flt Permitted		0.954			0.984							
Satd. Flow (perm)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		377			767			921			350	
Travel Time (s)		7.3			14.9			20.9			8.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1	1	1	1	1	1	184	1	1	159	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	3	0	0	186	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	23.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	39	1	1	1	1	1	1	175	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	1	1	1	1	1	1	184	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	370	369	179	370	389	185	200	0	0
Stage 1	182	182	-	187	187	-	-	-	-
Stage 2	188	187	-	183	202	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	587	560	864	587	546	857	1372	-	-
Stage 1	820	749	-	815	745	-	-	-	-
Stage 2	814	745	-	819	734	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	585	559	864	585	545	857	1372	-	-
Mov Cap-2 Maneuver	585	559	-	585	545	-	-	-	-
Stage 1	819	748	-	814	744	-	-	-	-
Stage 2	811	744	-	816	733	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11.6	10.7	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	589	637	1390	-	-
HCM Lane V/C Ratio	0.001	-	-	0.073	0.005	0.001	-	-
HCM Control Delay (s)	7.6	0	-	11.6	10.7	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	151	39
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	1	159	41

Major/Minor Major2

Conflicting Flow All	185	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1390	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1390	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB





















HCM Control Delay, s 0

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
54: Relocated S.W. Road & North Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	258	46	28	270	31	49	1	27	28	1	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.977			0.984			0.855			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1820	0	1770	1833	0	1770	1593	0	1770	1591	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1820	0	1770	1833	0	1770	1593	0	1770	1591	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		240			416			416			254	
Travel Time (s)		5.5			9.5			9.5			5.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	272	48	29	284	33	52	1	28	29	1	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	320	0	29	317	0	52	29	0	29	35	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)		12			12			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		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.1%
Analysis Period (min)	15
	ICU Level of Service A

Intersection										
Int Delay, s/veh	3.2									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	34	258	46	28	270	31	49	1	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	115	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	272	48	29	284	33	52	1	28

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	317	0	0	320	0	0	744	743	296
Stage 1	-	-	-	-	-	-	367	367	-
Stage 2	-	-	-	-	-	-	377	376	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1243	-	-	1240	-	-	331	343	743
Stage 1	-	-	-	-	-	-	653	622	-
Stage 2	-	-	-	-	-	-	644	616	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1243	-	-	1240	-	-	303	325	743
Mov Cap-2 Maneuver	-	-	-	-	-	-	303	325	-
Stage 1	-	-	-	-	-	-	634	604	-
Stage 2	-	-	-	-	-	-	599	602	-

Approach	EB	WB	NB
HCM Control Delay, s	0.8	0.7	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	303	710	1243	-	-	1240	-	-	306	711
HCM Lane V/C Ratio	0.17	0.042	0.029	-	-	0.024	-	-	0.096	0.049
HCM Control Delay (s)	19.3	10.3	8	-	-	8	-	-	18	10.3
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.6	0.1	0.1	-	-	0.1	-	-	0.3	0.2

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	28	1	32
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	29	1	34

Major/Minor

	Minor2		
Conflicting Flow All	741	751	301
Stage 1	359	359	-
Stage 2	382	392	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	332	340	739
Stage 1	659	627	-
Stage 2	640	606	-
Platoon blocked, %			
Mov Cap-1 Maneuver	306	322	739
Mov Cap-2 Maneuver	306	322	-
Stage 1	640	612	-
Stage 2	597	588	-

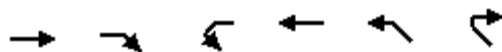
Approach

	SB
HCM Control Delay, s	13.8
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
1: Burlington & IL 149

2032 Design Year - Build
PM Peak Hour



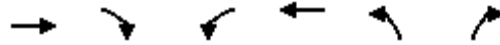
Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑			↑		
Volume (vph)	346	165	0	670	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.956					
Flt Protected						
Satd. Flow (prot)	1691	0	0	1792	0	0
Flt Permitted						
Satd. Flow (perm)	1691	0	0	1792	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	1214			886	922	
Travel Time (s)	27.6			20.1	21.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	2%	2%	6%	2%	2%
Adj. Flow (vph)	364	174	0	705	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	538	0	0	705	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
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	38.6%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

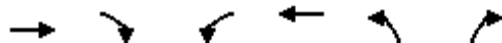
2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	346	1	31	497	173	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	115		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.977	
Fl _t Protected			0.950		0.960	
Satd. Flow (prot)	1728	0	1703	1792	1694	0
Fl _t Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1694	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					16	
Link Speed (mph)	30			30	30	
Link Distance (ft)	886			1076	340	
Travel Time (s)	20.1			24.5	7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	6%	6%	5%	6%
Adj. Flow (vph)	364	1	33	523	182	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	365	0	33	523	219	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	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
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Detector Phase	2		1	6	8	
Switch Phase						
Minimum Initial (s)	7.0		7.0	10.0	7.0	
Minimum Split (s)	12.0		12.0	15.0	12.0	
Total Split (s)	29.0		12.0	41.0	19.0	
Total Split (%)	48.3%		20.0%	68.3%	31.7%	
Maximum Green (s)	24.0		7.0	36.0	14.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
Act Effect Green (s)	33.4		7.1	38.3	11.7	

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour

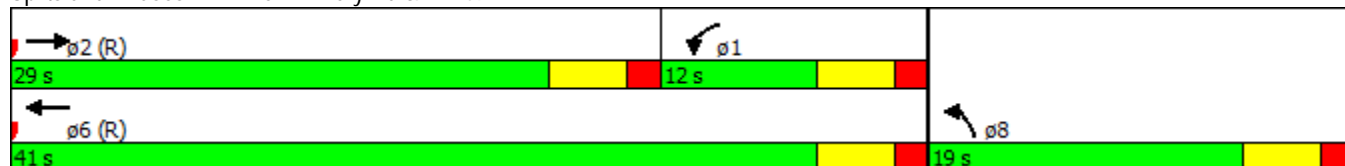


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.56		0.12	0.64	0.20	
v/c Ratio	0.38		0.17	0.46	0.64	
Control Delay	11.6		21.9	3.9	25.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	11.6		21.9	3.9	25.5	
LOS	B		C	A	C	
Approach Delay	11.6			5.0	25.5	
Approach LOS	B			A	C	
90th %ile Green (s)	24.0		7.0	36.0	14.0	
90th %ile Term Code	Coord		Max	Coord	Max	
70th %ile Green (s)	23.3		7.3	35.6	14.4	
70th %ile Term Code	Coord		Gap	Coord	Gap	
50th %ile Green (s)	37.6		0.0	37.6	12.4	
50th %ile Term Code	Coord		Skip	Coord	Gap	
30th %ile Green (s)	39.7		0.0	39.7	10.3	
30th %ile Term Code	Coord		Skip	Coord	Gap	
10th %ile Green (s)	42.6		0.0	42.6	7.4	
10th %ile Term Code	Coord		Skip	Coord	Gap	
Queue Length 50th (ft)	53		12	18	56	
Queue Length 95th (ft)	167		m25	58	84	
Internal Link Dist (ft)	806			996	260	
Turn Bay Length (ft)			115			
Base Capacity (vph)	967		200	1146	409	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.38		0.17	0.46	0.54	

Intersection Summary

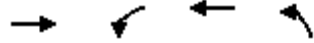
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 5 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.0
 Intersection LOS: B
 Intersection Capacity Utilization 46.2%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



Phasings
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	WBL	WBT	NBL
Protected Phases	2	1	6	8
Permitted Phases				
Minimum Initial (s)	7.0	7.0	10.0	7.0
Minimum Split (s)	12.0	12.0	15.0	12.0
Total Split (s)	29.0	12.0	41.0	19.0
Total Split (%)	48.3%	20.0%	68.3%	31.7%
Maximum Green (s)	24.0	7.0	36.0	14.0
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	C-Min	None	C-Min	None
Walk Time (s)				
Flash Dont Walk (s)				
Pedestrian Calls (#/hr)				
90th %ile Green (s)	24.0	7.0	36.0	14.0
90th %ile Term Code	Coord	Max	Coord	Max
70th %ile Green (s)	23.3	7.3	35.6	14.4
70th %ile Term Code	Coord	Gap	Coord	Gap
50th %ile Green (s)	37.6	0.0	37.6	12.4
50th %ile Term Code	Coord	Skip	Coord	Gap
30th %ile Green (s)	39.7	0.0	39.7	10.3
30th %ile Term Code	Coord	Skip	Coord	Gap
10th %ile Green (s)	42.6	0.0	42.6	7.4
10th %ile Term Code	Coord	Skip	Coord	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 5 (8%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour














Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	365	33	523	219
v/c Ratio	0.38	0.17	0.46	0.64
Control Delay	11.6	21.9	3.9	25.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.6	21.9	3.9	25.5
Queue Length 50th (ft)	53	12	18	56
Queue Length 95th (ft)	167	m25	58	84
Internal Link Dist (ft)	806		996	260
Turn Bay Length (ft)		115		
Base Capacity (vph)	967	200	1146	409
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.17	0.46	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Volume (veh/h)	346	1	31	497	173	35		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	172.8	190.0	179.2	179.2	180.7	190.0		
Adj Flow Rate, veh/h	364	1	33	523	182	37		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	10	10	6	6	0	0		
Cap, veh/h	528	1	95	920	257	52		
Arrive On Green	0.31	0.31	0.02	0.17	0.18	0.18		
Sat Flow, veh/h	1722	5	1707	1792	1395	284		
Grp Volume(v), veh/h	0	365	33	523	220	0		
Grp Sat Flow(s),veh/h/ln	0	1727	1707	1792	1687	0		
Q Serve(g_s), s	0.0	6.1	0.6	8.9	4.0	0.0		
Cycle Q Clear(g_c), s	0.0	6.1	0.6	8.9	4.0	0.0		
Prop In Lane		0.00	1.00		0.83	0.17		
Lane Grp Cap(c), veh/h	0	529	95	920	310	0		
V/C Ratio(X)	0.00	0.69	0.35	0.57	0.71	0.00		
Avail Cap(c_a), veh/h	0	1256	362	1955	715	0		
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.82	0.82	1.00	0.00		
Uniform Delay (d), s/veh	0.0	10.1	15.6	10.4	12.6	0.0		
Incr Delay (d2), s/veh	0.0	7.2	1.8	2.1	3.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.0	7.0	0.6	8.2	3.8	0.0		
LnGrp Delay(d),s/veh	0.0	17.3	17.4	12.4	15.6	0.0		
LnGrp LOS		B	B	B	B			
Approach Vol, veh/h	365			556	220			
Approach Delay, s/veh	17.3			12.7	15.6			
Approach LOS	B			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	33.8	15.1				48.9		11.1
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	7.0	24.0				36.0		14.0
Max Q Clear Time (g_c+I1), s	2.6	8.1				10.9		6.0
Green Ext Time (p_c), s	1.4	2.0				3.7		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			14.7					
HCM 2010 LOS			B					
Notes								
User approved volume balancing among the lanes for turning movement.								

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	276	67	357	382	52	76	26	368	190	39	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	155		0	160		160	215		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.971			0.982				0.850		0.932	
Flt Protected	0.950			0.950				0.964		0.950		
Satd. Flow (prot)	1805	1664	0	1787	1737	0	0	1805	1615	1787	1771	0
Flt Permitted	0.354			0.545				0.732		0.377		
Satd. Flow (perm)	673	1664	0	1025	1737	0	0	1370	1615	709	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			12				260			34
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1076			538			598				782
Travel Time (s)		24.5			12.2			13.6				17.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	13%	2%	1%	8%	3%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	31	291	71	376	402	55	80	27	387	200	41	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	362	0	376	457	0	0	107	387	200	75	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)		12			12			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
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt		NA
Protected Phases	5	2		1	6			8	1	7		4
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	7		4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0		7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		12.0	12.0	12.0	12.0		12.0
Total Split (s)	12.0	20.0		16.0	24.0		12.0	12.0	16.0	12.0		24.0
Total Split (%)	20.0%	33.3%		26.7%	40.0%		20.0%	20.0%	26.7%	20.0%		40.0%
Maximum Green (s)	7.0	15.0		11.0	19.0		7.0	7.0	11.0	7.0		19.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5		1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0		5.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0		3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None		None
Act Effect Green (s)	18.1	18.1		28.5	28.5			7.0	15.8	16.7		16.7

Lanes, Volumes, Timings
 3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
 PM Peak Hour

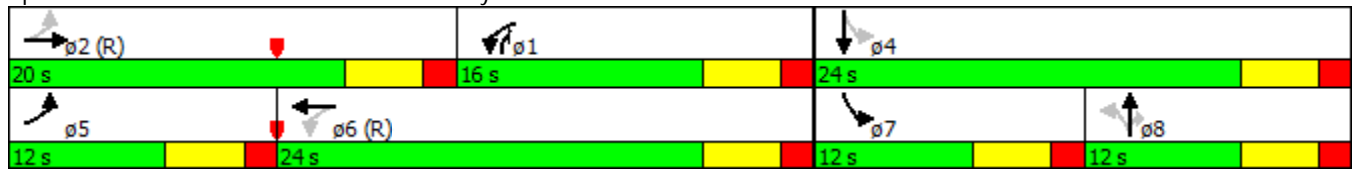


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.30	0.30		0.48	0.48			0.12	0.26	0.28	0.28	
v/c Ratio	0.09	0.70		0.61	0.55			0.67	0.63	0.62	0.15	
Control Delay	8.1	22.9		14.1	10.6			49.6	8.1	25.6	10.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	8.1	22.9		14.1	10.6			49.6	8.1	25.6	10.2	
LOS	A	C		B	B			D	A	C	B	
Approach Delay		21.8			12.2			17.1			21.4	
Approach LOS		C			B			B			C	
90th %ile Green (s)	7.0	15.0		11.0	19.0		7.0	7.0	11.0	7.0	19.0	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Hold	
70th %ile Green (s)	7.0	15.0		11.0	19.0		7.0	7.0	11.0	7.0	19.0	
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Hold	
50th %ile Green (s)	0.0	15.0		11.0	31.0		7.0	7.0	11.0	7.0	19.0	
50th %ile Term Code	Skip	Coord		Hold	Coord		Max	Max	Hold	Max	Hold	
30th %ile Green (s)	0.0	15.0		11.0	31.0		7.0	7.0	11.0	7.0	19.0	
30th %ile Term Code	Skip	Coord		Hold	Coord		Max	Max	Hold	Max	Hold	
10th %ile Green (s)	0.0	30.6		7.0	42.6		0.0	0.0	7.0	7.4	7.4	
10th %ile Term Code	Skip	Coord		Min	Coord		Skip	Skip	Min	Gap	Hold	
Queue Length 50th (ft)	9	123		25	32			38	18	55	10	
Queue Length 95th (ft)	m6	#85		#252	#285			#105	52	103	35	
Internal Link Dist (ft)		996			458			518			702	
Turn Bay Length (ft)	150			155					160	215		
Base Capacity (vph)	335	516		640	832			159	634	324	584	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.09	0.70		0.59	0.55			0.67	0.61	0.62	0.13	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 16.6 Intersection LOS: B
 Intersection Capacity Utilization 68.1% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



Phasings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour



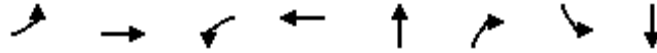
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8	1	7	4
Permitted Phases	2		6		8		8	4	
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	20.0	16.0	24.0	12.0	12.0	16.0	12.0	24.0
Total Split (%)	20.0%	33.3%	26.7%	40.0%	20.0%	20.0%	26.7%	20.0%	40.0%
Maximum Green (s)	7.0	15.0	11.0	19.0	7.0	7.0	11.0	7.0	19.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	6.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	15.0	11.0	19.0	7.0	7.0	11.0	7.0	19.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
70th %ile Green (s)	7.0	15.0	11.0	19.0	7.0	7.0	11.0	7.0	19.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
50th %ile Green (s)	0.0	15.0	11.0	31.0	7.0	7.0	11.0	7.0	19.0
50th %ile Term Code	Skip	Coord	Hold	Coord	Max	Max	Hold	Max	Hold
30th %ile Green (s)	0.0	15.0	11.0	31.0	7.0	7.0	11.0	7.0	19.0
30th %ile Term Code	Skip	Coord	Hold	Coord	Max	Max	Hold	Max	Hold
10th %ile Green (s)	0.0	30.6	7.0	42.6	0.0	0.0	7.0	7.4	7.4
10th %ile Term Code	Skip	Coord	Min	Coord	Skip	Skip	Min	Gap	Hold

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	362	376	457	107	387	200	75
v/c Ratio	0.09	0.70	0.61	0.55	0.67	0.63	0.62	0.15
Control Delay	8.1	22.9	14.1	10.6	49.6	8.1	25.6	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	22.9	14.1	10.6	49.6	8.1	25.6	10.2
Queue Length 50th (ft)	9	123	25	32	38	18	55	10
Queue Length 95th (ft)	m6	#85	#252	#285	#105	52	103	35
Internal Link Dist (ft)		996		458	518			702
Turn Bay Length (ft)	150		155			160	215	
Base Capacity (vph)	335	516	640	832	159	634	324	584
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.70	0.59	0.55	0.67	0.61	0.62	0.13

Intersection Summary






















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	29	276	67	357	382	52	76	26	368	190	39	32
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	190.0	171.4	190.0	188.1	176.9	190.0	190.0	187.2	190.0	188.1	190.0	190.0
Adj Flow Rate, veh/h	31	291	71	376	402	55	80	27	387	200	41	34
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	13	13	1	8	8	0	0	0	1	0	0
Cap, veh/h	210	325	79	436	555	76	230	55	467	393	316	262
Arrive On Green	0.09	0.49	0.49	0.17	0.36	0.36	0.12	0.12	0.12	0.12	0.33	0.33
Sat Flow, veh/h	1810	1332	325	1792	1524	208	1003	455	1615	1792	962	798
Grp Volume(v), veh/h	31	0	362	376	0	457	107	0	387	200	0	75
Grp Sat Flow(s),veh/h/ln	1810	0	1657	1792	0	1732	1459	0	1615	1792	0	1759
Q Serve(g_s), s	0.8	0.0	11.5	7.3	0.0	13.2	3.5	0.0	3.8	5.3	0.0	1.7
Cycle Q Clear(g_c), s	0.8	0.0	11.5	7.3	0.0	13.2	4.0	0.0	3.8	5.3	0.0	1.7
Prop In Lane	1.00		0.20	1.00		0.12	0.75		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	210	0	404	436	0	631	285	0	467	393	0	578
V/C Ratio(X)	0.15	0.00	0.90	0.86	0.00	0.72	0.37	0.00	0.83	0.51	0.00	0.13
Avail Cap(c_a), veh/h	344	0	430	476	0	631	285	0	467	393	0	578
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	0.0	14.1	21.7	0.0	15.9	24.0	0.0	5.8	17.4	0.0	13.6
Incr Delay (d2), s/veh	0.3	0.0	23.7	14.1	0.0	7.1	0.8	0.0	11.8	1.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	12.1	11.9	0.0	11.9	3.0	0.0	7.4	4.8	0.0	1.5
LnGrp Delay(d),s/veh	19.1	0.0	37.9	35.8	0.0	22.9	24.8	0.0	17.6	18.5	0.0	13.7
LnGrp LOS	B		D	D		C	C		B	B		B
Approach Vol, veh/h		393			833			494			275	
Approach Delay, s/veh		36.4			28.7			19.2			17.2	
Approach LOS		D			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.9	19.1		24.0	7.7	28.3	12.0	12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	11.0	15.0		19.0	7.0	19.0	7.0	7.0				
Max Q Clear Time (g_c+I1), s	9.3	13.5		3.7	2.8	15.2	7.3	6.0				
Green Ext Time (p_c), s	0.5	0.6		2.2	0.0	2.2	0.0	0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			26.3									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
4: IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	796	756	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			1	0	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1881	1810	1810	1863	0	0
Flt Permitted						
Satd. Flow (perm)	1881	1810	1810	1863	0	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		538	259		442	
Travel Time (s)		12.2	5.9		8.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	5%	2%	2%	2%
Adj. Flow (vph)	0	838	796	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	838	796	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↘	↑	↗
Volume (vph)	0	696	76	23	750	0	0	0	0	22	313	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	220		0	0		0	300		300
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		534			842			295			893	
Travel Time (s)		12.1			19.1			4.5			13.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	3%	4%	2%	2%	2%	2%	2%	14%	2%	7%
Adj. Flow (vph)	0	733	80	24	789	0	0	0	0	23	329	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	733	80	24	789	0	0	0	0	23	329	105
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)		12			12			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
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		25.0	25.0	7.0	25.0					7.0	7.0	7.0
Minimum Split (s)		30.0	30.0	12.0	30.0					12.0	12.0	12.0
Total Split (s)		30.0	30.0	12.0	42.0					18.0	18.0	18.0
Total Split (%)		50.0%	50.0%	20.0%	70.0%					30.0%	30.0%	30.0%
Maximum Green (s)		25.0	25.0	7.0	37.0					13.0	13.0	13.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		32.8	32.8	7.0	35.2					14.8	14.8	14.8

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

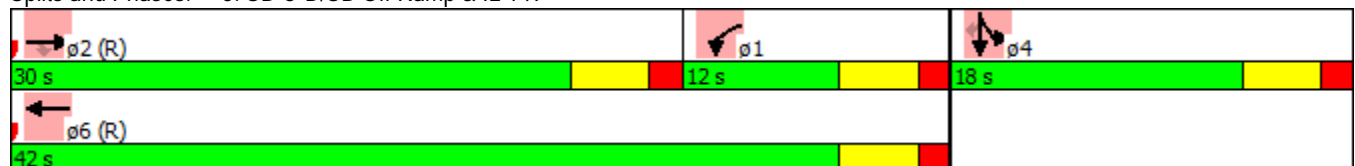


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.55	0.55	0.12	0.59					0.25	0.25	0.25
v/c Ratio		0.39	0.09	0.12	0.38					0.06	0.72	0.22
Control Delay		8.7	1.5	16.6	2.8					17.5	32.2	4.6
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		8.7	1.5	16.6	2.8					17.5	32.2	4.6
LOS		A	A	B	A					B	C	A
Approach Delay		8.0			3.2						25.1	
Approach LOS		A			A						C	
90th %ile Green (s)		25.0	25.0	7.0	37.0					13.0	13.0	13.0
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		31.1	31.1	0.0	31.1					18.9	18.9	18.9
70th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
50th %ile Green (s)		33.5	33.5	0.0	33.5					16.5	16.5	16.5
50th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
30th %ile Green (s)		35.6	35.6	0.0	35.6					14.4	14.4	14.4
30th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
10th %ile Green (s)		38.8	38.8	0.0	38.8					11.2	11.2	11.2
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		66	0	0	14					6	104	0
Queue Length 95th (ft)		133	m1	m0	3					23	#235	26
Internal Link Dist (ft)		454			762			215			813	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1879	914	202	2203					399	470	476
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.39	0.09	0.12	0.36					0.06	0.70	0.22

Intersection Summary

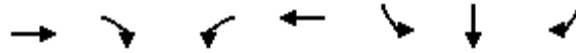
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 3 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 9.9
 Intersection LOS: A
 Intersection Capacity Utilization 55.6%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149



Phasings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



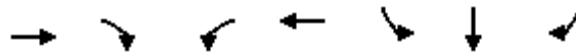
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	25.0	25.0	7.0	25.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	12.0	30.0	12.0	12.0	12.0
Total Split (s)	30.0	30.0	12.0	42.0	18.0	18.0	18.0
Total Split (%)	50.0%	50.0%	20.0%	70.0%	30.0%	30.0%	30.0%
Maximum Green (s)	25.0	25.0	7.0	37.0	13.0	13.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	25.0	25.0	7.0	37.0	13.0	13.0	13.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	31.1	31.1	0.0	31.1	18.9	18.9	18.9
70th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap
50th %ile Green (s)	33.5	33.5	0.0	33.5	16.5	16.5	16.5
50th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap
30th %ile Green (s)	35.6	35.6	0.0	35.6	14.4	14.4	14.4
30th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap
10th %ile Green (s)	38.8	38.8	0.0	38.8	11.2	11.2	11.2
10th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 3 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	733	80	24	789	23	329	105
v/c Ratio	0.39	0.09	0.12	0.38	0.06	0.72	0.22
Control Delay	8.7	1.5	16.6	2.8	17.5	32.2	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	1.5	16.6	2.8	17.5	32.2	4.6
Queue Length 50th (ft)	66	0	0	14	6	104	0
Queue Length 95th (ft)	133	m1	m0	3	23	#235	26
Internal Link Dist (ft)	454			762		813	
Turn Bay Length (ft)		200	220		300		300
Base Capacity (vph)	1879	914	202	2203	399	470	476
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.09	0.12	0.36	0.06	0.70	0.22

Intersection Summary













95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑	↑	↑
Volume (veh/h)	0	696	76	23	750	0	0	0	0	22	313	100
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	184.5	182.7	186.3	0.0				166.7	186.3	177.6
Adj Flow Rate, veh/h	0	733	0	24	789	0				23	329	0
Adj No. of Lanes	0	2	1	1	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	4	2	0				14	2	7
Cap, veh/h	0	1613	736	68	2132	0				333	391	317
Arrive On Green	0.00	0.47	0.00	0.04	0.60	0.00				0.21	0.21	0.00
Sat Flow, veh/h	0	3529	1568	1740	3632	0				1587	1863	1509
Grp Volume(v), veh/h	0	733	0	24	789	0				23	329	0
Grp Sat Flow(s),veh/h/ln	0	1719	1568	1740	1770	0				1587	1863	1509
Q Serve(g_s), s	0.0	7.7	0.0	0.7	6.1	0.0				0.6	9.0	0.0
Cycle Q Clear(g_c), s	0.0	7.7	0.0	0.7	6.1	0.0				0.6	9.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1613	736	68	2132	0				333	391	317
V/C Ratio(X)	0.00	0.45	0.00	0.35	0.37	0.00				0.07	0.84	0.00
Avail Cap(c_a), veh/h	0	1613	736	229	2458	0				387	454	368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.5	0.0	24.9	5.4	0.0				16.9	20.2	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	2.8	0.5	0.0				0.1	11.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	6.8	0.0	0.7	5.4	0.0				0.5	9.8	0.0
LnGrp Delay(d),s/veh	0.0	10.5	0.0	27.8	5.9	0.0				17.0	32.0	0.0
LnGrp LOS		B		C	A					B	C	
Approach Vol, veh/h		733			813						352	
Approach Delay, s/veh		10.5			6.5						31.1	
Approach LOS		B			A						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	13.8	30.0		16.2		43.8						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	7.0	25.0		13.0		37.0						
Max Q Clear Time (g_c+I1), s	2.7	9.7		11.0		8.1						
Green Ext Time (p_c), s	2.1	4.5		0.2		6.3						
Intersection Summary												
HCM 2010 Ctrl Delay				12.6								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑			↑↑	↗	↘	↑	↗			
Volume (vph)	82	609	0	0	632	27	114	302	9	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		200	225		225	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			127			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		842			517			1135			359	
Travel Time (s)		19.1			11.8			17.2			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	5%	2%	2%	2%	7%	3%	4%	5%	2%	2%	2%
Adj. Flow (vph)	86	641	0	0	665	28	120	318	9	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	641	0	0	665	28	120	318	9	0	0	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)		12			12			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
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	25.0			25.0	25.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	30.0			30.0	30.0	12.0	12.0	12.0			
Total Split (s)	12.0	42.0			30.0	30.0	18.0	18.0	18.0			
Total Split (%)	20.0%	70.0%			50.0%	50.0%	30.0%	30.0%	30.0%			
Maximum Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.0	37.4			27.8	27.8	12.6	12.6	12.6			

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

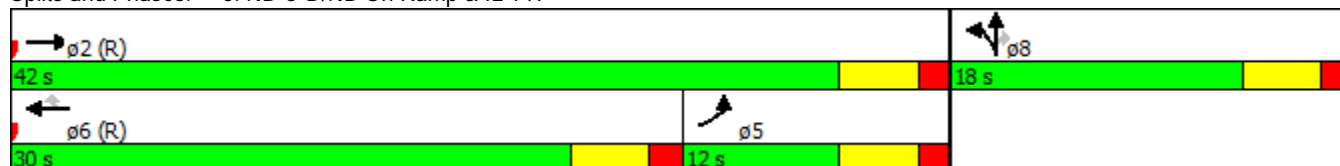


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.12	0.62			0.46	0.46	0.21	0.21	0.21			
v/c Ratio	0.44	0.30			0.41	0.04	0.33	0.83	0.02			
Control Delay	23.8	4.6			6.8	0.3	17.3	38.6	0.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	23.8	4.6			6.8	0.3	17.3	38.6	0.1			
LOS	C	A			A	A	B	D	A			
Approach Delay		6.9			6.6			32.1				
Approach LOS		A			A			C				
90th %ile Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
50th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
30th %ile Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
30th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
10th %ile Green (s)	0.0	39.1			39.1	39.1	10.9	10.9	10.9			
10th %ile Term Code	Skip	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	24	22			76	0	38	118	0			
Queue Length 95th (ft)	34	69			87	m0	73	#228	m0			
Internal Link Dist (ft)		762			437			1055				279
Turn Bay Length (ft)	260					200	225		225			
Base Capacity (vph)	194	2144			1640	767	379	395	432			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.44	0.30			0.41	0.04	0.32	0.81	0.02			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 12.8 Intersection LOS: B
 Intersection Capacity Utilization 55.6% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



Phasings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	25.0	25.0	25.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	30.0	30.0	12.0	12.0	12.0
Total Split (s)	12.0	42.0	30.0	30.0	18.0	18.0	18.0
Total Split (%)	20.0%	70.0%	50.0%	50.0%	30.0%	30.0%	30.0%
Maximum Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
50th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
30th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
30th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
10th %ile Green (s)	0.0	39.1	39.1	39.1	10.9	10.9	10.9
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	86	641	665	28	120	318	9
v/c Ratio	0.44	0.30	0.41	0.04	0.33	0.83	0.02
Control Delay	23.8	4.6	6.8	0.3	17.3	38.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	4.6	6.8	0.3	17.3	38.6	0.1
Queue Length 50th (ft)	24	22	76	0	38	118	0
Queue Length 95th (ft)	34	69	87	m0	73	#228	m0
Internal Link Dist (ft)		762	437			1055	
Turn Bay Length (ft)	260			200	225		225
Base Capacity (vph)	194	2144	1640	767	379	395	432
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.30	0.41	0.04	0.32	0.81	0.02

Intersection Summary






















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (veh/h)	82	609	0	0	632	27	114	302	9	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	175.9	181.0	0.0	0.0	186.3	177.6	184.5	182.7	181.0			
Adj Flow Rate, veh/h	86	641	0	0	665	0	120	318	0			
Adj No. of Lanes	1	2	0	0	2	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	8	5	0	0	2	7	3	4	5			
Cap, veh/h	153	2125	0	0	1554	663	362	377	317			
Arrive On Green	0.09	0.62	0.00	0.00	0.88	0.00	0.21	0.21	0.00			
Sat Flow, veh/h	1675	3529	0	0	3632	1509	1757	1827	1538			
Grp Volume(v), veh/h	86	641	0	0	665	0	120	318	0			
Grp Sat Flow(s),veh/h/ln	1675	1719	0	0	1770	1509	1757	1827	1538			
Q Serve(g_s), s	2.8	5.0	0.0	0.0	2.1	0.0	3.3	9.5	0.0			
Cycle Q Clear(g_c), s	2.8	5.0	0.0	0.0	2.1	0.0	3.3	9.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	153	2125	0	0	1554	663	362	377	317			
V/C Ratio(X)	0.56	0.30	0.00	0.00	0.43	0.00	0.33	0.84	0.00			
Avail Cap(c_a), veh/h	206	2234	0	0	1554	663	401	417	351			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.93	0.93	0.00	0.00	1.00	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	24.8	5.1	0.0	0.0	2.1	0.0	19.3	21.7	0.0			
Incr Delay (d2), s/veh	3.0	0.3	0.0	0.0	0.9	0.0	0.5	13.6	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	2.6	4.3	0.0	0.0	1.8	0.0	3.0	10.3	0.0			
LnGrp Delay(d),s/veh	27.8	5.4	0.0	0.0	2.9	0.0	19.8	35.3	0.0			
LnGrp LOS	C	A			A		B	D				
Approach Vol, veh/h		727			665			438				
Approach Delay, s/veh		8.1			2.9			31.1				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		43.3			13.3	30.0		16.7				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		37.0			7.0	25.0		13.0				
Max Q Clear Time (g_c+I1), s		7.0			4.8	4.1		11.5				
Green Ext Time (p_c), s		5.2			1.0	4.6		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay				11.7								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
8: Joiner St & IL 149













2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	635	19	136	639	44	20	2	91	1	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		115	200		115	115		115	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.996			0.990			0.891			0.981	
Flt Protected	0.950			0.950				0.991			0.993	
Satd. Flow (prot)	1770	1804	0	1770	1844	0	0	1645	0	0	1815	0
Flt Permitted	0.950			0.950				0.936			0.952	
Satd. Flow (perm)	1770	1804	0	1770	1844	0	0	1553	0	0	1740	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			8			96			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		511			1030			727			583	
Travel Time (s)		11.6			23.4			16.5			13.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	5	668	20	143	673	46	21	2	96	1	5	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	688	0	143	719	0	0	119	0	0	7	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0		12.0	12.0	
Total Split (s)	12.0	36.0		12.0	36.0		12.0	12.0		12.0	12.0	
Total Split (%)	20.0%	60.0%		20.0%	60.0%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	7.0	31.0		7.0	31.0		7.0	7.0		7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effect Green (s)	7.0	36.1		7.7	44.0			7.0			7.0	

Lanes, Volumes, Timings
8: Joiner St & IL 149

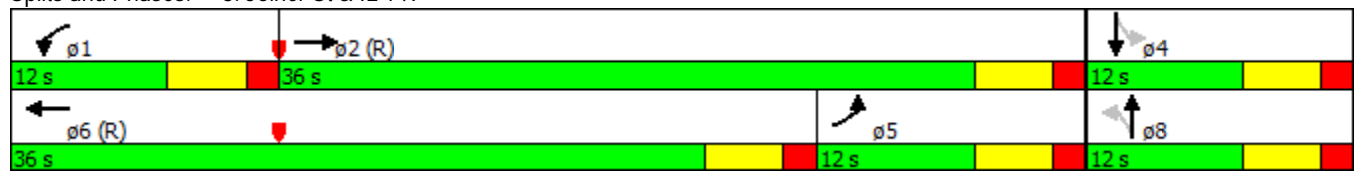
2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.12	0.60		0.13	0.73			0.12			0.12	
v/c Ratio	0.02	0.63		0.63	0.53			0.45			0.03	
Control Delay	15.6	8.3		42.9	2.5			21.1			22.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	15.6	8.3		42.9	2.5			21.1			22.9	
LOS	B	A		D	A			C			C	
Approach Delay		8.4			9.2			21.1			22.9	
Approach LOS		A			A			C			C	
90th %ile Green (s)	7.0	31.0		7.0	31.0		7.0	7.0		7.0	7.0	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	
70th %ile Green (s)	0.0	31.0		7.0	43.0		7.0	7.0		7.0	7.0	
70th %ile Term Code	Skip	Coord		Max	Coord		Max	Max		Hold	Hold	
50th %ile Green (s)	0.0	29.3		8.7	43.0		7.0	7.0		7.0	7.0	
50th %ile Term Code	Skip	Coord		Max	Coord		Min	Min		Hold	Hold	
30th %ile Green (s)	0.0	29.1		8.9	43.0		7.0	7.0		7.0	7.0	
30th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min		Hold	Hold	
10th %ile Green (s)	0.0	55.0		0.0	55.0		0.0	0.0		0.0	0.0	
10th %ile Term Code	Skip	Coord		Skip	Coord		Skip	Skip		Skip	Skip	
Queue Length 50th (ft)	1	59		43	10			1			2	
Queue Length 95th (ft)	m5	186		m#76	19			m54			12	
Internal Link Dist (ft)		431			950			647			503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	206	1108		227	1354			265			203	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.62		0.63	0.53			0.45			0.03	

Intersection Summary

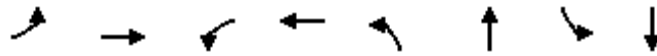
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 32 (53%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 9.8 Intersection LOS: A
 Intersection Capacity Utilization 64.4% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



Phasings
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	36.0	12.0	36.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	60.0%	20.0%	60.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	31.0	7.0	31.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Walk Time (s)								
Flash Dont Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	7.0	31.0	7.0	31.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max
70th %ile Green (s)	0.0	31.0	7.0	43.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Skip	Coord	Max	Coord	Max	Max	Hold	Hold
50th %ile Green (s)	0.0	29.3	8.7	43.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Max	Coord	Min	Min	Hold	Hold
30th %ile Green (s)	0.0	29.1	8.9	43.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 32 (53%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	688	143	719	119	7
v/c Ratio	0.02	0.63	0.63	0.53	0.45	0.03
Control Delay	15.6	8.3	42.9	2.5	21.1	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	8.3	42.9	2.5	21.1	22.9
Queue Length 50th (ft)	1	59	43	10	1	2
Queue Length 95th (ft)	m5	186	m#76	19	m54	12
Internal Link Dist (ft)		431		950	647	503
Turn Bay Length (ft)	115		200			
Base Capacity (vph)	206	1108	227	1354	265	203
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.62	0.63	0.53	0.45	0.03

Intersection Summary



















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	635	19	136	639	44	20	2	91	1	5	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	181.1	190.0	186.3	186.3	190.0	190.0	186.3	190.0	190.0	186.3	190.0
Adj Flow Rate, veh/h	5	668	20	143	673	46	21	2	96	1	5	1
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	841	25	209	829	57	102	14	144	90	161	29
Arrive On Green	0.08	0.32	0.32	0.16	0.64	0.64	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1774	1749	52	1774	1724	118	185	120	1273	98	1427	254
Grp Volume(v), veh/h	5	0	688	143	0	719	119	0	0	7	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1802	1774	0	1842	1578	0	0	1780	0	0
Q Serve(g_s), s	0.1	0.0	18.1	4.0	0.0	15.2	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	18.1	4.0	0.0	15.2	3.7	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.06	0.18		0.81	0.14		0.14
Lane Grp Cap(c), veh/h	209	0	867	209	0	886	260	0	0	280	0	0
V/C Ratio(X)	0.02	0.00	0.79	0.69	0.00	0.81	0.46	0.00	0.00	0.02	0.00	0.00
Avail Cap(c_a), veh/h	239	0	1075	239	0	1099	293	0	0	317	0	0
HCM Platoon Ratio	0.67	0.67	0.67	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.69	0.00	0.69	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.2	0.0	15.3	21.0	0.0	7.6	22.1	0.0	0.0	20.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	7.4	4.6	0.0	5.6	1.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	16.1	3.9	0.0	12.9	3.1	0.0	0.0	0.2	0.0	0.0
LnGrp Delay(d),s/veh	21.2	0.0	22.7	25.7	0.0	13.2	23.3	0.0	0.0	20.6	0.0	0.0
LnGrp LOS	C		C	C		B	C			C		
Approach Vol, veh/h		693			862			119			7	
Approach Delay, s/veh		22.7			15.3			23.3			20.6	
Approach LOS		C			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	38.0		10.9	19.1	30.0		10.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	31.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	6.0	20.1		2.2	2.1	17.2		5.7				
Green Ext Time (p_c), s	0.0	3.6		0.2	2.0	4.4		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			18.9									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	669	9	186	769	7	4	44	165	4	51	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	0		115	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
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		0.998			0.999				0.850			0.939
Flt Protected	0.950			0.950				0.996				0.998
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1855	1583	0	1746	0
Flt Permitted	0.950			0.950				0.974				0.983
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1814	1583	0	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			1				174			48
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1030			1313			920				481
Travel Time (s)		23.4			29.8			20.9				10.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	51	704	9	196	809	7	4	46	174	4	54	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	713	0	196	816	0	0	50	174	0	106	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)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
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
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm		NA
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0	7.0	7.0		7.0
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0	12.0	12.0		12.0
Total Split (s)	12.0	34.0		14.0	36.0		12.0	12.0	12.0	12.0		12.0
Total Split (%)	20.0%	56.7%		23.3%	60.0%		20.0%	20.0%	20.0%	20.0%		20.0%
Maximum Green (s)	7.0	29.0		9.0	31.0		7.0	7.0	7.0	7.0		7.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5		1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0			5.0
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None		None
Act Effect Green (s)	7.0	31.3		9.1	39.2			7.0	7.0			7.0

Lanes, Volumes, Timings
9: Taft St & IL 149

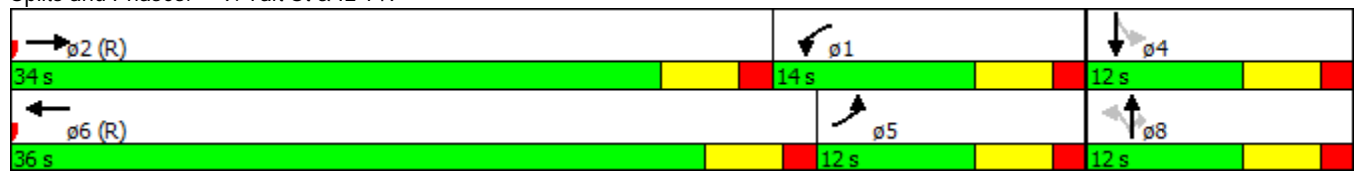
2032 Design Year - Build
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.12	0.52		0.15	0.65			0.12	0.12		0.12	
v/c Ratio	0.25	0.76		0.73	0.67			0.24	0.51		0.44	
Control Delay	25.3	9.9		43.2	14.8			32.1	17.0		21.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	25.3	9.9		43.2	14.8			32.1	17.0		21.5	
LOS	C	A		D	B			C	B		C	
Approach Delay		11.0			20.3			20.4			21.5	
Approach LOS		B			C			C			C	
90th %ile Green (s)	7.0	29.0		9.0	31.0		7.0	7.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	Max
70th %ile Green (s)	7.0	29.0		9.0	31.0		7.0	7.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	Max
50th %ile Green (s)	7.0	29.0		9.0	31.0		7.0	7.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	Max
30th %ile Green (s)	0.0	27.4		10.6	43.0		7.0	7.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min	Min	Min	Min	Min
10th %ile Green (s)	0.0	42.1		7.9	55.0		0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord		Gap	Coord		Skip	Skip	Skip	Skip	Skip	Skip
Queue Length 50th (ft)	20	21		69	232			14	0		20	
Queue Length 95th (ft)	m33	#381		#159	#455			48	76		60	
Internal Link Dist (ft)		950			1233			840			401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	208	952		274	1216			211	338		242	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.25	0.75		0.72	0.67			0.24	0.51		0.44	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 17.0 Intersection LOS: B
 Intersection Capacity Utilization 68.2% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149

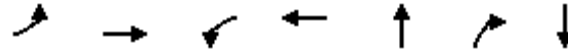




Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8			4
Permitted Phases					8		8	4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	34.0	14.0	36.0	12.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	56.7%	23.3%	60.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lead	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
50th %ile Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
30th %ile Green (s)	0.0	27.4	10.6	43.0	7.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
10th %ile Green (s)	0.0	42.1	7.9	55.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Gap	Coord	Skip	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	51	713	196	816	50	174	106
v/c Ratio	0.25	0.76	0.73	0.67	0.24	0.51	0.44
Control Delay	25.3	9.9	43.2	14.8	32.1	17.0	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	9.9	43.2	14.8	32.1	17.0	21.5
Queue Length 50th (ft)	20	21	69	232	14	0	20
Queue Length 95th (ft)	m33	#381	#159	#455	48	76	60
Internal Link Dist (ft)		950		1233	840		401
Turn Bay Length (ft)	200		225			115	
Base Capacity (vph)	208	952	274	1216	211	338	242
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.75	0.72	0.67	0.24	0.51	0.44

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

























HCM 2010 Signalized Intersection Summary
9: Taft St & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	669	9	186	769	7	4	44	165	4	51	46
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	188.1	181.0	190.0	186.3	186.3	190.0	190.0	186.3	186.3	190.0	186.3	190.0
Adj Flow Rate, veh/h	51	704	9	196	809	7	4	46	174	4	54	48
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	818	10	245	912	8	79	229	203	72	117	99
Arrive On Green	0.14	0.61	0.61	0.14	0.49	0.49	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1792	1784	23	1774	1844	16	57	1780	1583	27	909	774
Grp Volume(v), veh/h	51	0	713	196	0	816	50	0	174	106	0	0
Grp Sat Flow(s),veh/h/ln	1792	0	1806	1774	0	1860	1837	0	1583	1710	0	0
Q Serve(g_s), s	1.4	0.0	17.7	5.8	0.0	21.5	0.0	0.0	5.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.4	0.0	17.7	5.8	0.0	21.5	1.3	0.0	5.9	3.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.01	0.08		1.00	0.04		0.45
Lane Grp Cap(c), veh/h	183	0	828	245	0	920	307	0	203	288	0	0
V/C Ratio(X)	0.28	0.00	0.86	0.80	0.00	0.89	0.16	0.00	0.86	0.37	0.00	0.00
Avail Cap(c_a), veh/h	230	0	961	293	0	1058	307	0	203	288	0	0
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.00	0.73	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.8	0.0	9.2	22.8	0.0	12.4	21.3	0.0	23.3	22.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	8.6	12.5	0.0	12.4	0.2	0.0	28.3	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	0.0	15.1	6.6	0.0	20.2	1.2	0.0	7.4	2.8	0.0	0.0
LnGrp Delay(d),s/veh	22.4	0.0	17.9	35.3	0.0	24.8	21.5	0.0	51.6	22.8	0.0	0.0
LnGrp LOS	C		B	D		C	C		D	C		
Approach Vol, veh/h		764			1012			224			106	
Approach Delay, s/veh		18.2			26.8			44.9			22.8	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.0	30.0		12.0	16.0	32.0		12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	29.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	7.8	19.7		5.1	3.4	23.5		7.9				
Green Ext Time (p_c), s	0.1	3.4		0.3	0.2	3.4		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			25.4									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	508	81	103	495	80	92	290	121	103	227	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		200	180		180	115		0	125		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850			0.850		0.956			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1810	1583	1770	1863	1583	1770	3383	0	1770	3274	0
Flt Permitted	0.196			0.323			0.312			0.414		
Satd. Flow (perm)	362	1810	1583	602	1863	1583	581	3383	0	771	3274	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			154		76			241	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		377			1195			2471			1384	
Travel Time (s)		8.6			27.2			48.1			27.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	214	535	85	108	521	84	97	305	127	108	239	241
Shared Lane Traffic (%)												
Lane Group Flow (vph)	214	535	85	108	521	84	97	432	0	108	480	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	3	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.8	30.3	9.7	9.8	30.3	30.3	9.7	30.5		9.7	29.5	
Total Split (s)	12.4	35.0	10.5	9.8	32.4	32.4	10.5	30.5		9.7	29.7	
Total Split (%)	14.6%	41.2%	12.4%	11.5%	38.1%	38.1%	12.4%	35.9%		11.4%	34.9%	
Maximum Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	25.0		5.0	24.2	
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3		1.5	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	None	None	Min	Min	None	None		None	Min	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

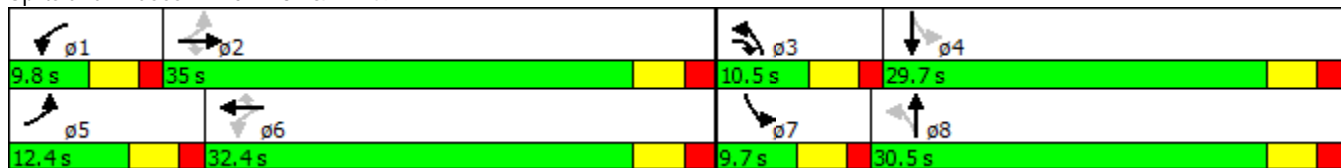


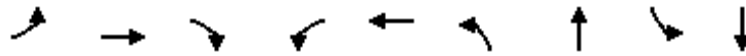
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0			18.0	18.0		18.0				17.0
Pedestrian Calls (#/hr)		0			0	0		0				0
Act Effct Green (s)	35.6	29.4	40.9	29.6	23.9	23.9	18.1	13.0		16.9	12.4	
Actuated g/C Ratio	0.52	0.43	0.60	0.43	0.35	0.35	0.27	0.19		0.25	0.18	
v/c Ratio	0.61	0.68	0.09	0.31	0.80	0.13	0.37	0.61		0.40	0.61	
Control Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6		22.7	16.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6		22.7	16.7	
LOS	B	C	A	B	C	A	C	C		C	B	
Approach Delay		20.8			25.3			24.9				17.8
Approach LOS		C			C			C				B
90th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	18.4		5.0	17.6	
90th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap		Max	Hold	
70th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	14.7		5.0	13.9	
70th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap		Max	Hold	
50th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	13.0		5.0	12.2	
50th %ile Term Code	Max	Hold	Max	Max	Max	Max	Max	Gap		Max	Hold	
30th %ile Green (s)	7.6	26.1	5.8	5.0	23.5	23.5	5.8	11.3		5.0	10.5	
30th %ile Term Code	Max	Hold	Max	Max	Gap	Gap	Max	Gap		Max	Hold	
10th %ile Green (s)	7.6	27.7	0.0	0.0	15.3	15.3	0.0	8.2		0.0	8.2	
10th %ile Term Code	Max	Hold	Skip	Skip	Gap	Gap	Skip	Gap		Skip	Hold	
Queue Length 50th (ft)	46	197	0	22	201	0	31	78		35	51	
Queue Length 95th (ft)	#114	#384	17	51	#389	4	63	123		69	96	
Internal Link Dist (ft)		297			1115			2391			1304	
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	349	817	989	350	767	742	259	1333		267	1357	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.65	0.09	0.31	0.68	0.11	0.37	0.32		0.40	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 68.1
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 22.1
 Intersection LOS: C
 Intersection Capacity Utilization 72.9%
 ICU Level of Service C
 Analysis Period (min) 15
 90th %ile Actuated Cycle: 78.4
 70th %ile Actuated Cycle: 74.7
 50th %ile Actuated Cycle: 73
 30th %ile Actuated Cycle: 67.7
 10th %ile Actuated Cycle: 46.7
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: IL 37 & IL 149





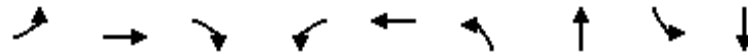
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	3	1	6	3	8	7	4
Permitted Phases	2		2	6		8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.8	30.3	9.7	9.8	30.3	9.7	30.5	9.7	29.5
Total Split (s)	12.4	35.0	10.5	9.8	32.4	10.5	30.5	9.7	29.7
Total Split (%)	14.6%	41.2%	12.4%	11.5%	38.1%	12.4%	35.9%	11.4%	34.9%
Maximum Green (s)	7.6	29.7	5.8	5.0	27.1	5.8	25.0	5.0	24.2
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	1.5	2.3	1.5	2.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	None	None	None	Min
Walk Time (s)		7.0			7.0		7.0		7.0
Flash Dont Walk (s)		18.0			18.0		18.0		17.0
Pedestrian Calls (#/hr)		0			0		0		0
90th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	5.8	18.4	5.0	17.6
90th %ile Term Code	Max	Max	Max	Max	Hold	Max	Gap	Max	Hold
70th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	5.8	14.7	5.0	13.9
70th %ile Term Code	Max	Max	Max	Max	Hold	Max	Gap	Max	Hold
50th %ile Green (s)	7.6	27.4	5.8	5.0	24.8	5.8	13.0	5.0	12.2
50th %ile Term Code	Max	Gap	Max	Max	Hold	Max	Gap	Max	Hold
30th %ile Green (s)	7.6	21.9	5.8	5.0	19.3	5.8	11.0	5.0	10.2
30th %ile Term Code	Max	Gap	Max	Max	Hold	Max	Gap	Max	Hold
10th %ile Green (s)	7.3	21.8	0.0	0.0	9.7	0.0	7.7	0.0	7.7
10th %ile Term Code	Gap	Hold	Skip	Skip	Gap	Skip	Gap	Skip	Hold

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 65.5
 Control Type: Actuated-Uncoordinated
 90th %ile Actuated Cycle: 78.4
 70th %ile Actuated Cycle: 74.7
 50th %ile Actuated Cycle: 70.7
 30th %ile Actuated Cycle: 63.2
 10th %ile Actuated Cycle: 40.3

Queues
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour



























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	535	85	108	605	97	432	108	480
v/c Ratio	0.52	0.72	0.09	0.32	0.54	0.35	0.60	0.38	0.59
Control Delay	14.6	25.9	2.3	12.3	19.8	20.6	24.7	21.6	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	25.9	2.3	12.3	19.8	20.6	24.7	21.6	16.3
Queue Length 50th (ft)	46	197	0	22	102	29	75	33	49
Queue Length 95th (ft)	95	#384	17	51	164	63	123	69	96
Internal Link Dist (ft)		297			1115		2391		1304
Turn Bay Length (ft)	115		200	180		115		125	
Base Capacity (vph)	417	869	972	333	1532	275	1414	282	1429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.62	0.09	0.32	0.39	0.35	0.31	0.38	0.34

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	203	508	81	103	495	80	92	290	121	103	227	229
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1810	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	214	535	85	108	521	84	97	305	127	108	239	241
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	684	692	299	624	530	283	539	220	315	399	357
Arrive On Green	0.10	0.38	0.38	0.06	0.33	0.33	0.06	0.22	0.22	0.07	0.23	0.23
Sat Flow, veh/h	1757	1810	1583	1774	1863	1583	1774	2455	1001	1774	1770	1583
Grp Volume(v), veh/h	214	535	85	108	521	84	97	218	214	108	239	241
Grp Sat Flow(s),veh/h/ln	1757	1810	1583	1774	1863	1583	1774	1770	1686	1774	1770	1583
Q Serve(g_s), s	5.7	19.2	2.3	2.9	19.0	2.7	3.1	8.0	8.3	3.4	8.9	10.2
Cycle Q Clear(g_c), s	5.7	19.2	2.3	2.9	19.0	2.7	3.1	8.0	8.3	3.4	8.9	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.59	1.00		1.00
Lane Grp Cap(c), veh/h	342	684	692	299	624	530	283	389	370	315	399	357
V/C Ratio(X)	0.63	0.78	0.12	0.36	0.84	0.16	0.34	0.56	0.58	0.34	0.60	0.67
Avail Cap(c_a), veh/h	342	732	735	312	688	585	317	603	574	320	583	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	20.2	12.3	16.3	22.5	17.1	20.9	25.5	25.6	20.5	25.5	26.0
Incr Delay (d2), s/veh	3.6	5.2	0.1	0.7	8.2	0.1	0.7	1.3	1.4	0.6	1.4	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.0	10.5	1.0	1.4	11.1	1.2	1.5	4.1	4.0	1.7	4.5	4.6
LnGrp Delay(d),s/veh	20.0	25.4	12.4	17.0	30.7	17.3	21.6	26.8	27.0	21.1	26.9	28.2
LnGrp LOS	B	C	B	B	C	B	C	C	C	C	C	C
Approach Vol, veh/h		834			713			529			588	
Approach Delay, s/veh		22.7			27.1			25.9			26.4	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	33.0	9.1	22.1	12.4	29.9	9.5	21.6				
Change Period (Y+Rc), s	* 4.8	* 5.3	* 4.7	5.5	* 4.8	* 5.3	* 4.7	5.5				
Max Green Setting (Gmax), s	* 5	* 30	* 5.8	24.2	* 7.6	* 27	* 5	25.0				
Max Q Clear Time (g_c+I1), s	4.9	21.2	5.1	12.2	7.7	21.0	5.4	10.3				
Green Ext Time (p_c), s	0.0	4.6	0.0	4.3	0.0	3.6	0.0	4.8				
Intersection Summary												
HCM 2010 Ctrl Delay			25.3									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 11: Winery Rd/New Winery Rd & Burlington

2032 Design Year - Build
 PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖		↗		↕			↕	
Volume (vph)	0	148	17	1	0	150	0	58	1	1	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		115	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.986				0.850		0.998				
Flt Protected				0.950							0.998	
Satd. Flow (prot)	0	1789	0	1770	0	1509	0	1859	0	0	1759	0
Flt Permitted				0.950							0.998	
Satd. Flow (perm)	0	1789	0	1770	0	1509	0	1859	0	0	1759	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		922			1154			1790			340	
Travel Time (s)		21.0			26.2			34.9			6.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	7%	2%	2%	2%	2%	8%	2%
Adj. Flow (vph)	0	156	18	1	0	158	0	61	1	1	26	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	174	0	1	0	158	0	62	0	0	27	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
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	31.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	148	17	1	0	150	0	58	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	5	2	2	2	7	2	2	2
Mvmt Flow	0	156	18	1	0	158	0	61	1

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	0	0	0	174	0	0	178	167	165
Stage 1	-	-	-	-	-	-	165	165	-
Stage 2	-	-	-	-	-	-	13	2	-
Critical Hdwy	-	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	-	1403	-	-	784	726	879
Stage 1	-	-	-	-	-	-	837	762	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	1403	-	-	-	725	879
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	725	-
Stage 1	-	-	-	-	-	-	837	762	-
Stage 2	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	-
HCM LOS	-	-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-	1403	-	-	-
HCM Lane V/C Ratio	-	-	-	-	0.001	-	-	-
HCM Control Delay (s)	-	0	-	-	7.6	-	-	-
HCM Lane LOS	-	A	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	25	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	8	2
Mvmt Flow	1	26	0

Major/Minor **Minor2**

Conflicting Flow All	196	176	0
Stage 1	0	2	-
Stage 2	196	174	-
Critical Hdwy	7.12	6.58	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	6.12	5.58	-
Follow-up Hdwy	3.518	4.072	-
Pot Cap-1 Maneuver	763	707	-
Stage 1	-	-	-
Stage 2	806	744	-
Platoon blocked, %			
Mov Cap-1 Maneuver	713	706	-
Mov Cap-2 Maneuver	713	706	-
Stage 1	-	-	-
Stage 2	741	744	-






















Approach **SB**

HCM Control Delay, s
 HCM LOS -

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
12: Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	195	8	72	172	38	8	1	75	56	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		115	115		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.994			0.973				0.850		0.887	
Flt Protected	0.950			0.950				0.957		0.950		
Satd. Flow (prot)	1770	1817	0	1787	1753	0	0	1783	1583	1770	1652	0
Flt Permitted	0.950			0.950				0.957		0.950		
Satd. Flow (perm)	1770	1817	0	1787	1753	0	0	1783	1583	1770	1652	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1154			919			730			505	
Travel Time (s)		26.2			20.9			14.2			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	1%	6%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	205	8	76	181	40	8	1	79	59	1	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	213	0	76	221	0	0	9	79	59	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	34.5%
ICU Level of Service	A
Analysis Period (min)	15

Intersection									
Int Delay, s/veh	3.8								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	1	195	8	72	172	38	8	1	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	4	2	1	6	3	2	2	2
Mvmt Flow	1	205	8	76	181	40	8	1	79

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	221	0	0	214	0	0	567	585	209
Stage 1	-	-	-	-	-	-	212	212	-
Stage 2	-	-	-	-	-	-	355	373	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1348	-	-	1362	-	-	434	423	831
Stage 1	-	-	-	-	-	-	790	727	-
Stage 2	-	-	-	-	-	-	662	618	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1348	-	-	1362	-	-	413	399	831
Mov Cap-2 Maneuver	-	-	-	-	-	-	413	399	-
Stage 1	-	-	-	-	-	-	789	726	-
Stage 2	-	-	-	-	-	-	622	584	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	10.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	411	831	1348	-	-	1362	-	-	377	664
HCM Lane V/C Ratio	0.023	0.095	0.001	-	-	0.056	-	-	0.156	0.006
HCM Control Delay (s)	14	9.8	7.7	-	-	7.8	-	-	16.3	10.5
HCM Lane LOS	B	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.3	0	-	-	0.2	-	-	0.5	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	56	1	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	59	1	3

Major/Minor	Minor2		
Conflicting Flow All	565	569	201
Stage 1	353	353	-
Stage 2	212	216	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	436	432	840
Stage 1	664	631	-
Stage 2	790	724	-
Platoon blocked, %			
Mov Cap-1 Maneuver	377	408	840
Mov Cap-2 Maneuver	377	408	-
Stage 1	664	596	-
Stage 2	713	723	-

Approach SB

HCM Control Delay, s	15.9
HCM LOS	C

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	211	105	345	165	70	108	1	356	61	2	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	250		115	115		0	115		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
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			0.850			0.850			0.850		0.984	
Flt Protected	0.950			0.950				0.953			0.959	
Satd. Flow (prot)	1770	1827	1583	1805	1810	1599	0	1775	1509	0	1776	0
Flt Permitted	0.950			0.950				0.703			0.679	
Satd. Flow (perm)	1770	1827	1583	1805	1810	1599	0	1310	1509	0	1257	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127			127			375		9	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		919			720			557			629	
Travel Time (s)		20.9			16.4			10.9			12.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	0%	5%	1%	2%	1%	7%	1%	0%	1%
Adj. Flow (vph)	11	222	111	363	174	74	114	1	375	64	2	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	222	111	363	174	74	0	115	375	0	75	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)		12			12			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
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		Free	4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0	
Total Split (s)	12.0	19.0	19.0	25.0	32.0	32.0	16.0	16.0		16.0	16.0	
Total Split (%)	20.0%	31.7%	31.7%	41.7%	53.3%	53.3%	26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	7.0	14.0	14.0	20.0	27.0	27.0	11.0	11.0		11.0	11.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None	
Act Effect Green (s)	9.3	21.3	21.3	16.5	39.0	39.0		9.7	60.0		9.7	

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour

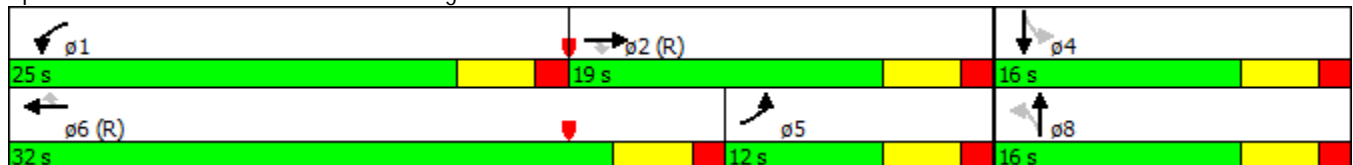


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.16	0.36	0.36	0.28	0.65	0.65		0.16	1.00		0.16	
v/c Ratio	0.04	0.34	0.17	0.73	0.15	0.07		0.55	0.25		0.36	
Control Delay	19.0	19.7	4.4	22.5	8.8	1.7		33.0	0.4		24.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	19.0	19.7	4.4	22.5	8.8	1.7		33.0	0.4		24.8	
LOS	B	B	A	C	A	A		C	A		C	
Approach Delay	14.7			16.1				8.0			24.8	
Approach LOS	B			B				A			C	
90th %ile Green (s)	18.4	14.0	14.0	20.0	15.6	15.6	11.0	11.0		11.0	11.0	
90th %ile Term Code	Hold	Coord	Coord	Max	Coord	Coord	Max	Max		Max	Max	
70th %ile Green (s)	0.0	14.6	14.6	19.4	39.0	39.0	11.0	11.0		11.0	11.0	
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Max	Max		Hold	Hold	
50th %ile Green (s)	0.0	17.2	17.2	17.1	39.3	39.3	10.7	10.7		10.7	10.7	
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold	
30th %ile Green (s)	0.0	21.6	21.6	14.7	41.3	41.3	8.7	8.7		8.7	8.7	
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold	
10th %ile Green (s)	0.0	38.9	38.9	11.1	55.0	55.0	0.0	0.0		0.0	0.0	
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip	
Queue Length 50th (ft)	4	65	0	78	21	0		38	0		21	
Queue Length 95th (ft)	12	129	28	132	86	7		82	0		54	
Internal Link Dist (ft)	839			640				477			549	
Turn Bay Length (ft)	150		150	250		115						
Base Capacity (vph)	273	647	642	601	1246	1140		240	1509		237	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.04	0.34	0.17	0.60	0.14	0.06		0.48	0.25		0.32	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 19 (32%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.6
 Intersection LOS: B
 Intersection Capacity Utilization 53.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 13: Russell Rd & Burlington



Phasings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2		1	6			8			4
Permitted Phases			2			6	8		Free	4	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0
Total Split (s)	12.0	19.0	19.0	25.0	32.0	32.0	16.0	16.0		16.0	16.0
Total Split (%)	20.0%	31.7%	31.7%	41.7%	53.3%	53.3%	26.7%	26.7%		26.7%	26.7%
Maximum Green (s)	7.0	14.0	14.0	20.0	27.0	27.0	11.0	11.0		11.0	11.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None
Walk Time (s)											
Flash Dont Walk (s)											
Pedestrian Calls (#/hr)											
90th %ile Green (s)	18.4	14.0	14.0	20.0	15.6	15.6	11.0	11.0		11.0	11.0
90th %ile Term Code	Hold	Coord	Coord	Max	Coord	Coord	Max	Max		Max	Max
70th %ile Green (s)	0.0	14.6	14.6	19.4	39.0	39.0	11.0	11.0		11.0	11.0
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Max	Max		Hold	Hold
50th %ile Green (s)	0.0	17.6	17.6	17.1	39.7	39.7	10.3	10.3		10.3	10.3
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
30th %ile Green (s)	0.0	21.8	21.8	14.7	41.5	41.5	8.5	8.5		8.5	8.5
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
10th %ile Green (s)	0.0	38.9	38.9	11.1	55.0	55.0	0.0	0.0		0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip

Intersection Summary

Cycle Length: 60

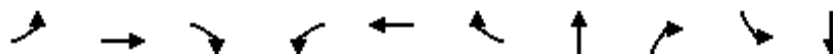
Actuated Cycle Length: 60

Offset: 19 (32%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	222	111	363	174	74	115	375	64	11
v/c Ratio	0.04	0.34	0.17	0.73	0.15	0.07	0.54	0.25	0.31	0.04
Control Delay	19.0	19.6	4.4	22.6	8.7	1.7	32.7	0.4	26.1	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	19.6	4.4	22.6	8.7	1.7	32.7	0.4	26.1	13.7
Queue Length 50th (ft)	4	64	0	81	20	0	38	0	21	1
Queue Length 95th (ft)	12	129	28	132	86	7	82	0	50	12
Internal Link Dist (ft)		839			640		477			549
Turn Bay Length (ft)	150		150	250		115			115	
Base Capacity (vph)	273	650	645	601	1250	1143	245	1509	235	310
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.34	0.17	0.60	0.14	0.06	0.47	0.25	0.27	0.04

Intersection Summary




















HCM 2010 Signalized Intersection Summary
 13: Russell Rd & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	211	105	345	165	70	108	1	356	61	2	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1827	1863	1900	1810	1881	1900	1863	1776	1900	1882	1900
Adj Flow Rate, veh/h	11	222	0	363	174	0	114	1	0	64	2	9
Adj No. of Lanes	1	1	1	1	1	1	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	4	2	0	5	1	1	1	7	0	0	0
Cap, veh/h	837	726	629	436	302	267	289	1	169	261	14	22
Arrive On Green	0.47	0.40	0.00	0.08	0.06	0.00	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1774	1827	1583	1810	1810	1599	1516	13	1509	1344	125	200
Grp Volume(v), veh/h	11	222	0	363	174	0	115	0	0	75	0	0
Grp Sat Flow(s),veh/h/ln	1774	1827	1583	1810	1810	1599	1529	0	1509	1670	0	0
Q Serve(g_s), s	0.2	5.0	0.0	11.9	5.6	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	5.0	0.0	11.9	5.6	0.0	4.1	0.0	0.0	2.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.99		1.00	0.85		0.12
Lane Grp Cap(c), veh/h	837	726	629	436	302	267	290	0	169	298	0	0
V/C Ratio(X)	0.01	0.31	0.00	0.83	0.58	0.00	0.40	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	837	726	629	603	814	720	391	0	277	402	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.93	0.93	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.4	12.4	0.0	26.4	26.3	0.0	25.4	0.0	0.0	24.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	6.6	7.3	0.0	0.9	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.1	2.7	0.0	6.8	3.4	0.0	1.9	0.0	0.0	1.2	0.0	0.0
LnGrp Delay(d),s/veh	8.4	13.5	0.0	33.0	33.5	0.0	26.3	0.0	0.0	25.1	0.0	0.0
LnGrp LOS	A	B		C	C		C			C		
Approach Vol, veh/h		233			537			115			75	
Approach Delay, s/veh		13.3			33.2			26.3			25.1	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.5	28.8		11.7	33.3	15.0		11.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	20.0	14.0		11.0	7.0	27.0		11.0				
Max Q Clear Time (g_c+I1), s	13.9	7.0		4.3	2.2	7.6		6.1				
Green Ext Time (p_c), s	0.6	0.7		0.5	0.5	0.9		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			26.9									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
14: SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	390	238	159	495	0	0	0	0	160	167	85	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	250		0	0		0	300		300	
Storage Lanes	0		1	1		0	0		0	1		1	
Taper Length (ft)	100			100			100			100			
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			0.850										0.850
Flt Protected				0.950							0.950		
Satd. Flow (prot)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599	
Flt Permitted				0.950							0.950		
Satd. Flow (perm)	0	1810	1524	1770	1863	0	0	0	0	1770	1845	1599	
Right Turn on Red			Yes				Yes				Yes		Yes
Satd. Flow (RTOR)			251										127
Link Speed (mph)		30				30				45			45
Link Distance (ft)		720				743				941			1033
Travel Time (s)		16.4				16.9				14.3			15.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	2%	5%	6%	2%	2%	2%	2%	2%	2%	2%	3%	1%	
Adj. Flow (vph)	0	411	251	167	521	0	0	0	0	168	176	89	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	411	251	167	521	0	0	0	0	168	176	89	
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)		12				12				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	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm	
Protected Phases		2		1	6					4	4		
Permitted Phases			2									4	
Detector Phase		2	2	1	6					4	4	4	
Switch Phase													
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0	
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0	
Total Split (s)		28.0	28.0	16.0	44.0					16.0	16.0	16.0	
Total Split (%)		46.7%	46.7%	26.7%	73.3%					26.7%	26.7%	26.7%	
Maximum Green (s)		23.0	23.0	11.0	39.0					11.0	11.0	11.0	
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5	
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0	
Lead/Lag		Lead	Lead	Lag									
Lead-Lag Optimize?		Yes	Yes	Yes									
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0	
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None	
Act Effect Green (s)		27.8	27.8	9.8	40.2					9.8	9.8	9.8	

Lanes, Volumes, Timings
14: SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour

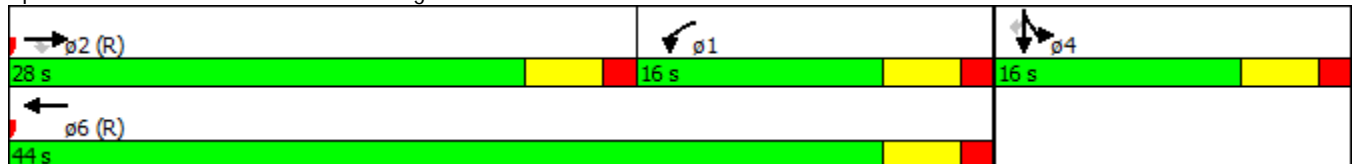


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.46	0.46	0.16	0.67					0.16	0.16	0.16
v/c Ratio		0.49	0.30	0.58	0.42					0.58	0.58	0.24
Control Delay		12.5	2.1	21.4	1.4					18.4	18.3	4.0
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		12.5	2.1	21.4	1.4					18.4	18.3	4.0
LOS		B	A	C	A					B	B	A
Approach Delay		8.6			6.3						15.4	
Approach LOS		A			A						B	
90th %ile Green (s)		23.0	23.0	11.0	39.0					11.0	11.0	11.0
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		23.0	23.0	11.0	39.0					11.0	11.0	11.0
70th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
50th %ile Green (s)		23.3	23.3	10.8	39.1					10.9	10.9	10.9
50th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
30th %ile Green (s)		26.7	26.7	9.1	40.8					9.2	9.2	9.2
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
10th %ile Green (s)		43.0	43.0	0.0	43.0					7.0	7.0	7.0
10th %ile Term Code		Coord	Coord	Skip	Coord					Min	Min	Min
Queue Length 50th (ft)		81	0	49	2					61	64	10
Queue Length 95th (ft)		125	16	m89	4					m22	m23	m1
Internal Link Dist (ft)		640			663			861			953	
Turn Bay Length (ft)				250						300		300
Base Capacity (vph)		838	840	324	1247					324	338	396
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.49	0.30	0.52	0.42					0.52	0.52	0.22

Intersection Summary

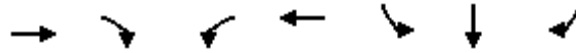
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 9.3
 Intersection LOS: A
 Intersection Capacity Utilization 53.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB C-D & Burlington



Phasings
14: SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



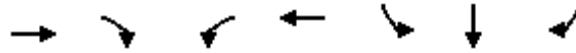
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	28.0	28.0	16.0	44.0	16.0	16.0	16.0
Total Split (%)	46.7%	46.7%	26.7%	73.3%	26.7%	26.7%	26.7%
Maximum Green (s)	23.0	23.0	11.0	39.0	11.0	11.0	11.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	23.0	23.0	11.0	39.0	11.0	11.0	11.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	23.0	23.0	11.0	39.0	11.0	11.0	11.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	23.3	23.3	10.8	39.1	10.9	10.9	10.9
50th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
30th %ile Green (s)	26.7	26.7	9.1	40.8	9.2	9.2	9.2
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
10th %ile Green (s)	43.0	43.0	0.0	43.0	7.0	7.0	7.0
10th %ile Term Code	Coord	Coord	Skip	Coord	Min	Min	Min

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
14: SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour






















Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	411	251	167	521	168	176	89
v/c Ratio	0.49	0.30	0.58	0.42	0.58	0.58	0.24
Control Delay	12.5	2.1	21.4	1.4	18.4	18.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	2.1	21.4	1.4	18.4	18.3	4.0
Queue Length 50th (ft)	81	0	49	2	61	64	10
Queue Length 95th (ft)	125	16	m89	4	m22	m23	m1
Internal Link Dist (ft)	640			663		953	
Turn Bay Length (ft)			250		300		300
Base Capacity (vph)	838	840	324	1247	324	338	396
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.30	0.52	0.42	0.52	0.52	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.




















HCM 2010 Signalized Intersection Summary
 14: SB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	390	238	159	495	0	0	0	0	160	167	85
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	179.2	186.3	186.3	0.0				186.3	184.5	188.1
Adj Flow Rate, veh/h	0	411	0	167	521	0				168	176	0
Adj No. of Lanes	0	1	1	1	1	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	6	2	2	0				2	3	1
Cap, veh/h	0	573	483	267	1098	0				297	308	267
Arrive On Green	0.00	0.10	0.00	0.30	1.00	0.00				0.17	0.17	0.00
Sat Flow, veh/h	0	1810	1524	1774	1863	0				1774	1845	1599
Grp Volume(v), veh/h	0	411	0	167	521	0				168	176	0
Grp Sat Flow(s),veh/h/ln	0	1810	1524	1774	1863	0				1774	1845	1599
Q Serve(g_s), s	0.0	9.0	0.0	3.3	0.0	0.0				3.6	3.6	0.0
Cycle Q Clear(g_c), s	0.0	9.0	0.0	3.3	0.0	0.0				3.6	3.6	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	573	483	267	1098	0				297	308	267
V/C Ratio(X)	0.00	0.72	0.00	0.63	0.47	0.00				0.57	0.57	0.00
Avail Cap(c_a), veh/h	0	1014	854	475	1770	0				475	494	429
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.00	0.79	0.79	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	16.6	0.0	13.4	0.0	0.0				15.7	15.7	0.0
Incr Delay (d2), s/veh	0.0	7.3	0.0	1.9	1.2	0.0				1.7	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	9.5	0.0	3.0	0.6	0.0				3.4	3.5	0.0
LnGrp Delay(d),s/veh	0.0	23.9	0.0	15.3	1.2	0.0				17.4	17.4	0.0
LnGrp LOS		C		B	A					B	B	
Approach Vol, veh/h		411			688						344	
Approach Delay, s/veh		23.9			4.6						17.4	
Approach LOS		C			A						B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	30.1	18.0		11.9		48.1						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	11.0	23.0		11.0		39.0						
Max Q Clear Time (g_c+I1), s	5.3	11.0		5.6		2.0						
Green Ext Time (p_c), s	1.9	2.0		0.5		4.3						
Intersection Summary												
HCM 2010 Ctrl Delay			13.1									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
15: NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	459	0	0	436	135	218	199	157	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	250		250	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1626	1845	0	0	1863	1583	1770	1863	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						142			165			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		743			828			745			447	
Travel Time (s)		16.9			18.8			11.3			6.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	11%	3%	2%	2%	2%	2%	2%	2%	1%	2%	2%	2%
Adj. Flow (vph)	96	483	0	0	459	142	229	209	165	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	483	0	0	459	142	229	209	165	0	0	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)		12			12			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
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	15.0			15.0	15.0	12.0	12.0	12.0			
Total Split (s)	12.0	42.0			30.0	30.0	18.0	18.0	18.0			
Total Split (%)	20.0%	70.0%			50.0%	50.0%	30.0%	30.0%	30.0%			
Maximum Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.7	38.3			28.0	28.0	11.7	11.7	11.7			

Lanes, Volumes, Timings
15: NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour

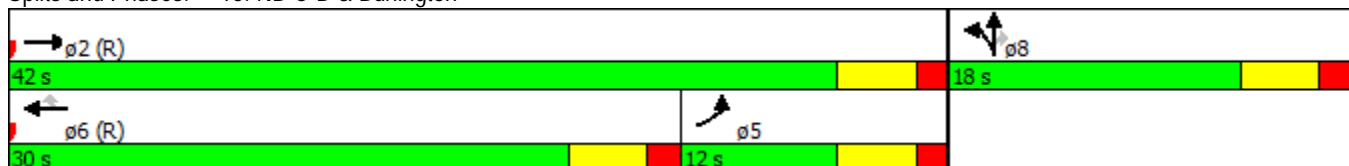


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.13	0.64			0.47	0.47	0.20	0.20	0.20			
v/c Ratio	0.46	0.41			0.53	0.17	0.66	0.58	0.37			
Control Delay	21.7	2.1			9.9	1.1	14.6	11.9	3.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	21.7	2.1			9.9	1.1	14.6	11.9	3.2			
LOS	C	A			A	A	B	B	A			
Approach Delay		5.4			7.8			10.6				
Approach LOS		A			A			B				
90th %ile Green (s)	7.0	37.0			25.0	25.0	13.0	13.0	13.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	8.2	37.0			23.8	23.8	13.0	13.0	13.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	8.8	36.3			22.5	22.5	13.7	13.7	13.7			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	7.5	39.1			26.6	26.6	10.9	10.9	10.9			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	0.0	42.0			42.0	42.0	8.0	8.0	8.0			
10th %ile Term Code	Skip	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	28	5			115	0	18	16	0			
Queue Length 95th (ft)	m#67	22			171	0	m44	m37	m3			
Internal Link Dist (ft)		663			748			665			367	
Turn Bay Length (ft)	200						250		250			
Base Capacity (vph)	208	1181			891	831	387	407	478			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.46	0.41			0.52	0.17	0.59	0.51	0.35			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 8.0
 Intersection LOS: A
 Intersection Capacity Utilization 53.4%
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB C-D & Burlington



Phasings
15: NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	12.0	12.0	12.0
Total Split (s)	12.0	42.0	30.0	30.0	18.0	18.0	18.0
Total Split (%)	20.0%	70.0%	50.0%	50.0%	30.0%	30.0%	30.0%
Maximum Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	7.0	37.0	25.0	25.0	13.0	13.0	13.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	8.2	37.0	23.8	23.8	13.0	13.0	13.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	8.8	36.3	22.5	22.5	13.7	13.7	13.7
50th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Gap
30th %ile Green (s)	7.5	39.1	26.6	26.6	10.9	10.9	10.9
30th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	42.0	42.0	42.0	8.0	8.0	8.0
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 24 (40%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
15: NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	96	483	459	142	229	209	165
v/c Ratio	0.46	0.41	0.53	0.17	0.66	0.58	0.37
Control Delay	21.7	2.1	9.9	1.1	14.6	11.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	2.1	9.9	1.1	14.6	11.9	3.2
Queue Length 50th (ft)	28	5	115	0	18	16	0
Queue Length 95th (ft)	m#67	22	171	0	m44	m37	m3
Internal Link Dist (ft)		663	748			665	
Turn Bay Length (ft)	200				250		250
Base Capacity (vph)	208	1181	891	831	387	407	478
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.41	0.52	0.17	0.59	0.51	0.35

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 15: NB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	91	459	0	0	436	135	218	199	157	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	171.2	184.5	0.0	0.0	186.3	186.3	186.3	186.3	188.1			
Adj Flow Rate, veh/h	96	483	0	0	459	0	229	209	0			
Adj No. of Lanes	1	1	0	0	1	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	11	3	0	0	2	2	2	2	1			
Cap, veh/h	183	1057	0	0	637	541	335	352	302			
Arrive On Green	0.22	1.00	0.00	0.00	0.11	0.00	0.06	0.06	0.00			
Sat Flow, veh/h	1630	1845	0	0	1863	1583	1774	1863	1599			
Grp Volume(v), veh/h	96	483	0	0	459	0	229	209	0			
Grp Sat Flow(s),veh/h/ln	1630	1845	0	0	1863	1583	1774	1863	1599			
Q Serve(g_s), s	2.2	0.0	0.0	0.0	10.0	0.0	5.3	4.6	0.0			
Cycle Q Clear(g_c), s	2.2	0.0	0.0	0.0	10.0	0.0	5.3	4.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	183	1057	0	0	637	541	335	352	302			
V/C Ratio(X)	0.52	0.46	0.00	0.00	0.72	0.00	0.68	0.59	0.00			
Avail Cap(c_a), veh/h	272	1625	0	0	1108	942	549	576	495			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33			
Upstream Filter(I)	0.84	0.84	0.00	0.00	0.93	0.00	0.56	0.56	0.00			
Uniform Delay (d), s/veh	15.3	0.0	0.0	0.0	16.7	0.0	18.5	18.1	0.0			
Incr Delay (d2), s/veh	2.0	1.2	0.0	0.0	6.4	0.0	1.4	0.9	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.9	0.6	0.0	0.0	10.2	0.0	4.8	4.4	0.0			
LnGrp Delay(d),s/veh	17.3	1.2	0.0	0.0	23.1	0.0	19.9	19.0	0.0			
LnGrp LOS	B	A			C		B	B				
Approach Vol, veh/h		579			459			438				
Approach Delay, s/veh		3.9			23.1			19.5				
Approach LOS		A			C			B				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		47.1			27.7	19.4		12.9				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		37.0			7.0	25.0		13.0				
Max Q Clear Time (g_c+I1), s		2.0			4.2	12.0		7.3				
Green Ext Time (p_c), s		3.7			0.9	2.4		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay				14.5								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	301	76	25	263	66	68	17	23	67	21	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		125	250		0	0		0	0		150
Storage Lanes	1		1	1		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
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			0.850		0.970			0.914				0.850
Flt Protected	0.950			0.950			0.950				0.963	
Satd. Flow (prot)	1770	1863	1583	1770	1807	0	1770	1703	0	0	1794	1583
Flt Permitted	0.950			0.950			0.697				0.749	
Satd. Flow (perm)	1770	1863	1583	1770	1807	0	1298	1703	0	0	1395	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		22			24				253
Link Speed (mph)		30			30			30				30
Link Distance (ft)		828			677			292				525
Travel Time (s)		18.8			15.4			6.6				11.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	252	317	80	26	277	69	72	18	24	71	22	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	317	80	26	346	0	72	42	0	0	93	253
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)		12			12			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
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6			8			4	5
Permitted Phases			2				8			4		4
Detector Phase	5	2	2	1	6		8	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		10.0	10.0		10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0		15.0	15.0		15.0	15.0	12.0
Total Split (s)	21.0	33.0	33.0	12.0	24.0		15.0	15.0		15.0	15.0	21.0
Total Split (%)	35.0%	55.0%	55.0%	20.0%	40.0%		25.0%	25.0%		25.0%	25.0%	35.0%
Maximum Green (s)	16.0	28.0	28.0	7.0	19.0		10.0	10.0		10.0	10.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag							Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
Act Effect Green (s)	13.1	40.4	40.4	8.0	24.8		10.2	10.2		10.2	10.2	25.2
Actuated g/C Ratio	0.22	0.67	0.67	0.13	0.41		0.17	0.17		0.17	0.17	0.42

Lanes, Volumes, Timings
16: Joiner St & Burlington

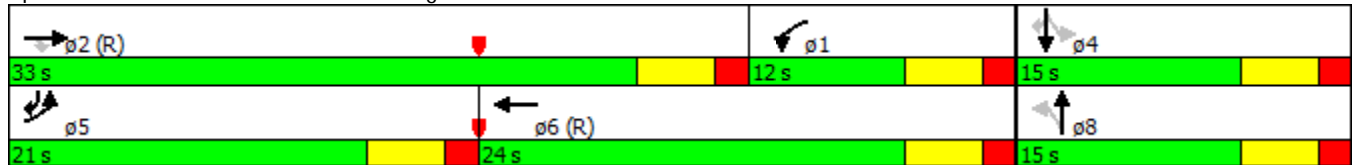
2032 Design Year - Build
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.65	0.25	0.07	0.11	0.46		0.33	0.14			0.39	0.31
Control Delay	28.2	8.2	2.9	19.8	4.6		26.6	14.2			27.1	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	28.2	8.2	2.9	19.8	4.6		26.6	14.2			27.1	3.5
LOS	C	A	A	B	A		C	B			C	A
Approach Delay		15.3			5.7			22.0			9.8	
Approach LOS		B			A			C			A	
90th %ile Green (s)	16.0	22.8	22.8	12.2	19.0		10.0	10.0		10.0	10.0	16.0
90th %ile Term Code	Max	Coord	Coord	Hold	Coord		Max	Max		Max	Max	Max
70th %ile Green (s)	15.7	39.2	39.2	0.0	18.5		10.8	10.8		10.8	10.8	15.7
70th %ile Term Code	Gap	Coord	Coord	Skip	Coord		Hold	Hold		Max	Max	Gap
50th %ile Green (s)	13.6	40.0	40.0	0.0	21.4		10.0	10.0		10.0	10.0	13.6
50th %ile Term Code	Gap	Coord	Coord	Skip	Coord		Min	Min		Min	Min	Gap
30th %ile Green (s)	11.5	40.0	40.0	0.0	23.5		10.0	10.0		10.0	10.0	11.5
30th %ile Term Code	Gap	Coord	Coord	Skip	Coord		Min	Min		Min	Min	Gap
10th %ile Green (s)	8.5	55.0	55.0	0.0	41.5		0.0	0.0		0.0	0.0	8.5
10th %ile Term Code	Gap	Coord	Coord	Skip	Coord		Skip	Skip		Skip	Skip	Gap
Queue Length 50th (ft)	79	22	0	0	8		23	6			31	10
Queue Length 95th (ft)	132	147	16	9	43		57	29			m68	m41
Internal Link Dist (ft)		748			597			212			445	
Turn Bay Length (ft)	200		125	250								150
Base Capacity (vph)	472	1287	1132	237	762		219	308			236	877
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.53	0.25	0.07	0.11	0.45		0.33	0.14			0.39	0.29

Intersection Summary

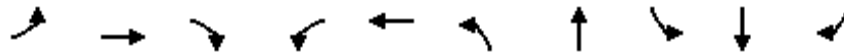
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 12.1 Intersection LOS: B
 Intersection Capacity Utilization 55.1% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Joiner St & Burlington



Phasings
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2		1	6		8		4	5
Permitted Phases			2			8		4		4
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	15.0	15.0	15.0	12.0
Total Split (s)	21.0	33.0	33.0	12.0	24.0	15.0	15.0	15.0	15.0	21.0
Total Split (%)	35.0%	55.0%	55.0%	20.0%	40.0%	25.0%	25.0%	25.0%	25.0%	35.0%
Maximum Green (s)	16.0	28.0	28.0	7.0	19.0	10.0	10.0	10.0	10.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	16.0	22.8	22.8	12.2	19.0	10.0	10.0	10.0	10.0	16.0
90th %ile Term Code	Max	Coord	Coord	Hold	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	15.7	39.2	39.2	0.0	18.5	10.8	10.8	10.8	10.8	15.7
70th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Hold	Hold	Max	Max	Gap
50th %ile Green (s)	13.6	40.0	40.0	0.0	21.4	10.0	10.0	10.0	10.0	13.6
50th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Min	Min	Min	Min	Gap
30th %ile Green (s)	11.5	40.0	40.0	0.0	23.5	10.0	10.0	10.0	10.0	11.5
30th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Min	Min	Min	Min	Gap
10th %ile Green (s)	8.5	55.0	55.0	0.0	41.5	0.0	0.0	0.0	0.0	8.5
10th %ile Term Code	Gap	Coord	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Gap

Intersection Summary

Cycle Length: 60

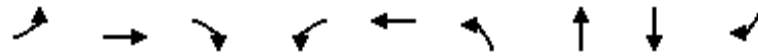
Actuated Cycle Length: 60

Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour
























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	252	317	80	26	346	72	42	93	253
v/c Ratio	0.65	0.25	0.07	0.11	0.46	0.33	0.14	0.39	0.31
Control Delay	28.2	8.2	2.9	19.8	4.6	26.6	14.2	27.1	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	8.2	2.9	19.8	4.6	26.6	14.2	27.1	3.5
Queue Length 50th (ft)	79	22	0	0	8	23	6	31	10
Queue Length 95th (ft)	132	147	16	9	43	57	29	m68	m41
Internal Link Dist (ft)		748			597		212	445	
Turn Bay Length (ft)	200		125	250					150
Base Capacity (vph)	472	1287	1132	237	762	219	308	236	877
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.25	0.07	0.11	0.45	0.33	0.14	0.39	0.29

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.




















HCM 2010 Signalized Intersection Summary
 16: Joiner St & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	239	301	76	25	263	66	68	17	23	67	21	240
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	190.0	190.0	186.3	186.3
Adj Flow Rate, veh/h	252	317	80	26	277	0	72	18	24	71	22	253
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	318	444	378	311	437	0	368	170	226	387	101	654
Arrive On Green	0.30	0.40	0.40	0.06	0.08	0.00	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	1774	1863	0	1100	725	967	1016	431	1583
Grp Volume(v), veh/h	252	317	80	26	277	0	72	0	42	93	0	253
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	0	1100	0	1692	1447	0	1583
Q Serve(g_s), s	5.6	6.1	1.4	0.6	6.1	0.0	2.4	0.0	0.8	1.4	0.0	4.8
Cycle Q Clear(g_c), s	5.6	6.1	1.4	0.6	6.1	0.0	4.7	0.0	0.8	2.3	0.0	4.8
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.57	0.76		1.00
Lane Grp Cap(c), veh/h	318	444	378	311	437	0	368	0	396	487	0	654
V/C Ratio(X)	0.79	0.71	0.21	0.08	0.63	0.00	0.20	0.00	0.11	0.19	0.00	0.39
Avail Cap(c_a), veh/h	667	1225	1041	311	831	0	369	0	397	489	0	655
HCM Platoon Ratio	1.67	1.67	1.67	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	11.6	10.2	16.8	17.9	0.0	15.3	0.0	12.8	13.3	0.0	8.7
Incr Delay (d2), s/veh	4.2	8.7	1.2	0.1	6.8	0.0	0.3	0.0	0.1	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.5	7.3	1.3	0.5	7.2	0.0	1.4	0.0	0.7	1.6	0.0	3.8
LnGrp Delay(d),s/veh	18.4	20.3	11.4	16.9	24.7	0.0	15.6	0.0	12.9	13.5	0.0	9.1
LnGrp LOS	B	C	B	B	C		B		B	B		A
Approach Vol, veh/h		649			303			114				346
Approach Delay, s/veh		18.4			24.0			14.6				10.3
Approach LOS		B			C			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.9	15.2		15.0	12.6	32.4		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	28.0		10.0	16.0	19.0		10.0				
Max Q Clear Time (g_c+I1), s	2.6	8.1		6.8	7.6	8.1		6.7				
Green Ext Time (p_c), s	0.6	2.1		0.7	0.5	1.2		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			17.3									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
17: Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	383	0	4	346	12	0	0	6	12	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.995			0.865				0.949
Flt Protected	0.950			0.950								0.970
Satd. Flow (prot)	1770	1863	0	1770	1853	0	0	1611	0	0	1715	0
Flt Permitted	0.950			0.950								0.970
Satd. Flow (perm)	1770	1863	0	1770	1853	0	0	1611	0	0	1715	0
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		677			508			158			296	
Travel Time (s)		15.4			11.5			3.1			6.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	403	0	4	364	13	0	0	6	13	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	403	0	4	377	0	0	6	0	0	21	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)		12			12			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	34.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	383	0	4	346	12	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	403	0	4	364	13	0	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	377	403	803
Stage 1	-	-	420
Stage 2	-	-	383
Critical Hdwy	4.12	4.12	7.12
Critical Hdwy Stg 1	-	-	6.12
Critical Hdwy Stg 2	-	-	6.12
Follow-up Hdwy	2.218	2.218	3.518
Pot Cap-1 Maneuver	1181	1156	302
Stage 1	-	-	611
Stage 2	-	-	640
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1181	1156	296
Mov Cap-2 Maneuver	-	-	296
Stage 1	-	-	607
Stage 2	-	-	630

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	647	1181	-	-	1156	-	-	383
HCM Lane V/C Ratio	0.01	0.007	-	-	0.004	-	-	0.055
HCM Control Delay (s)	10.6	8.1	-	-	8.1	-	-	14.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	12	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	13	0	8

Major/Minor	Minor2		
Conflicting Flow All	802	799	371
Stage 1	379	379	-
Stage 2	423	420	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	302	319	675
Stage 1	643	615	-
Stage 2	609	589	-
Platoon blocked, %			
Mov Cap-1 Maneuver	297	316	675
Mov Cap-2 Maneuver	297	316	-
Stage 1	639	613	-
Stage 2	599	585	-

Approach SB

HCM Control Delay, s	14.9
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	311	2	257	284	3	2	105	339	2	109	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		150	0		115
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
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		0.999			0.999				0.850			0.850
Flt Protected	0.950			0.950				0.999			0.999	
Satd. Flow (prot)	1770	1861	0	1770	1861	0	0	1861	1583	0	1861	1583
Flt Permitted	0.950			0.950				0.993			0.993	
Satd. Flow (perm)	1770	1861	0	1770	1861	0	0	1850	1583	0	1850	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			1				264			127
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		508			664			689			912	
Travel Time (s)		11.5			15.1			15.7			20.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	327	2	271	299	3	2	111	357	2	115	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	329	0	271	302	0	0	113	357	0	117	76
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)		12			12			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
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases							8		8	4		4
Detector Phase	5	2		1	6		8	8	1	4	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	13.0	23.0		22.0	32.0		15.0	15.0	22.0	15.0	15.0	13.0
Total Split (%)	21.7%	38.3%		36.7%	53.3%		25.0%	25.0%	36.7%	25.0%	25.0%	21.7%
Maximum Green (s)	8.0	18.0		17.0	27.0		10.0	10.0	17.0	10.0	10.0	8.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag		Lead	Lead				Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	14.2	24.1		13.9	27.1			10.0	25.9		10.0	26.3
Actuated g/C Ratio	0.24	0.40		0.23	0.45			0.17	0.43		0.17	0.44

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

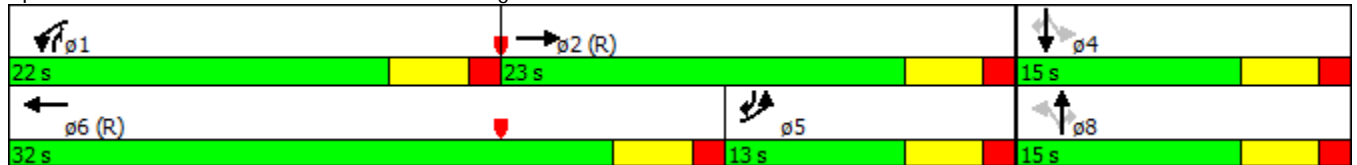
2032 Design Year - Build
PM Peak Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR										
v/c Ratio	0.23	0.44		0.66	0.36			0.37	0.43		0.38	0.10										
Control Delay	14.5	13.8		22.7	11.7			24.7	3.8		14.7	0.6										
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0										
Total Delay	14.5	13.8		22.7	11.7			24.7	3.8		14.7	0.6										
LOS	B	B		C	B			C	A		B	A										
Approach Delay		14.0			16.9			8.8			9.1											
Approach LOS		B			B			A			A											
90th %ile Green (s)	13.5	18.0		17.0	21.5		10.0	10.0	17.0	10.0	10.0	13.5										
90th %ile Term Code	Hold	Coord		Max	Coord		Max	Max	Max	Max	Max	Hold										
70th %ile Green (s)	17.3	17.8		17.0	17.5		10.2	10.2	17.0	10.2	10.2	17.3										
70th %ile Term Code	Hold	Coord		Max	Coord		Max	Max	Max	Max	Max	Hold										
50th %ile Green (s)	16.7	20.7		14.3	18.3		10.0	10.0	14.3	10.0	10.0	16.7										
50th %ile Term Code	Hold	Coord		Gap	Coord		Min	Min	Gap	Min	Min	Hold										
30th %ile Green (s)	16.6	22.9		12.1	18.4		10.0	10.0	12.1	10.0	10.0	16.6										
30th %ile Term Code	Hold	Coord		Gap	Coord		Min	Min	Gap	Min	Min	Hold										
10th %ile Green (s)	0.0	41.0		9.0	55.0		0.0	0.0	9.0	0.0	0.0	0.0										
10th %ile Term Code	Skip	Coord		Gap	Coord		Skip	Skip	Gap	Skip	Skip	Skip										
Queue Length 50th (ft)	25	87		55	57			28	5		20	0										
Queue Length 95th (ft)	35	89		m81	m70			71	15		m25	m0										
Internal Link Dist (ft)		428			584			609			832											
Turn Bay Length (ft)	200			200					150			115										
Base Capacity (vph)	425	748		501	1043			309	902		309	769										
Starvation Cap Reductn	0	0		0	0			0	0		0	0										
Spillback Cap Reductn	0	0		0	0			0	0		0	0										
Storage Cap Reductn	0	0		0	0			0	0		0	0										
Reduced v/c Ratio	0.22	0.44		0.54	0.29			0.37	0.40		0.38	0.10										

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 13.0 Intersection LOS: B
 Intersection Capacity Utilization 58.3% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: North Rd/Taft St & Burlington



Phasings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour



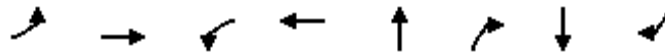
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2	1	6		8	1		4	5
Permitted Phases					8		8	4		4
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	13.0	23.0	22.0	32.0	15.0	15.0	22.0	15.0	15.0	13.0
Total Split (%)	21.7%	38.3%	36.7%	53.3%	25.0%	25.0%	36.7%	25.0%	25.0%	21.7%
Maximum Green (s)	8.0	18.0	17.0	27.0	10.0	10.0	17.0	10.0	10.0	8.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead			Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	13.5	18.0	17.0	21.5	10.0	10.0	17.0	10.0	10.0	13.5
90th %ile Term Code	Hold	Coord	Max	Coord	Max	Max	Max	Max	Max	Hold
70th %ile Green (s)	17.3	17.8	17.0	17.5	10.2	10.2	17.0	10.2	10.2	17.3
70th %ile Term Code	Hold	Coord	Max	Coord	Max	Max	Max	Max	Max	Hold
50th %ile Green (s)	16.7	20.7	14.3	18.3	10.0	10.0	14.3	10.0	10.0	16.7
50th %ile Term Code	Hold	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Hold
30th %ile Green (s)	16.6	22.9	12.1	18.4	10.0	10.0	12.1	10.0	10.0	16.6
30th %ile Term Code	Hold	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Hold
10th %ile Green (s)	0.0	41.0	9.0	55.0	0.0	0.0	9.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Gap	Coord	Skip	Skip	Gap	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 56 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour























Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	95	329	271	302	113	357	117	76
v/c Ratio	0.23	0.44	0.66	0.36	0.37	0.43	0.38	0.10
Control Delay	14.6	13.9	22.7	11.7	24.7	3.8	14.7	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	13.9	22.7	11.7	24.7	3.8	14.7	0.6
Queue Length 50th (ft)	25	88	55	57	28	5	20	0
Queue Length 95th (ft)	35	89	m81	m70	71	15	m25	m0
Internal Link Dist (ft)		428		584	609		832	
Turn Bay Length (ft)	200		200			150		115
Base Capacity (vph)	425	748	501	1043	309	902	309	769
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.44	0.54	0.29	0.37	0.40	0.38	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 18: North Rd/Taft St & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	311	2	257	284	3	2	105	339	2	109	72
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	95	327	2	271	299	3	2	111	357	2	115	76
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	659	736	5	329	390	4	63	308	557	62	308	852
Arrive On Green	0.12	0.13	0.13	0.19	0.21	0.21	0.06	0.06	0.06	0.17	0.17	0.17
Sat Flow, veh/h	1774	1849	11	1774	1841	18	9	1849	1583	9	1845	1583
Grp Volume(v), veh/h	95	0	329	271	0	302	113	0	357	117	0	76
Grp Sat Flow(s),veh/h/ln	1774	0	1861	1774	0	1859	1858	0	1583	1854	0	1583
Q Serve(g_s), s	2.9	0.0	9.8	8.8	0.0	9.2	0.0	0.0	10.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	9.8	8.8	0.0	9.2	3.5	0.0	10.0	3.4	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.01	0.02		1.00	0.02		1.00
Lane Grp Cap(c), veh/h	659	0	741	329	0	394	371	0	557	370	0	852
V/C Ratio(X)	0.14	0.00	0.44	0.82	0.00	0.77	0.30	0.00	0.64	0.32	0.00	0.09
Avail Cap(c_a), veh/h	659	0	741	503	0	837	371	0	557	370	0	852
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	19.9	23.5	0.0	22.2	25.3	0.0	18.2	22.2	0.0	6.7
Incr Delay (d2), s/veh	0.1	0.0	1.9	6.6	0.0	13.3	0.5	0.0	2.5	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.4	0.0	5.4	4.9	0.0	6.2	1.9	0.0	5.1	1.8	0.0	0.6
LnGrp Delay(d),s/veh	17.9	0.0	21.9	30.1	0.0	35.6	25.7	0.0	20.7	22.7	0.0	6.8
LnGrp LOS	B		C	C		D	C		C	C		A
Approach Vol, veh/h		424			573			470			193	
Approach Delay, s/veh		21.0			33.0			21.9			16.4	
Approach LOS		C			C			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.1	28.9		15.0	27.3	17.7		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	17.0	18.0		10.0	8.0	27.0		10.0				
Max Q Clear Time (g_c+I1), s	10.8	11.8		5.4	4.9	11.2		12.0				
Green Ext Time (p_c), s	0.4	1.2		1.3	0.7	1.5		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.9									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
20: Winery Rd & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	34	21	16	33	14	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.949		0.909			
Flt Protected	0.970					0.974
Satd. Flow (prot)	1715	0	1693	0	0	1814
Flt Permitted	0.970					0.974
Satd. Flow (perm)	1715	0	1693	0	0	1814
Link Speed (mph)	30		35			35
Link Distance (ft)	864		1335			1790
Travel Time (s)	19.6		26.0			34.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	22	17	35	15	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	52	0	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
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)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.1%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	34	21	16	33	14	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	22	17	35	15	13

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	76	34	0
Stage 1	34	-	-
Stage 2	42	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	927	1039	1554
Stage 1	988	-	-
Stage 2	980	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	918	1039	1554
Mov Cap-2 Maneuver	918	-	-
Stage 1	988	-	-
Stage 2	970	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	961	1554	-
HCM Lane V/C Ratio	-	-	0.06	0.009	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Lanes, Volumes, Timings
21: North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1	47	55	101	111	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.913			
Flt Protected		0.999			0.950	
Satd. Flow (prot)	0	1759	1701	0	1641	0
Flt Permitted		0.999			0.950	
Satd. Flow (perm)	0	1759	1701	0	1641	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		864	1164		673	
Travel Time (s)		19.6	26.5		13.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	8%	2%	2%	10%	2%
Adj. Flow (vph)	1	49	58	106	117	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	50	164	0	117	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.9%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	47	55	101	111	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	8	2	2	10	2
Mvmt Flow	1	49	58	106	117	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	164	0	163
Stage 1	-	-	111
Stage 2	-	-	52
Critical Hdwy	4.12	-	6.5
Critical Hdwy Stg 1	-	-	5.5
Critical Hdwy Stg 2	-	-	5.5
Follow-up Hdwy	2.218	-	3.59
Pot Cap-1 Maneuver	1414	-	809
Stage 1	-	-	894
Stage 2	-	-	950
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1414	-	808
Mov Cap-2 Maneuver	-	-	808
Stage 1	-	-	894
Stage 2	-	-	949

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1414	-	-	-	808
HCM Lane V/C Ratio	0.001	-	-	-	0.145
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Lanes, Volumes, Timings
22: Russell Rd & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕		↕		↕	↕	
Volume (vph)	1	168	1	7	176	104	1	1	10	108	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		200	0		0	120		0
Storage Lanes	0		0	0		1	0		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.999				0.850		0.886				0.925
Flt Protected					0.998			0.996		0.950		
Satd. Flow (prot)	0	1826	0	0	1792	1223	0	1644	0	1556	1740	0
Flt Permitted					0.998			0.996		0.950		
Satd. Flow (perm)	0	1826	0	0	1792	1223	0	1644	0	1556	1740	0
Link Speed (mph)		30			30			35				35
Link Distance (ft)		1164			722			1310				602
Travel Time (s)		26.5			16.4			25.5				11.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	4%	1%	1%	6%	32%	2%	2%	2%	16%	1%	1%
Adj. Flow (vph)	1	177	1	7	185	109	1	1	11	114	1	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	192	109	0	13	0	114	2	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		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	1	168	1	7	176	104	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yeild	-	-	None
Storage Length	-	-	-	-	-	200	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	4	1	1	6	32	2	2	2
Mvmt Flow	1	177	1	7	185	109	1	1	11

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	185	0	0	178	0	0	380	379	177
Stage 1	-	-	-	-	-	-	179	179	-
Stage 2	-	-	-	-	-	-	201	200	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1396	-	-	1404	-	-	578	553	866
Stage 1	-	-	-	-	-	-	823	751	-
Stage 2	-	-	-	-	-	-	801	736	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1396	-	-	1404	-	-	573	549	866
Mov Cap-2 Maneuver	-	-	-	-	-	-	573	549	-
Stage 1	-	-	-	-	-	-	822	750	-
Stage 2	-	-	-	-	-	-	794	732	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	794	1396	-	-	1404	-	-	539	671
HCM Lane V/C Ratio	0.016	0.001	-	-	0.005	-	-	0.211	0.003
HCM Control Delay (s)	9.6	7.6	0	-	7.6	0	-	13.5	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.8	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	108	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	120	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	16	1	1
Mvmt Flow	114	1	1

Major/Minor **Minor2**

Conflicting Flow All	385	380	185
Stage 1	200	200	-
Stage 2	185	180	-
Critical Hdwy	7.26	6.51	6.21
Critical Hdwy Stg 1	6.26	5.51	-
Critical Hdwy Stg 2	6.26	5.51	-
Follow-up Hdwy	3.644	4.009	3.309
Pot Cap-1 Maneuver	549	554	860
Stage 1	771	738	-
Stage 2	785	752	-
Platoon blocked, %			
Mov Cap-1 Maneuver	539	550	860
Mov Cap-2 Maneuver	539	550	-
Stage 1	770	734	-
Stage 2	774	751	-




















Approach **SB**

HCM Control Delay, s	13.4
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	184	102	238	239	0	0	0	0	20	496	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	250		0	0		0	400		400
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	1827	1380	1770	1681	0	0	0	0	1787	1863	1292
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		722			756			1140			941	
Travel Time (s)		16.4			17.2			17.3			14.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	17%	2%	13%	2%	2%	2%	2%	1%	2%	25%
Adj. Flow (vph)	0	194	107	251	252	0	0	0	0	21	522	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	194	107	251	252	0	0	0	0	21	522	51
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)		12			12			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
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0
Total Split (s)		16.0	16.0	17.0	33.0					27.0	27.0	27.0
Total Split (%)		26.7%	26.7%	28.3%	55.0%					45.0%	45.0%	45.0%
Maximum Green (s)		11.0	11.0	12.0	28.0					22.0	22.0	22.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		13.5	13.5	11.4	29.9					20.1	20.1	20.1

Lanes, Volumes, Timings
 23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
 PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.22	0.22	0.19	0.50					0.34	0.34	0.34
v/c Ratio		0.47	0.26	0.75	0.30					0.04	0.84	0.10
Control Delay		26.2	5.7	27.9	6.1					15.2	30.4	1.9
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		26.2	5.7	27.9	6.1					15.2	30.4	1.9
LOS		C	A	C	A					B	C	A
Approach Delay		18.9			17.0						27.4	
Approach LOS		B			B						C	
90th %ile Green (s)		11.0	11.0	12.0	28.0					22.0	22.0	22.0
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		11.0	11.0	12.0	28.0					22.0	22.0	22.0
70th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
50th %ile Green (s)		11.0	11.0	12.0	28.0					22.0	22.0	22.0
50th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
30th %ile Green (s)		13.7	13.7	11.9	30.6					19.4	19.4	19.4
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
10th %ile Green (s)		20.8	20.8	8.9	34.7					15.3	15.3	15.3
10th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		65	0	22	17					4	135	0
Queue Length 95th (ft)		122	28	#162	61					m14	#286	m3
Internal Link Dist (ft)		642			676			1060			861	
Turn Bay Length (ft)			175	250						400		400
Base Capacity (vph)		410	408	354	836					655	683	554
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.47	0.26	0.71	0.30					0.03	0.76	0.09

Intersection Summary

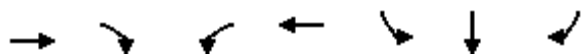
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 21.8
 Intersection LOS: C
 Intersection Capacity Utilization 64.8%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 23: SB On Ramp/SB C-D & North Rd



Phasings
23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	16.0	16.0	17.0	33.0	27.0	27.0	27.0
Total Split (%)	26.7%	26.7%	28.3%	55.0%	45.0%	45.0%	45.0%
Maximum Green (s)	11.0	11.0	12.0	28.0	22.0	22.0	22.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	11.0	11.0	12.0	28.0	22.0	22.0	22.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	11.0	11.0	12.0	28.0	22.0	22.0	22.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	11.0	11.0	12.0	28.0	22.0	22.0	22.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	13.7	13.7	11.9	30.6	19.4	19.4	19.4
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
10th %ile Green (s)	20.8	20.8	8.9	34.7	15.3	15.3	15.3
10th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 16 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

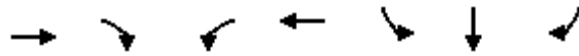
Control Type: Actuated-Coordinated

Queues

2032 Design Year - Build

23: SB On Ramp/SB C-D & North Rd

PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	194	107	251	252	21	522	51
v/c Ratio	0.47	0.26	0.75	0.30	0.04	0.84	0.10
Control Delay	26.2	5.7	27.9	6.1	15.2	30.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	5.7	27.9	6.1	15.2	30.4	1.9
Queue Length 50th (ft)	65	0	22	17	4	135	0
Queue Length 95th (ft)	122	28	#162	61	m14	#286	m3
Internal Link Dist (ft)	642			676		861	
Turn Bay Length (ft)		175	250		400		400
Base Capacity (vph)	410	408	354	836	655	683	554
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.26	0.71	0.30	0.03	0.76	0.09

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.




















HCM 2010 Signalized Intersection Summary
 23: SB On Ramp/SB C-D & North Rd

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	184	102	238	239	0	0	0	0	20	496	48
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	182.7	162.4	186.3	168.1	0.0				188.1	186.3	152.0
Adj Flow Rate, veh/h	0	194	0	251	252	0				21	522	0
Adj No. of Lanes	0	1	1	1	1	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	4	17	2	13	0				1	2	25
Cap, veh/h	0	358	271	314	793	0				596	619	429
Arrive On Green	0.00	0.20	0.00	0.35	0.94	0.00				0.11	0.11	0.00
Sat Flow, veh/h	0	1827	1380	1774	1681	0				1792	1863	1292
Grp Volume(v), veh/h	0	194	0	251	252	0				21	522	0
Grp Sat Flow(s),veh/h/ln	0	1827	1380	1774	1681	0				1792	1863	1292
Q Serve(g_s), s	0.0	4.9	0.0	6.5	0.6	0.0				0.5	14.0	0.0
Cycle Q Clear(g_c), s	0.0	4.9	0.0	6.5	0.6	0.0				0.5	14.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	358	271	314	793	0				596	619	429
V/C Ratio(X)	0.00	0.54	0.00	0.80	0.32	0.00				0.04	0.84	0.00
Avail Cap(c_a), veh/h	0	394	298	418	924	0				773	804	558
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				0.33	0.33	0.33
Upstream Filter(I)	0.00	1.00	0.00	0.86	0.86	0.00				0.89	0.89	0.00
Uniform Delay (d), s/veh	0.0	18.4	0.0	15.6	0.8	0.0				15.4	21.4	0.0
Incr Delay (d2), s/veh	0.0	5.8	0.0	6.8	0.9	0.0				0.0	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.4	0.0	6.7	0.7	0.0				0.5	12.7	0.0
LnGrp Delay(d),s/veh	0.0	24.2	0.0	22.4	1.7	0.0				15.4	27.1	0.0
LnGrp LOS		C		C	A					B	C	
Approach Vol, veh/h		194			503						543	
Approach Delay, s/veh		24.2			12.0						26.7	
Approach LOS		C			B						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	23.1	15.0		21.9		38.1						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	12.0	11.0		22.0		28.0						
Max Q Clear Time (g_c+I1), s	8.5	6.9		16.0		2.6						
Green Ext Time (p_c), s	0.8	0.3		0.9		2.3						
Intersection Summary												
HCM 2010 Ctrl Delay			20.4									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	149	0	0	385	21	92	498	332	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	0		250	300		300	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1687	1863	0	0	1863	1583	1367	1881	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			349			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		756			506			972			745	
Travel Time (s)		17.2			11.5			14.7			11.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	2%	2%	2%	2%	2%	32%	1%	1%	2%	2%	2%
Adj. Flow (vph)	58	157	0	0	405	22	97	524	349	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	157	0	0	405	22	97	524	349	0	0	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)		12			12			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
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	15.0			15.0	15.0	12.0	12.0	12.0			
Total Split (s)	12.0	34.0			22.0	22.0	26.0	26.0	26.0			
Total Split (%)	20.0%	56.7%			36.7%	36.7%	43.3%	43.3%	43.3%			
Maximum Green (s)	7.0	29.0			17.0	17.0	21.0	21.0	21.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.0	30.2			23.0	23.0	19.8	19.8	19.8			

Lanes, Volumes, Timings
 24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
 PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.12	0.50			0.38	0.38	0.33	0.33	0.33			
v/c Ratio	0.30	0.17			0.57	0.03	0.22	0.84	0.46			
Control Delay	9.7	5.7			13.5	0.1	15.3	33.0	4.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	9.7	5.7			13.5	0.1	15.3	33.0	4.2			
LOS	A	A			B	A	B	C	A			
Approach Delay		6.7			12.8			20.9				
Approach LOS		A			B			C				
90th %ile Green (s)	7.0	29.0			17.0	17.0	21.0	21.0	21.0			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	7.0	29.0			17.0	17.0	21.0	21.0	21.0			
70th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
50th %ile Green (s)	7.0	29.0			17.0	17.0	21.0	21.0	21.0			
50th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
30th %ile Green (s)	0.0	29.2			29.2	29.2	20.8	20.8	20.8			
30th %ile Term Code	Skip	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	0.0	34.6			34.6	34.6	15.4	15.4	15.4			
10th %ile Term Code	Skip	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	3	5			120	0	24	166	0			
Queue Length 95th (ft)	m10	18			#242	m0	54	#315	46			
Internal Link Dist (ft)		676			426			892			665	
Turn Bay Length (ft)	250					250	300		300			
Base Capacity (vph)	196	936			712	684	478	658	786			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.30	0.17			0.57	0.03	0.20	0.80	0.44			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 14 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 16.8
 Intersection LOS: B
 Intersection Capacity Utilization 64.8%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 24: NB Off Ramp/NB C-D & North Rd



Phasings
 24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
 PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	10.0	10.0	10.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	12.0	12.0	12.0
Total Split (s)	12.0	34.0	22.0	22.0	26.0	26.0	26.0
Total Split (%)	20.0%	56.7%	36.7%	36.7%	43.3%	43.3%	43.3%
Maximum Green (s)	7.0	29.0	17.0	17.0	21.0	21.0	21.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	7.0	29.0	17.0	17.0	21.0	21.0	21.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	7.0	29.0	17.0	17.0	21.0	21.0	21.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	7.0	29.0	17.0	17.0	21.0	21.0	21.0
50th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
30th %ile Green (s)	0.0	29.2	29.2	29.2	20.8	20.8	20.8
30th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	34.6	34.6	34.6	15.4	15.4	15.4
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 14 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues

2032 Design Year - Build

24: NB Off Ramp/NB C-D & North Rd

PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	58	157	405	22	97	524	349
v/c Ratio	0.30	0.17	0.57	0.03	0.22	0.84	0.46
Control Delay	9.7	5.7	13.5	0.1	15.3	33.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	5.7	13.5	0.1	15.3	33.0	4.2
Queue Length 50th (ft)	3	5	120	0	24	166	0
Queue Length 95th (ft)	m10	18	#242	m0	54	#315	46
Internal Link Dist (ft)		676	426			892	
Turn Bay Length (ft)	250			250	300		300
Base Capacity (vph)	196	936	712	684	478	658	786
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.17	0.57	0.03	0.20	0.80	0.44

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.























HCM 2010 Signalized Intersection Summary
 24: NB Off Ramp/NB C-D & North Rd

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	149	0	0	385	21	92	498	332	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	177.6	186.3	0.0	0.0	186.3	186.3	143.9	188.1	188.1			
Adj Flow Rate, veh/h	58	157	0	0	405	0	97	524	0			
Adj No. of Lanes	1	1	0	0	1	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	7	2	0	0	2	2	32	1	1			
Cap, veh/h	218	907	0	0	488	415	439	603	512			
Arrive On Green	0.26	0.97	0.00	0.00	0.26	0.00	0.32	0.32	0.00			
Sat Flow, veh/h	1691	1863	0	0	1863	1583	1371	1881	1599			
Grp Volume(v), veh/h	58	157	0	0	405	0	97	524	0			
Grp Sat Flow(s),veh/h/ln	1691	1863	0	0	1863	1583	1371	1881	1599			
Q Serve(g_s), s	1.4	0.1	0.0	0.0	10.6	0.0	2.7	13.6	0.0			
Cycle Q Clear(g_c), s	1.4	0.1	0.0	0.0	10.6	0.0	2.7	13.6	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	218	907	0	0	488	415	439	603	512			
V/C Ratio(X)	0.27	0.17	0.00	0.00	0.83	0.00	0.22	0.87	0.00			
Avail Cap(c_a), veh/h	228	1040	0	0	610	518	554	760	646			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.90	0.90	0.00	0.00	1.00	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	17.3	0.3	0.0	0.0	18.1	0.0	12.9	16.6	0.0			
Incr Delay (d2), s/veh	0.6	0.4	0.0	0.0	15.0	0.0	0.3	8.8	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	1.2	0.3	0.0	0.0	11.9	0.0	1.9	13.2	0.0			
LnGrp Delay(d),s/veh	17.9	0.7	0.0	0.0	33.1	0.0	13.2	25.5	0.0			
LnGrp LOS	B	A			C		B	C				
Approach Vol, veh/h		215			405			621				
Approach Delay, s/veh		5.4			33.1			23.5				
Approach LOS		A			C			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		38.4			19.7	18.6		21.6				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		29.0			7.0	17.0		21.0				
Max Q Clear Time (g_c+I1), s		2.1			3.4	12.6		15.6				
Green Ext Time (p_c), s		1.0			0.3	1.0		1.0				
Intersection Summary												
HCM 2010 Ctrl Delay				23.5								
HCM 2010 LOS				C								

Lanes, Volumes, Timings
28: Joiner St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	0	146	129	0	32	142	52	130	33	53	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	115		115	115		115
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.850			0.850				0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1773	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1773	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		624			647			525			582	
Travel Time (s)		14.2			14.7			11.9			13.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	0	154	136	0	34	149	55	137	35	56	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	154	0	136	34	0	149	55	137	35	82	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)		12			12			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	40.7%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	27	0	146	129	0	32	142	52	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	Yeild	-	-	Yeild	-	-	Yeild
Storage Length	115	-	-	115	-	-	115	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	0	154	136	0	34	149	55	137

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	479	479	56	479	479	55	56	0	0
Stage 1	125	125	-	354	354	-	-	-	-
Stage 2	354	354	-	125	125	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	497	486	1011	497	486	1012	1549	-	-
Stage 1	879	792	-	663	630	-	-	-	-
Stage 2	663	630	-	879	792	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	438	429	1011	384	429	1012	1549	-	-
Mov Cap-2 Maneuver	438	429	-	384	429	-	-	-	-
Stage 1	794	774	-	599	569	-	-	-	-
Stage 2	579	569	-	729	774	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	9.2	18.1	3.3
HCM LOS	A	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	438	1198	384	479	1550	-	-
HCM Lane V/C Ratio	0.096	-	-	0.065	0.128	0.354	0.07	0.022	-	-
HCM Control Delay (s)	7.6	-	-	13.8	8.4	19.4	13.1	7.4	-	-
HCM Lane LOS	A	-	-	B	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0.4	1.6	0.2	0.1	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	33	53	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	35	56	26

Major/Minor	Major2		
Conflicting Flow All	55	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1550	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1550	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	2.2
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	233	195	2	93	2	269	253	5	5	227	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	0		0	200		0	115		115
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850		0.997			0.997			0.934	
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1855	0	1770	3529	0	1770	3306	0
Flt Permitted	0.477				0.987		0.950			0.950		
Satd. Flow (perm)	889	1863	1583	0	1833	0	1770	3529	0	1770	3306	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			166		1			3			188	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1069			1076			386			2471	
Travel Time (s)		24.3			24.5			7.5			48.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	234	245	205	2	98	2	283	266	5	5	239	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	245	205	0	102	0	283	271	0	5	427	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)		12			12			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
Turn Type	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3		6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phase	5	2	3	6	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0		12.0	15.0		12.0	15.0	
Total Split (s)	12.0	27.0	18.0	15.0	15.0		18.0	21.0		12.0	15.0	
Total Split (%)	20.0%	45.0%	30.0%	25.0%	25.0%		30.0%	35.0%		20.0%	25.0%	
Maximum Green (s)	7.0	22.0	13.0	10.0	10.0		13.0	16.0		7.0	10.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	None	C-Min	C-Min		None	None		None	None	
Act Effect Green (s)	22.6	22.6	40.0		10.6		12.4	24.3		7.7	10.0	
Actuated g/C Ratio	0.38	0.38	0.67		0.18		0.21	0.40		0.13	0.17	

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

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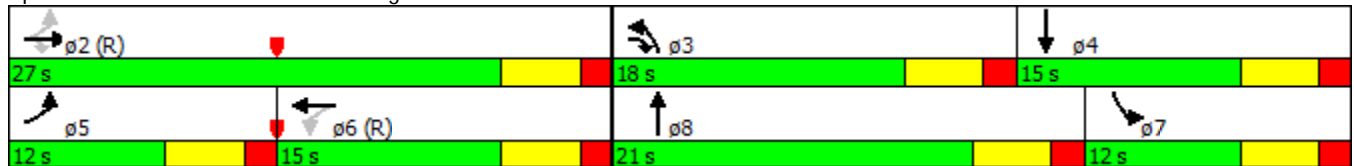


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.53	0.35	0.18		0.31		0.78	0.19		0.02	0.60	
Control Delay	15.3	12.3	0.7		24.9		39.3	13.4		22.0	16.8	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	15.3	12.3	0.7		24.9		39.3	13.4		22.0	16.8	
LOS	B	B	A		C		D	B		C	B	
Approach Delay		9.9			24.9			26.6			16.9	
Approach LOS		A			C			C			B	
90th %ile Green (s)	7.0	22.0	13.0	10.0	10.0		13.0	12.5		10.5	10.0	
90th %ile Term Code	Max	Coord	Max	Coord	Coord		Max	Gap		Hold	Max	
70th %ile Green (s)	7.0	22.0	13.0	10.0	10.0		13.0	28.0		0.0	10.0	
70th %ile Term Code	Max	Coord	Max	Coord	Coord		Max	Hold		Skip	Max	
50th %ile Green (s)	7.0	22.0	13.0	10.0	10.0		13.0	28.0		0.0	10.0	
50th %ile Term Code	Max	Coord	Max	Coord	Coord		Max	Hold		Skip	Max	
30th %ile Green (s)	7.0	22.0	13.0	10.0	10.0		13.0	28.0		0.0	10.0	
30th %ile Term Code	Max	Coord	Max	Coord	Coord		Max	Hold		Skip	Max	
10th %ile Green (s)	7.1	25.2	9.8	13.1	13.1		9.8	24.8		0.0	10.0	
10th %ile Term Code	Gap	Coord	Gap	Coord	Coord		Gap	Hold		Skip	Min	
Queue Length 50th (ft)	35	37	0		33		96	27		2	41	
Queue Length 95th (ft)	81	84	1		71		#199	74		9	80	
Internal Link Dist (ft)		989			996			306			2391	
Turn Bay Length (ft)	200		200				200			115		
Base Capacity (vph)	438	703	1125		325		383	1469		227	707	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.53	0.35	0.18		0.31		0.74	0.18		0.02	0.60	

Intersection Summary

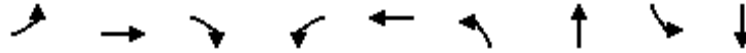
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 40 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 17.7
 Intersection LOS: B
 Intersection Capacity Utilization 58.4%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 32: IL 37 & Burlington/Cleveland



Phasings
32: IL 37 & Burlington/Cleveland

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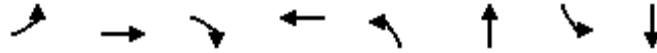
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	3		6	3	8	7	4
Permitted Phases	2		2	6					
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	7.0	10.0	7.0	10.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	12.0	15.0	12.0	15.0
Total Split (s)	12.0	27.0	18.0	15.0	15.0	18.0	21.0	12.0	15.0
Total Split (%)	20.0%	45.0%	30.0%	25.0%	25.0%	30.0%	35.0%	20.0%	25.0%
Maximum Green (s)	7.0	22.0	13.0	10.0	10.0	13.0	16.0	7.0	10.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	22.0	13.0	10.0	10.0	13.0	16.0	7.0	10.0
90th %ile Term Code	Max	Coord	Max	Coord	Coord	Max	Max	Max	Max
70th %ile Green (s)	7.0	22.0	13.0	10.0	10.0	13.0	28.0	0.0	10.0
70th %ile Term Code	Max	Coord	Max	Coord	Coord	Max	Hold	Skip	Max
50th %ile Green (s)	7.0	22.0	13.0	10.0	10.0	13.0	28.0	0.0	10.0
50th %ile Term Code	Max	Coord	Max	Coord	Coord	Max	Hold	Skip	Max
30th %ile Green (s)	7.0	22.0	13.0	10.0	10.0	13.0	28.0	0.0	10.0
30th %ile Term Code	Max	Coord	Max	Coord	Coord	Max	Hold	Skip	Max
10th %ile Green (s)	7.1	25.2	9.8	13.1	13.1	9.8	24.8	0.0	10.0
10th %ile Term Code	Gap	Coord	Gap	Coord	Coord	Gap	Hold	Skip	Min

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 40 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues
32: IL 37 & Burlington/Cleveland

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Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	245	205	102	283	271	5	427
v/c Ratio	0.53	0.35	0.18	0.31	0.78	0.35	0.02	0.60
Control Delay	15.3	12.3	0.7	24.9	39.3	14.8	23.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	12.3	0.7	24.9	39.3	14.8	23.8	16.8
Queue Length 50th (ft)	35	37	0	33	96	57	2	41
Queue Length 95th (ft)	81	84	1	71	#199	148	10	80
Internal Link Dist (ft)		989		996		306		2391
Turn Bay Length (ft)	200		200		200		115	
Base Capacity (vph)	438	703	1125	325	383	773	206	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.35	0.18	0.31	0.74	0.35	0.02	0.60

Intersection Summary

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




















HCM 2010 Signalized Intersection Summary
 32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	222	233	195	2	93	2	269	253	5	5	227	179
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	234	245	205	2	98	2	283	266	5	5	239	188
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	630	736	924	63	351	7	334	592	11	334	321	242
Arrive On Green	0.12	0.40	0.40	0.20	0.20	0.20	0.19	0.17	0.17	0.19	0.17	0.17
Sat Flow, veh/h	1774	1863	1583	10	1801	36	1774	3554	67	1774	1923	1453
Grp Volume(v), veh/h	234	245	205	102	0	0	283	132	139	5	219	208
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1847	0	0	1774	1770	1851	1774	1770	1606
Q Serve(g_s), s	6.0	5.5	3.7	0.0	0.0	0.0	9.2	4.0	4.1	0.1	7.1	7.4
Cycle Q Clear(g_c), s	6.0	5.5	3.7	2.8	0.0	0.0	9.2	4.0	4.1	0.1	7.1	7.4
Prop In Lane	1.00		1.00	0.02		0.02	1.00		0.04	1.00		0.90
Lane Grp Cap(c), veh/h	630	736	924	421	0	0	334	295	308	334	295	268
V/C Ratio(X)	0.37	0.33	0.22	0.24	0.00	0.00	0.85	0.45	0.45	0.01	0.74	0.78
Avail Cap(c_a), veh/h	630	736	924	421	0	0	384	472	494	334	295	268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	14.8	12.6	6.0	20.6	0.0	0.0	23.5	22.5	22.5	19.8	23.8	23.9
Incr Delay (d2), s/veh	0.4	1.2	0.6	1.4	0.0	0.0	14.5	1.1	1.0	0.0	8.5	11.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	2.9	3.0	1.7	1.6	0.0	0.0	5.8	2.0	2.1	0.1	4.2	4.2
LnGrp Delay(d),s/veh	15.2	13.9	6.5	21.9	0.0	0.0	38.0	23.6	23.5	19.8	32.3	35.7
LnGrp LOS	B	B	A	C			D	C	C	B	C	D
Approach Vol, veh/h		684			102			554			432	
Approach Delay, s/veh		12.1			21.9			30.9			33.8	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		28.7	16.3	15.0	12.0	16.7	16.3	15.0				
Change Period (Y+Rc), s		5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	13.0	10.0	7.0	10.0	7.0	16.0				
Max Q Clear Time (g_c+I1), s		7.5	11.2	9.4	8.0	4.8	2.1	6.1				
Green Ext Time (p_c), s		2.4	0.2	0.2	0.0	1.3	1.1	1.0				
Intersection Summary												
HCM 2010 Ctrl Delay			23.8									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
35: North Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	417	0	0	320	10	0	0	0	7	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.995							0.900
Flt Protected	0.950											0.987
Satd. Flow (prot)	1770	1863	0	1863	1853	0	0	1863	0	0	1655	0
Flt Permitted	0.950											0.987
Satd. Flow (perm)	1770	1863	0	1863	1853	0	0	1863	0	0	1655	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		419			689			460			195	
Travel Time (s)		9.5			15.7			9.0			3.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	439	0	0	337	11	0	0	0	7	0	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	439	0	0	348	0	0	0	0	0	27	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)		12			12			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	31.9%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	21	417	0	0	320	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	439	0	0	337	11	0	0	0

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	347	0	0	439	0	0	835	830	439
Stage 1	-	-	-	-	-	-	483	483	-
Stage 2	-	-	-	-	-	-	352	347	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1212	-	-	1121	-	-	287	306	618
Stage 1	-	-	-	-	-	-	565	553	-
Stage 2	-	-	-	-	-	-	665	635	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1212	-	-	1121	-	-	275	300	618
Mov Cap-2 Maneuver	-	-	-	-	-	-	275	300	-
Stage 1	-	-	-	-	-	-	555	543	-
Stage 2	-	-	-	-	-	-	646	635	-

Approach	EB	WB	NB
HCM Control Delay, s	0.4	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1212	-	-	1121	-	-	506
HCM Lane V/C Ratio	-	0.018	-	-	-	-	-	0.054
HCM Control Delay (s)	0	8	-	-	0	-	-	12.5
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	7	0	19
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	7	0	20

Major/Minor	Minor2		
Conflicting Flow All	825	825	342
Stage 1	342	342	-
Stage 2	483	483	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	292	308	701
Stage 1	673	638	-
Stage 2	565	553	-
Platoon blocked, %			
Mov Cap-1 Maneuver	288	302	701
Mov Cap-2 Maneuver	288	302	-
Stage 1	661	638	-
Stage 2	555	543	-






















Approach SB

HCM Control Delay, s	12.5
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
38: Russell Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	0	50	58	0	209	48	0	56	177	0	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	115		0	115		200
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
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		0.850				0.850		0.850				0.850
Flt Protected	0.950				0.950		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	0	1410	1468	1703	1049	0	1787	1900	1615
Flt Permitted	0.950				0.950		0.950			0.950		
Satd. Flow (perm)	1770	1583	0	0	1410	1468	1703	1049	0	1787	1900	1615
Link Speed (mph)		35			35			35				35
Link Distance (ft)		796			593			602				557
Travel Time (s)		15.5			11.6			11.7				10.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	28%	2%	10%	6%	2%	54%	1%	0%	0%
Adj. Flow (vph)	268	0	53	61	0	220	51	0	59	186	0	287
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	53	0	0	61	220	51	59	0	186	0	287
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)		12			12			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	43.9%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	255	0	50	58	0	209	48	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Yield
Storage Length	0	-	-	-	-	0	115	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	28	2	10	6	2	54
Mvmt Flow	268	0	53	61	0	220	51	0	59

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	474	474	0	500	474	0	0	0	0
Stage 1	373	373	-	101	101	-	-	-	-
Stage 2	101	101	-	399	373	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.38	6.52	6.3	4.16	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.38	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.38	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.752	4.018	3.39	2.254	-	-
Pot Cap-1 Maneuver	501	489	-	442	489	-	-	-	-
Stage 1	648	618	-	845	811	-	-	-	-
Stage 2	905	811	-	578	618	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	489	-	-	489	-	-	-	-
Mov Cap-2 Maneuver	-	489	-	-	489	-	-	-	-
Stage 1	648	618	-	845	811	-	-	-	-
Stage 2	905	811	-	578	618	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s			0
HCM LOS	-	-	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	-	-	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-	-	-
HCM Control Delay (s)	-	-	-	-	-	-	-	-	-	-
HCM Lane LOS	-	-	-	-	-	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-	-	-	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	177	0	273
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	1	0	0
Mvmt Flow	186	0	287

Major/Minor Major2

Conflicting Flow All	0	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.11	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.209	-	-
Pot Cap-1 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s 0

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
42: Taft St & Jones St

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	39	1	1	1	1	1	1	175	1	1	151	39
Ideal Flow (vphp)	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		0.997			0.955			0.999			0.972	
Flt Protected		0.954			0.984							
Satd. Flow (prot)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Flt Permitted		0.954			0.984							
Satd. Flow (perm)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		377			767			912			350	
Travel Time (s)		7.3			14.9			20.7			8.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1	1	1	1	1	1	184	1	1	159	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	3	0	0	186	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	23.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	39	1	1	1	1	1	1	175	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	1	1	1	1	1	1	184	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	370	369	179	370	389	185	200	0	0
Stage 1	182	182	-	187	187	-	-	-	-
Stage 2	188	187	-	183	202	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	587	560	864	587	546	857	1372	-	-
Stage 1	820	749	-	815	745	-	-	-	-
Stage 2	814	745	-	819	734	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	585	559	864	585	545	857	1372	-	-
Mov Cap-2 Maneuver	585	559	-	585	545	-	-	-	-
Stage 1	819	748	-	814	744	-	-	-	-
Stage 2	811	744	-	816	733	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11.6	10.7	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	589	637	1390	-	-
HCM Lane V/C Ratio	0.001	-	-	0.073	0.005	0.001	-	-
HCM Control Delay (s)	7.6	0	-	11.6	10.7	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	151	39
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	1	159	41

Major/Minor Major2

Conflicting Flow All	185	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1390	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1390	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s 0

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
49: Relocated S.W. Rd & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	29	406	46	25	326	24	53	0	31	21	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.987			0.991			0.950			0.924	
Flt Protected		0.997			0.997			0.969			0.978	
Satd. Flow (prot)	0	1833	0	0	1840	0	0	1715	0	0	1683	0
Flt Permitted		0.997			0.997			0.969			0.978	
Satd. Flow (perm)	0	1833	0	0	1840	0	0	1715	0	0	1683	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		741			419			589			230	
Travel Time (s)		16.8			9.5			11.5			4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	427	48	26	343	25	56	0	33	22	0	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	506	0	0	394	0	0	89	0	0	50	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		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection										
Int Delay, s/veh	3									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	29	406	46	25	326	24	53	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	115	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	427	48	26	343	25	56	0	33

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	368	0	0	476	0	0	936	934	452
Stage 1	-	-	-	-	-	-	513	513	-
Stage 2	-	-	-	-	-	-	423	421	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1191	-	-	1086	-	-	245	266	608
Stage 1	-	-	-	-	-	-	544	536	-
Stage 2	-	-	-	-	-	-	609	589	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1191	-	-	1086	-	-	226	253	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	253	-
Stage 1	-	-	-	-	-	-	530	522	-
Stage 2	-	-	-	-	-	-	570	575	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0.6	20.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	226	608	1191	-	-	1086	-	-	223	688
HCM Lane V/C Ratio	0.247	0.054	0.026	-	-	0.024	-	-	0.099	0.041
HCM Control Delay (s)	26.1	11.3	8.1	-	-	8.4	-	-	22.9	10.5
HCM Lane LOS	D	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.9	0.2	0.1	-	-	0.1	-	-	0.3	0.1

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	21	0	27
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	0	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	22	0	28

Major/Minor

	Minor2		
Conflicting Flow All	937	945	356
Stage 1	408	408	-
Stage 2	529	537	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	245	262	688
Stage 1	620	597	-
Stage 2	533	523	-
Platoon blocked, %			
Mov Cap-1 Maneuver	223	249	688
Mov Cap-2 Maneuver	223	249	-
Stage 1	604	583	-
Stage 2	491	509	-

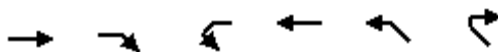
Approach

	SB
HCM Control Delay, s	15.9
HCM LOS	C

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
1: Burlington & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑			↑		
Volume (vph)	416	148	0	380	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965					
Flt Protected						
Satd. Flow (prot)	1699	0	0	1792	0	0
Flt Permitted						
Satd. Flow (perm)	1699	0	0	1792	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	1214			901	931	
Travel Time (s)	27.6			20.5	21.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	2%	2%	6%	2%	2%
Adj. Flow (vph)	438	156	0	400	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	0	400	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
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	34.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

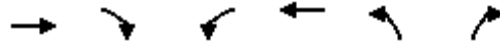
2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	416	1	36	245	135	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	115		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.978	
Fl _t Protected			0.950		0.960	
Satd. Flow (prot)	1728	0	1703	1792	1696	0
Fl _t Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1696	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					14	
Link Speed (mph)	30			30	30	
Link Distance (ft)	901			1058	332	
Travel Time (s)	20.5			24.0	7.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	6%	6%	5%	6%
Adj. Flow (vph)	438	1	38	258	142	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	439	0	38	258	170	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	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
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

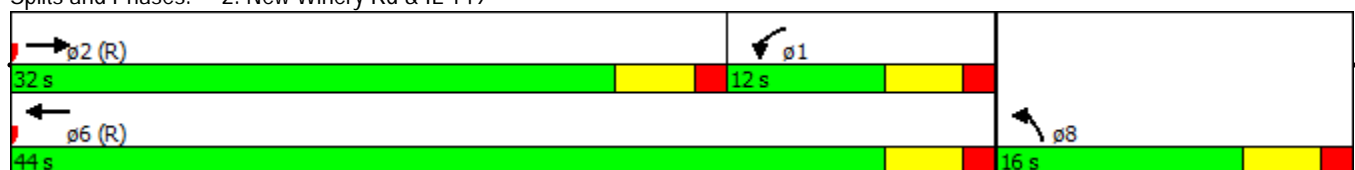


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2		1	6	8	
Switch Phase						
Minimum Initial (s)	7.0		7.0	10.0	7.0	
Minimum Split (s)	12.0		12.0	15.0	12.0	
Total Split (s)	32.0		12.0	44.0	16.0	
Total Split (%)	53.3%		20.0%	73.3%	26.7%	
Maximum Green (s)	27.0		7.0	39.0	11.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
Act Effect Green (s)	38.4		7.1	43.4	10.0	
Actuated g/C Ratio	0.64		0.12	0.72	0.17	
v/c Ratio	0.40		0.19	0.20	0.58	
Control Delay	10.4		24.2	1.5	23.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	10.4		24.2	1.5	23.7	
LOS	B		C	A	C	
Approach Delay	10.4			4.4	23.7	
Approach LOS	B			A	C	
Queue Length 50th (ft)	60		15	9	43	
Queue Length 95th (ft)	188		m36	3	70	
Internal Link Dist (ft)	821			978	252	
Turn Bay Length (ft)			115			
Base Capacity (vph)	1119		201	1303	330	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.39		0.19	0.20	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 11.0
 Intersection LOS: B
 Intersection Capacity Utilization 47.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



Phasings
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour



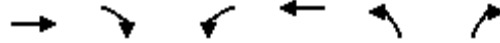
Lane Group	EBT	WBL	WBT	NBL
Protected Phases	2	1	6	8
Permitted Phases				
Minimum Initial (s)	7.0	7.0	10.0	7.0
Minimum Split (s)	12.0	12.0	15.0	12.0
Total Split (s)	32.0	12.0	44.0	16.0
Total Split (%)	53.3%	20.0%	73.3%	26.7%
Maximum Green (s)	27.0	7.0	39.0	11.0
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	C-Min	None	C-Min	None
Walk Time (s)				
Flash Dont Walk (s)				
Pedestrian Calls (#/hr)				
90th %ile Green (s)	27.0	7.0	39.0	11.0
90th %ile Term Code	Coord	Max	Coord	Max
70th %ile Green (s)	24.9	7.6	37.5	12.5
70th %ile Term Code	Coord	Gap	Coord	Gap
50th %ile Green (s)	39.3	0.0	39.3	10.7
50th %ile Term Code	Coord	Skip	Coord	Gap
30th %ile Green (s)	41.0	0.0	41.0	9.0
30th %ile Term Code	Coord	Skip	Coord	Gap
10th %ile Green (s)	55.0	0.0	55.0	0.0
10th %ile Term Code	Coord	Skip	Coord	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

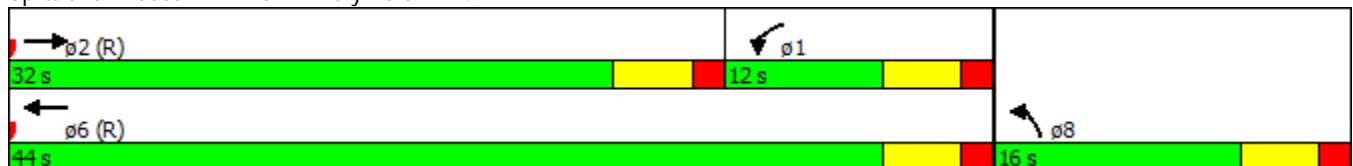


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Volume (vph)	416	1	36	245	135	27
Satd. Flow (prot)	1728	0	1703	1792	1696	0
Flt Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1696	0
Satd. Flow (RTOR)					14	
Lane Group Flow (vph)	439	0	38	258	170	0
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Total Split (s)	32.0		12.0	44.0	16.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Act Effect Green (s)	38.4		7.1	43.4	10.0	
Actuated g/C Ratio	0.64		0.12	0.72	0.17	
v/c Ratio	0.40		0.19	0.20	0.58	
Control Delay	10.4		24.2	1.5	23.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	10.4		24.2	1.5	23.7	
LOS	B		C	A	C	
Approach Delay	10.4			4.4	23.7	
Approach LOS	B			A	C	
Queue Length 50th (ft)	60		15	9	43	
Queue Length 95th (ft)	188		m36	3	70	
Internal Link Dist (ft)	821			978	252	
Turn Bay Length (ft)			115			
Base Capacity (vph)	1119		201	1303	330	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.39		0.19	0.20	0.52	

Intersection Summary












Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 11.0
 Intersection LOS: B
 Intersection Capacity Utilization 47.4%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



HCM 2010 Signalized Intersection Summary
2: New Winery Rd & IL 149

2032 Design Year - Build
AM Peak Hour

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Volume (veh/h)	416	1	36	245	135	27		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	172.8	190.0	179.2	179.2	180.7	190.0		
Adj Flow Rate, veh/h	438	1	38	258	142	28		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	10	10	6	6	0	0		
Cap, veh/h	605	1	105	994	226	45		
Arrive On Green	0.35	0.35	0.06	0.55	0.16	0.16		
Sat Flow, veh/h	1723	4	1707	1792	1402	276		
Grp Volume(v), veh/h	0	439	38	258	171	0		
Grp Sat Flow(s),veh/h/ln	0	1727	1707	1792	1688	0		
Q Serve(g_s), s	0.0	7.8	0.8	2.6	3.3	0.0		
Cycle Q Clear(g_c), s	0.0	7.8	0.8	2.6	3.3	0.0		
Prop In Lane		0.00	1.00		0.83	0.16		
Lane Grp Cap(c), veh/h	0	606	105	994	272	0		
V/C Ratio(X)	0.00	0.72	0.36	0.26	0.63	0.00		
Avail Cap(c_a), veh/h	0	1324	339	1985	527	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.93	0.93	1.00	0.00		
Uniform Delay (d), s/veh	0.0	9.9	15.9	4.1	13.8	0.0		
Incr Delay (d2), s/veh	0.0	7.4	1.9	0.6	2.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.0	8.5	0.7	2.6	3.1	0.0		
LnGrp Delay(d),s/veh	0.0	17.3	17.8	4.7	16.2	0.0		
LnGrp LOS		B	B	A	B			
Approach Vol, veh/h	439			296	171			
Approach Delay, s/veh	17.3			6.4	16.1			
Approach LOS	B			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	32.0	17.4				49.3		10.7
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	7.0	27.0				39.0		11.0
Max Q Clear Time (g_c+I1), s	2.8	9.8				4.6		5.3
Green Ext Time (p_c), s	0.6	2.6				1.7		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			13.5					
HCM 2010 LOS			B					
Notes								
User approved volume balancing among the lanes for turning movement.								

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	435	78	268	234	91	40	27	171	105	28	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	155		0	160		160	215		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.977			0.958				0.850		0.932	
Flt Protected	0.950			0.950				0.971		0.950		
Satd. Flow (prot)	1719	1742	0	1736	1674	0	0	1809	1524	1626	1644	0
Flt Permitted	0.295			0.397				0.785		0.435		
Satd. Flow (perm)	534	1742	0	725	1674	0	0	1462	1524	745	1644	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			34				218			24
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1058			538			598				782
Travel Time (s)		24.0			12.2			13.6				17.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	4%	4%	11%	3%	0%	5%	6%	11%	5%	11%
Adj. Flow (vph)	55	458	82	282	246	96	42	28	180	111	29	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	540	0	282	342	0	0	70	180	111	53	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)		12			12			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
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	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
Detector 1 Queue (s)	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
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	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt		NA
Protected Phases	5	2		1	6			8	1	7		4
Permitted Phases	2			6			8		8	4		

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour

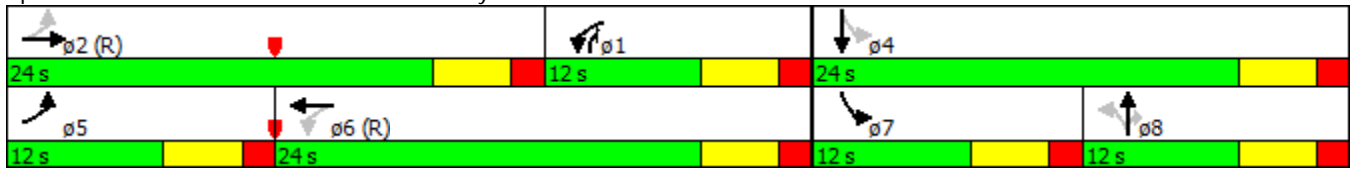


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8	1	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	12.0	15.0		12.0	15.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	24.0		12.0	24.0		12.0	12.0	12.0	12.0	24.0	
Total Split (%)	20.0%	40.0%		20.0%	40.0%		20.0%	20.0%	20.0%	20.0%	40.0%	
Maximum Green (s)	7.0	19.0		7.0	19.0		7.0	7.0	7.0	7.0	19.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	26.2	26.2		31.0	32.0		7.0	11.2	14.2	14.2		
Actuated g/C Ratio	0.44	0.44		0.52	0.53		0.12	0.19	0.24	0.24		
v/c Ratio	0.15	0.70		0.57	0.38		0.41	0.39	0.40	0.13		
Control Delay	11.5	21.9		16.4	6.1		32.5	3.7	21.0	10.4		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	11.5	21.9		16.4	6.1		32.5	3.7	21.0	10.4		
LOS	B	C		B	A		C	A	C	B		
Approach Delay		20.9			10.7		11.8				17.6	
Approach LOS		C			B		B				B	
Queue Length 50th (ft)	15	192		39	38		24	0	29	7		
Queue Length 95th (ft)	m23	#343		#108	65		58	17	62	28		
Internal Link Dist (ft)		978			458		518			702		
Turn Bay Length (ft)	150			155				160	215			
Base Capacity (vph)	371	769		492	908		170	461	278	537		
Starvation Cap Reductn	0	0		0	0		0	0	0	0		
Spillback Cap Reductn	0	0		0	0		0	0	0	0		
Storage Cap Reductn	0	0		0	0		0	0	0	0		
Reduced v/c Ratio	0.15	0.70		0.57	0.38		0.41	0.39	0.40	0.10		

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 43 (72%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.3 Intersection LOS: B
 Intersection Capacity Utilization 67.5% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



Phasings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8	1	7	4
Permitted Phases	2		6		8		8	4	
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	24.0	12.0	24.0	12.0	12.0	12.0	12.0	24.0
Total Split (%)	20.0%	40.0%	20.0%	40.0%	20.0%	20.0%	20.0%	20.0%	40.0%
Maximum Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	6.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
70th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
50th %ile Green (s)	7.0	19.0	7.0	19.0	7.0	7.0	7.0	7.0	19.0
50th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
30th %ile Green (s)	0.0	31.0	7.0	43.0	0.0	0.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Max	Coord	Skip	Skip	Max	Max	Hold
10th %ile Green (s)	0.0	43.0	7.0	55.0	0.0	0.0	7.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Max	Coord	Skip	Skip	Max	Skip	Skip

Intersection Summary

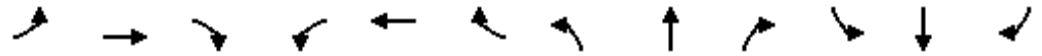
Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 43 (72%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues

2032 Design Year - Build

3: Frankfort Plaza/Ken Gray Blvd & IL 149

AM Peak Hour

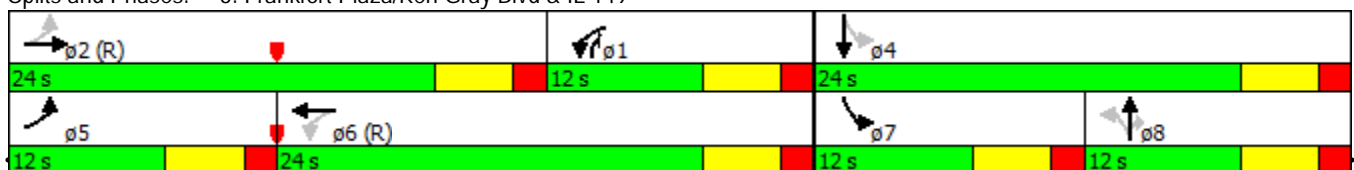


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	435	78	268	234	91	40	27	171	105	28	23
Satd. Flow (prot)	1719	1742	0	1736	1674	0	0	1809	1524	1626	1644	0
Flt Permitted	0.295			0.397				0.785		0.435		
Satd. Flow (perm)	534	1742	0	725	1674	0	0	1462	1524	745	1644	0
Satd. Flow (RTOR)		16			34				218		24	
Lane Group Flow (vph)	55	540	0	282	342	0	0	70	180	111	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	12.0	24.0		12.0	24.0		12.0	12.0	12.0	12.0	24.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0	5.0	
Act Effect Green (s)	26.2	26.2		31.0	32.0			7.0	11.2	14.2	14.2	
Actuated g/C Ratio	0.44	0.44		0.52	0.53			0.12	0.19	0.24	0.24	
v/c Ratio	0.15	0.70		0.57	0.38			0.41	0.39	0.40	0.13	
Control Delay	11.5	21.9		16.4	6.1			32.5	3.7	21.0	10.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	11.5	21.9		16.4	6.1			32.5	3.7	21.0	10.4	
LOS	B	C		B	A			C	A	C	B	
Approach Delay		20.9			10.7			11.8			17.6	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	15	192		39	38			24	0	29	7	
Queue Length 95th (ft)	m23	#343		#108	65			58	17	62	28	
Internal Link Dist (ft)		978			458			518			702	
Turn Bay Length (ft)	150			155					160	215		
Base Capacity (vph)	371	769		492	908			170	461	278	537	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.15	0.70		0.57	0.38			0.41	0.39	0.40	0.10	

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 43 (72%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 15.3
 Intersection LOS: B
 Intersection Capacity Utilization 67.5%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



HCM 2010 Signalized Intersection Summary
 3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	52	435	78	268	234	91	40	27	171	105	28	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	181.0	178.3	190.0	182.7	174.7	190.0	190.0	186.3	179.2	171.2	176.4	190.0
Adj Flow Rate, veh/h	55	458	82	282	246	96	42	28	180	111	29	24
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	7	7	4	11	11	5	5	6	11	5	5
Cap, veh/h	249	476	85	330	445	174	186	99	361	372	271	224
Arrive On Green	0.14	0.65	0.65	0.12	0.37	0.37	0.12	0.12	0.12	0.10	0.30	0.30
Sat Flow, veh/h	1723	1473	264	1740	1197	467	741	837	1524	1630	894	740
Grp Volume(v), veh/h	55	0	540	282	0	342	70	0	180	111	0	53
Grp Sat Flow(s),veh/h/ln	1723	0	1737	1740	0	1665	1578	0	1524	1630	0	1633
Q Serve(g_s), s	1.3	0.0	17.1	5.1	0.0	9.6	0.9	0.0	1.5	3.2	0.0	1.4
Cycle Q Clear(g_c), s	1.3	0.0	17.1	5.1	0.0	9.6	2.2	0.0	1.5	3.2	0.0	1.4
Prop In Lane	1.00		0.15	1.00		0.28	0.60		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	249	0	561	330	0	618	284	0	361	372	0	495
V/C Ratio(X)	0.22	0.00	0.96	0.86	0.00	0.55	0.25	0.00	0.50	0.30	0.00	0.11
Avail Cap(c_a), veh/h	333	0	561	330	0	618	286	0	363	403	0	528
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	10.1	24.0	0.0	14.6	23.8	0.0	6.7	17.8	0.0	14.8
Incr Delay (d2), s/veh	0.4	0.0	28.3	19.3	0.0	3.5	0.4	0.0	1.1	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.2	0.0	17.6	10.2	0.0	8.6	2.0	0.0	2.6	2.6	0.0	1.1
LnGrp Delay(d),s/veh	16.3	0.0	38.4	43.3	0.0	18.2	24.2	0.0	7.8	18.3	0.0	14.9
LnGrp LOS	B		D	D		B	C		A	B		B
Approach Vol, veh/h		595			624			250				164
Approach Delay, s/veh		36.4			29.5			12.4				17.2
Approach LOS		D			C			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.2	24.0		22.8	9.1	28.0	10.9	12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	19.0		19.0	7.0	19.0	7.0	7.0				
Max Q Clear Time (g_c+I1), s	7.1	19.1		3.4	3.3	11.6	5.2	4.2				
Green Ext Time (p_c), s	0.0	0.0		1.1	0.0	3.0	0.0	0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			28.1									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
4: IL 149

2032 Design Year - Build
AM Peak Hour















Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	96	615	593	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			1	0	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1787	1759	1776	1863	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1759	1776	1863	0	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		538	290		442	
Travel Time (s)		12.2	6.6		8.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	8%	7%	2%	2%	2%
Adj. Flow (vph)	101	647	624	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	101	647	624	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖	↑	↗
Volume (vph)	0	501	114	222	479	0	0	0	0	10	287	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	220		0	0		0	300		300
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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
Fr _t			0.850									0.850
Fl _t Protected				0.950						0.950		
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Fl _t Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		503			842			306			1286	
Travel Time (s)		11.4			19.1			4.6			19.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	3%	4%	2%	2%	2%	2%	2%	14%	2%	7%
Adj. Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
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)		12			12			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
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		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
Detector 1 Queue (s)		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
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

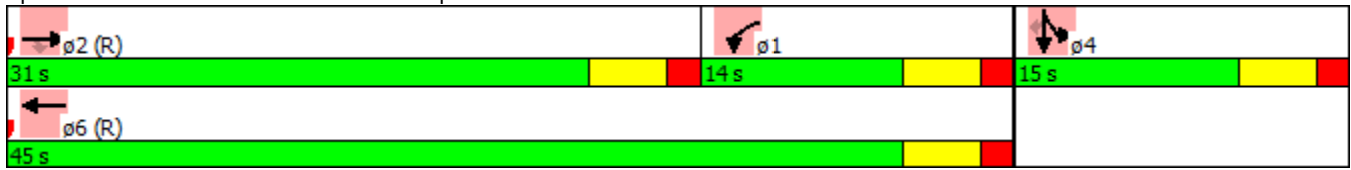


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		25.0	25.0	7.0	25.0					7.0	7.0	7.0
Minimum Split (s)		30.0	30.0	12.0	30.0					15.0	15.0	15.0
Total Split (s)		31.0	31.0	14.0	45.0					15.0	15.0	15.0
Total Split (%)		51.7%	51.7%	23.3%	75.0%					25.0%	25.0%	25.0%
Maximum Green (s)		26.0	26.0	9.0	40.0					10.0	10.0	10.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		25.0	25.0	10.0	40.0					10.0	10.0	10.0
Actuated g/C Ratio		0.42	0.42	0.17	0.67					0.17	0.17	0.17
v/c Ratio		0.37	0.17	0.81	0.21					0.04	0.97	0.22
Control Delay		7.6	1.2	36.1	2.2					21.6	74.8	3.7
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		7.6	1.2	36.1	2.2					21.6	74.8	3.7
LOS		A	A	D	A					C	E	A
Approach Delay		6.4			13.0						58.8	
Approach LOS		A			B						E	
Queue Length 50th (ft)		32	0	44	16					3	110	0
Queue Length 95th (ft)		56	m0	#175	17					15	#246	15
Internal Link Dist (ft)		423			762			226			1206	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1489	751	289	2359					263	310	357
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.35	0.16	0.81	0.21					0.04	0.97	0.22

Intersection Summary

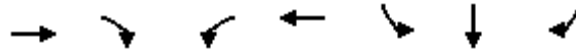
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 54 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 20.7
 Intersection LOS: C
 Intersection Capacity Utilization 60.7%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149



Phasings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	25.0	25.0	7.0	25.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	12.0	30.0	15.0	15.0	15.0
Total Split (s)	31.0	31.0	14.0	45.0	15.0	15.0	15.0
Total Split (%)	51.7%	51.7%	23.3%	75.0%	25.0%	25.0%	25.0%
Maximum Green (s)	26.0	26.0	9.0	40.0	10.0	10.0	10.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
30th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
10th %ile Green (s)	25.0	25.0	10.0	40.0	10.0	10.0	10.0
10th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 54 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues

2032 Design Year - Build

5: SB C-D/SB Off Ramp & IL 149

AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑	↑↑					↑	↑	↑
Volume (vph)	0	501	114	222	479	0	0	0	0	10	287	76
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Satd. Flow (RTOR)			127									127
Lane Group Flow (vph)	0	527	120	234	504	0	0	0	0	11	302	80
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Total Split (s)		31.0	31.0	14.0	45.0					15.0	15.0	15.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Act Effect Green (s)		25.0	25.0	10.0	40.0					10.0	10.0	10.0
Actuated g/C Ratio		0.42	0.42	0.17	0.67					0.17	0.17	0.17
v/c Ratio		0.37	0.17	0.81	0.21					0.04	0.97	0.22
Control Delay		7.6	1.2	36.1	2.2					21.6	74.8	3.7
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		7.6	1.2	36.1	2.2					21.6	74.8	3.7
LOS		A	A	D	A					C	E	A
Approach Delay		6.4			13.0						58.8	
Approach LOS		A			B						E	
Queue Length 50th (ft)		32	0	44	16					3	110	0
Queue Length 95th (ft)		56	m0	#175	17					15	#246	15
Internal Link Dist (ft)		423			762			226			1206	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1489	751	289	2359					263	310	357
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.35	0.16	0.81	0.21					0.04	0.97	0.22

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 54 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 20.7

Intersection LOS: C

Intersection Capacity Utilization 60.7%

ICU Level of Service B

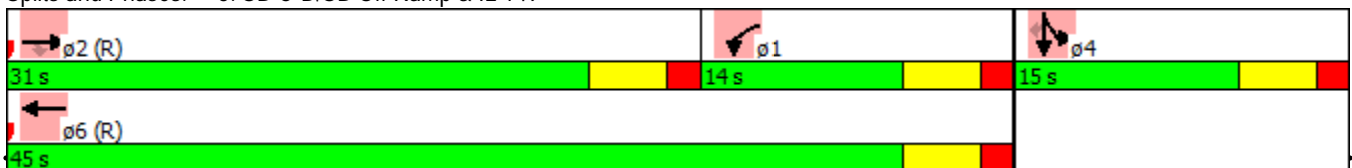
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149
























HCM 2010 Signalized Intersection Summary
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖	↑	↗
Volume (veh/h)	0	501	114	222	479	0	0	0	0	10	287	76
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	184.5	182.7	186.3	0.0				166.7	186.3	177.6
Adj Flow Rate, veh/h	0	527	0	234	504	0				11	302	0
Adj No. of Lanes	0	2	1	1	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	4	2	0				14	2	7
Cap, veh/h	0	1457	664	265	2339	0				269	316	256
Arrive On Green	0.00	0.42	0.00	0.31	1.00	0.00				0.17	0.17	0.00
Sat Flow, veh/h	0	3529	1568	1740	3632	0				1587	1863	1509
Grp Volume(v), veh/h	0	527	0	234	504	0				11	302	0
Grp Sat Flow(s),veh/h/ln	0	1719	1568	1740	1770	0				1587	1863	1509
Q Serve(g_s), s	0.0	6.2	0.0	7.5	0.0	0.0				0.3	9.5	0.0
Cycle Q Clear(g_c), s	0.0	6.2	0.0	7.5	0.0	0.0				0.3	9.5	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1457	664	265	2339	0				269	316	256
V/C Ratio(X)	0.00	0.36	0.00	0.88	0.22	0.00				0.04	0.96	0.00
Avail Cap(c_a), veh/h	0	1515	691	265	2399	0				269	316	256
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.6	0.0	20.0	0.0	0.0				20.5	24.3	0.0
Incr Delay (d2), s/veh	0.0	0.7	0.0	25.9	0.2	0.0				0.1	39.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	5.4	0.0	9.2	0.1	0.0				0.3	13.0	0.0
LnGrp Delay(d),s/veh	0.0	12.3	0.0	45.9	0.2	0.0				20.6	63.3	0.0
LnGrp LOS		B		D	A					C	E	
Approach Vol, veh/h		527			738						313	
Approach Delay, s/veh		12.3			14.7						61.8	
Approach LOS		B			B						E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	15.0	30.0		15.0		45.0						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	9.0	26.0		10.0		40.0						
Max Q Clear Time (g_c+I1), s	9.5	8.2		11.5		2.0						
Green Ext Time (p_c), s	0.0	3.3		0.0		4.5						
Intersection Summary												
HCM 2010 Ctrl Delay			23.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	109	428	0	0	625	76	46	234	2	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		200	225		225	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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
Fr _t						0.850			0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127			127			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		842			517			1563			1224	
Travel Time (s)		19.1			11.8			23.7			18.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	5%	2%	2%	2%	7%	3%	4%	5%	2%	2%	2%
Adj. Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	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)		12			12			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
Number of Detectors	1	2			2	1	1	2	1			
Detector Template	Left	Thru			Thru	Right	Left	Thru	Right			
Leading Detector (ft)	20	100			100	20	20	100	20			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	20	6	20			
Detector 1 Type	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			
Detector 1 Queue (s)	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			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

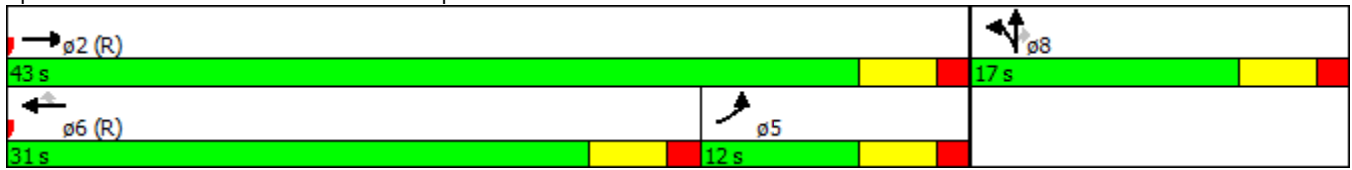


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	25.0			25.0	25.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	30.0			30.0	30.0	12.0	12.0	12.0			
Total Split (s)	12.0	43.0			31.0	31.0	17.0	17.0	17.0			
Total Split (%)	20.0%	71.7%			51.7%	51.7%	28.3%	28.3%	28.3%			
Maximum Green (s)	7.0	38.0			26.0	26.0	12.0	12.0	12.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag			Lead		Lead						
Lead-Lag Optimize?	Yes			Yes		Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	7.8	38.8			28.4	28.4	11.2	11.2	11.2			
Actuated g/C Ratio	0.13	0.65			0.47	0.47	0.19	0.19	0.19			
v/c Ratio	0.53	0.20			0.39	0.10	0.15	0.72	0.01			
Control Delay	19.8	0.7			7.1	1.6	22.8	38.2	0.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	19.8	0.7			7.1	1.6	22.8	38.2	0.0			
LOS	B	A			A	A	C	D	A			
Approach Delay		4.6			6.5			35.4				
Approach LOS		A			A			D				
Queue Length 50th (ft)	29	1			88	3	15	90	0			
Queue Length 95th (ft)	#71	2			84	m8	m27	#170	m0			
Internal Link Dist (ft)		762			437			1483			1144	
Turn Bay Length (ft)	260					200	225		225			
Base Capacity (vph)	216	2223			1715	796	350	365	409			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.53	0.20			0.38	0.10	0.14	0.67	0.00			

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.2 Intersection LOS: B
 Intersection Capacity Utilization 60.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



Phasings
6: NB C-D/NB On Ramp & IL 149

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Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	25.0	25.0	25.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	30.0	30.0	12.0	12.0	12.0
Total Split (s)	12.0	43.0	31.0	31.0	17.0	17.0	17.0
Total Split (%)	20.0%	71.7%	51.7%	51.7%	28.3%	28.3%	28.3%
Maximum Green (s)	7.0	38.0	26.0	26.0	12.0	12.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
50th %ile Green (s)	8.0	38.0	25.0	25.0	12.0	12.0	12.0
50th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
30th %ile Green (s)	8.0	38.6	25.6	25.6	11.4	11.4	11.4
30th %ile Term Code	Max	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	41.4	41.4	41.4	8.6	8.6	8.6
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
6: NB C-D/NB On Ramp & IL 149

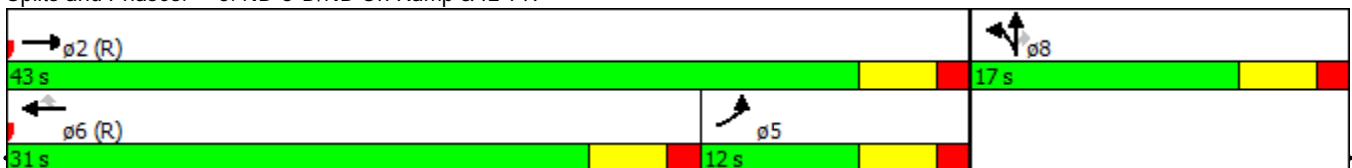
2032 Design Year - Build
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	428	0	0	625	76	46	234	2	0	0	0
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Satd. Flow (RTOR)							127		127			
Lane Group Flow (vph)	115	451	0	0	658	80	48	246	2	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Total Split (s)	12.0	43.0			31.0	31.0	17.0	17.0	17.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Act Effct Green (s)	7.8	38.8			28.4	28.4	11.2	11.2	11.2			
Actuated g/C Ratio	0.13	0.65			0.47	0.47	0.19	0.19	0.19			
v/c Ratio	0.53	0.20			0.39	0.10	0.15	0.72	0.01			
Control Delay	19.8	0.7			7.1	1.6	22.8	38.2	0.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	19.8	0.7			7.1	1.6	22.8	38.2	0.0			
LOS	B	A			A	A	C	D	A			
Approach Delay		4.6			6.5			35.4				
Approach LOS		A			A			D				
Queue Length 50th (ft)	29	1			88	3	15	90	0			
Queue Length 95th (ft)	#71	2			84	m8	m27	#170	m0			
Internal Link Dist (ft)		762			437			1483			1144	
Turn Bay Length (ft)	260					200	225		225			
Base Capacity (vph)	216	2223			1715	796	350	365	409			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.53	0.20			0.38	0.10	0.14	0.67	0.00			

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.2 Intersection LOS: B
 Intersection Capacity Utilization 60.7% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



HCM 2010 Signalized Intersection Summary
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (veh/h)	109	428	0	0	625	76	46	234	2	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	175.9	181.0	0.0	0.0	186.3	177.6	184.5	182.7	181.0			
Adj Flow Rate, veh/h	115	451	0	0	658	0	48	246	0			
Adj No. of Lanes	1	2	0	0	2	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	8	5	0	0	2	7	3	4	5			
Cap, veh/h	176	2227	0	0	1601	683	301	313	263			
Arrive On Green	0.21	1.00	0.00	0.00	0.90	0.00	0.06	0.06	0.00			
Sat Flow, veh/h	1675	3529	0	0	3632	1509	1757	1827	1538			
Grp Volume(v), veh/h	115	451	0	0	658	0	48	246	0			
Grp Sat Flow(s),veh/h/ln	1675	1719	0	0	1770	1509	1757	1827	1538			
Q Serve(g_s), s	3.5	0.0	0.0	0.0	1.6	0.0	1.4	7.3	0.0			
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	1.6	0.0	1.4	7.3	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	176	2227	0	0	1601	683	301	313	263			
V/C Ratio(X)	0.65	0.20	0.00	0.00	0.41	0.00	0.16	0.79	0.00			
Avail Cap(c_a), veh/h	212	2364	0	0	1665	710	381	397	334			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	0.33	0.33	0.33			
Upstream Filter(I)	0.94	0.94	0.00	0.00	1.00	0.00	0.92	0.92	0.00			
Uniform Delay (d), s/veh	20.9	0.0	0.0	0.0	1.5	0.0	22.3	25.1	0.0			
Incr Delay (d2), s/veh	5.0	0.2	0.0	0.0	0.8	0.0	0.2	7.3	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	3.2	0.1	0.0	0.0	1.4	0.0	1.3	7.6	0.0			
LnGrp Delay(d),s/veh	25.9	0.2	0.0	0.0	2.3	0.0	22.5	32.4	0.0			
LnGrp LOS	C	A			A		C	C				
Approach Vol, veh/h		566			658			294				
Approach Delay, s/veh		5.4			2.3			30.8				
Approach LOS		A			A			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		45.5			15.5	30.0		14.5				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		38.0			7.0	26.0		12.0				
Max Q Clear Time (g_c+I1), s		2.0			5.5	3.6		9.3				
Green Ext Time (p_c), s		3.7			0.5	4.7		0.2				
Intersection Summary												
HCM 2010 Ctrl Delay				9.0								
HCM 2010 LOS				A								

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	349	36	110	683	27	18	1	77	1	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		115	200		115	115		115	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.986			0.994			0.892			0.981	
Flt Protected	0.950			0.950				0.991			0.993	
Satd. Flow (prot)	1770	1789	0	1770	1852	0	0	1647	0	0	1815	0
Flt Permitted	0.950			0.950				0.932			0.961	
Satd. Flow (perm)	1770	1789	0	1770	1852	0	0	1549	0	0	1756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			5			81			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		511			1030			591			583	
Travel Time (s)		11.6			23.4			13.4			13.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	18	367	38	116	719	28	19	1	81	1	5	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	405	0	116	747	0	0	101	0	0	7	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

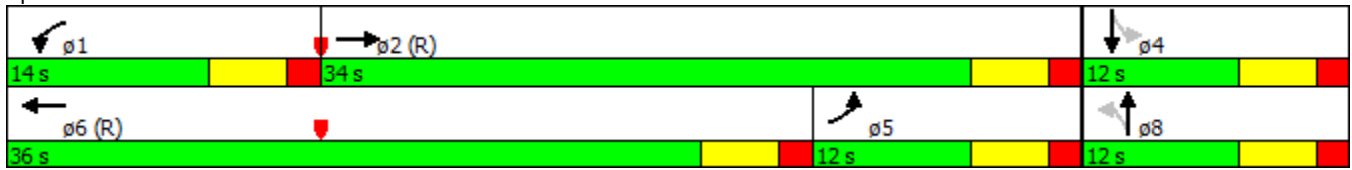


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0		12.0	12.0	
Total Split (s)	12.0	34.0		14.0	36.0		12.0	12.0		12.0	12.0	
Total Split (%)	20.0%	56.7%		23.3%	60.0%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	7.0	29.0		9.0	31.0		7.0	7.0		7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effect Green (s)	7.0	34.9		8.7	43.8			7.2			7.2	
Actuated g/C Ratio	0.12	0.58		0.14	0.73			0.12			0.12	
v/c Ratio	0.09	0.39		0.45	0.55			0.39			0.03	
Control Delay	13.5	2.3		31.9	3.0			9.5			22.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.5	2.3		31.9	3.0			9.5			22.6	
LOS	B	A		C	A			A			C	
Approach Delay		2.8			6.9			9.5			22.6	
Approach LOS		A			A			A			C	
Queue Length 50th (ft)	4	7		33	14			1			2	
Queue Length 95th (ft)	22	11		m56	#33			m16			12	
Internal Link Dist (ft)		431			950			511			503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	206	1061		276	1354			256			210	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.38		0.42	0.55			0.39			0.03	

Intersection Summary

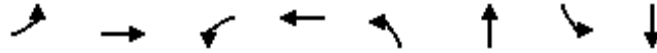
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 38 (63%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 5.9 Intersection LOS: A
 Intersection Capacity Utilization 64.4% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



Phasings
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	34.0	14.0	36.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	56.7%	23.3%	60.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Walk Time (s)								
Flash Dont Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	7.0	29.0	9.0	31.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max
70th %ile Green (s)	0.0	26.6	10.6	42.2	7.8	7.8	7.8	7.8
70th %ile Term Code	Skip	Coord	Gap	Coord	Gap	Gap	Hold	Hold
50th %ile Green (s)	0.0	28.8	9.2	43.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
30th %ile Green (s)	0.0	30.2	7.8	43.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 38 (63%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	349	36	110	683	27	18	1	77	1	5	1
Satd. Flow (prot)	1770	1789	0	1770	1852	0	0	1647	0	0	1815	0
Flt Permitted	0.950			0.950				0.932			0.961	
Satd. Flow (perm)	1770	1789	0	1770	1852	0	0	1549	0	0	1756	0
Satd. Flow (RTOR)		12			5			81			1	
Lane Group Flow (vph)	18	405	0	116	747	0	0	101	0	0	7	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Total Split (s)	12.0	34.0		14.0	36.0		12.0	12.0		12.0	12.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Act Effect Green (s)	7.0	34.9		8.7	43.8			7.2			7.2	
Actuated g/C Ratio	0.12	0.58		0.14	0.73			0.12			0.12	
v/c Ratio	0.09	0.39		0.45	0.55			0.39			0.03	
Control Delay	13.5	2.3		31.9	3.0			9.5			22.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.5	2.3		31.9	3.0			9.5			22.6	
LOS	B	A		C	A			A			C	
Approach Delay		2.8			6.9			9.5			22.6	
Approach LOS		A			A			A			C	
Queue Length 50th (ft)	4	7		33	14			1			2	
Queue Length 95th (ft)	22	11		m56	#33			m16			12	
Internal Link Dist (ft)		431			950			511			503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	206	1061		276	1354			256			210	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.38		0.42	0.55			0.39			0.03	

Intersection Summary



















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 38 (63%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 5.9
 Intersection LOS: A
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



HCM 2010 Signalized Intersection Summary
8: Joiner St & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	349	36	110	683	27	18	1	77	1	5	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	181.4	190.0	186.3	186.3	190.0	190.0	186.3	190.0	190.0	186.3	190.0
Adj Flow Rate, veh/h	18	367	38	116	719	28	19	1	81	1	5	1
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	791	82	196	871	34	105	12	136	92	152	27
Arrive On Green	0.07	0.33	0.33	0.22	0.98	0.98	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1774	1617	167	1774	1781	69	198	114	1263	103	1418	253
Grp Volume(v), veh/h	18	0	405	116	0	747	101	0	0	7	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1785	1774	0	1851	1575	0	0	1774	0	0
Q Serve(g_s), s	0.5	0.0	9.2	3.0	0.0	2.4	1.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.5	0.0	9.2	3.0	0.0	2.4	3.1	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.04	0.19		0.80	0.14		0.14
Lane Grp Cap(c), veh/h	196	0	872	196	0	905	253	0	0	271	0	0
V/C Ratio(X)	0.09	0.00	0.46	0.59	0.00	0.83	0.40	0.00	0.00	0.03	0.00	0.00
Avail Cap(c_a), veh/h	243	0	1012	312	0	1122	298	0	0	322	0	0
HCM Platoon Ratio	0.67	0.67	0.67	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.74	0.00	0.74	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	0.0	11.9	18.9	0.0	0.3	21.7	0.0	0.0	20.5	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	1.8	2.1	0.0	6.5	1.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.0	8.6	2.8	0.0	3.3	2.6	0.0	0.0	0.2	0.0	0.0
LnGrp Delay(d),s/veh	21.5	0.0	13.7	21.0	0.0	6.8	22.8	0.0	0.0	20.5	0.0	0.0
LnGrp LOS	C		B	C		A	C			C		
Approach Vol, veh/h		423			863			101			7	
Approach Delay, s/veh		14.0			8.7			22.8			20.5	
Approach LOS		B			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	38.9		10.5	19.5	30.0		10.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	9.0	29.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	5.0	11.2		2.2	2.5	4.4		5.1				
Green Ext Time (p_c), s	0.1	2.4		0.2	1.0	6.0		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			11.4									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	386	6	144	765	3	7	38	155	1	40	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	0		115	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
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		0.998			0.999				0.850		0.927	
Flt Protected	0.950			0.950				0.993			0.999	
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1850	1583	0	1725	0
Flt Permitted	0.950			0.950				0.957			0.995	
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1783	1583	0	1718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2							163		51	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1030			1325			920			481	
Travel Time (s)		23.4			30.1			20.9			10.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	36	406	6	152	805	3	7	40	163	1	42	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	412	0	152	808	0	0	47	163	0	94	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

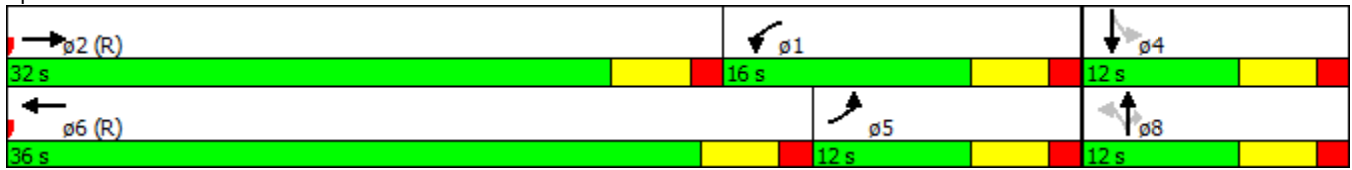


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0	12.0	12.0	12.0	
Total Split (s)	12.0	32.0		16.0	36.0		12.0	12.0	12.0	12.0	12.0	
Total Split (%)	20.0%	53.3%		26.7%	60.0%		20.0%	20.0%	20.0%	20.0%	20.0%	
Maximum Green (s)	7.0	27.0		11.0	31.0		7.0	7.0	7.0	7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	
Act Effect Green (s)	7.0	33.5		10.3	41.6		7.0	7.0	7.0	7.0	7.0	
Actuated g/C Ratio	0.12	0.56		0.17	0.69		0.12	0.12	0.12	0.12	0.12	
v/c Ratio	0.17	0.41		0.50	0.63		0.23	0.50	0.50	0.50	0.38	
Control Delay	24.7	4.1		28.0	12.4		19.8	9.9	9.9	9.9	18.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	24.7	4.1		28.0	12.4		19.8	9.9	9.9	9.9	18.7	
LOS	C	A		C	B		B	A	A	A	B	
Approach Delay		5.8			14.8		12.1				18.7	
Approach LOS		A			B		B				B	
Queue Length 50th (ft)	14	20		50	110		18	0	0	0	14	
Queue Length 95th (ft)	m34	37		96	#445		27	13	13	13	52	
Internal Link Dist (ft)		950			1245		840				401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	208	1030		343	1290		208	328	328	328	245	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.40		0.44	0.63		0.23	0.50	0.50	0.50	0.38	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 12.3 Intersection LOS: B
 Intersection Capacity Utilization 65.4% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149



Phasings
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8			4
Permitted Phases					8		8	4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	32.0	16.0	36.0	12.0	12.0	12.0	12.0	12.0
Total Split (%)	20.0%	53.3%	26.7%	60.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	7.0	27.0	11.0	31.0	7.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lead	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	25.7	12.3	31.0	7.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	7.0	25.0	13.0	31.0	7.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Max	Coord	Hold	Coord	Max	Max	Max	Max	Max
50th %ile Green (s)	0.0	27.6	10.4	43.0	7.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
30th %ile Green (s)	0.0	29.3	8.7	43.0	7.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	386	6	144	765	3	7	38	155	1	40	48
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1850	1583	0	1725	0
Flt Permitted	0.950			0.950				0.957			0.995	
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1783	1583	0	1718	0
Satd. Flow (RTOR)		2							163		51	
Lane Group Flow (vph)	36	412	0	152	808	0	0	47	163	0	94	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Total Split (s)	12.0	32.0		16.0	36.0		12.0	12.0	12.0	12.0	12.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Act Effct Green (s)	7.0	33.5		10.3	41.6			7.0	7.0		7.0	
Actuated g/C Ratio	0.12	0.56		0.17	0.69			0.12	0.12		0.12	
v/c Ratio	0.17	0.41		0.50	0.63			0.23	0.50		0.38	
Control Delay	24.7	4.1		28.0	12.4			19.8	9.9		18.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	24.7	4.1		28.0	12.4			19.8	9.9		18.7	
LOS	C	A		C	B			B	A		B	
Approach Delay		5.8			14.8			12.1			18.7	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)	14	20		50	110			18	0		14	
Queue Length 95th (ft)	m34	37		96	#445			27	13		52	
Internal Link Dist (ft)		950			1245			840			401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	208	1030		343	1290			208	328		245	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.17	0.40		0.44	0.63			0.23	0.50		0.38	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 12.3

Intersection LOS: B

Intersection Capacity Utilization 65.4%

ICU Level of Service C

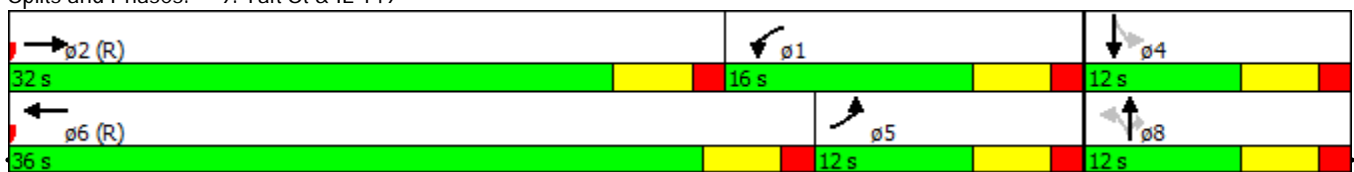
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149























10/31/2014
KDP

Synchro 8 Report
Timing Plan: Alt 4-Dual lefts

























HCM 2010 Signalized Intersection Summary
9: Taft St & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	34	386	6	144	765	3	7	38	155	1	40	48
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	188.1	181.1	190.0	186.3	186.3	190.0	190.0	186.3	186.3	190.0	186.3	190.0
Adj Flow Rate, veh/h	36	406	6	152	805	3	7	40	163	1	42	51
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	835	12	209	917	3	93	223	208	69	101	121
Arrive On Green	0.03	0.15	0.15	0.12	0.49	0.49	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1792	1780	26	1774	1855	7	116	1696	1583	6	770	921
Grp Volume(v), veh/h	36	0	412	152	0	808	47	0	163	94	0	0
Grp Sat Flow(s),veh/h/ln	1792	0	1806	1774	0	1862	1812	0	1583	1697	0	0
Q Serve(g_s), s	1.0	0.0	11.1	4.4	0.0	20.7	0.0	0.0	5.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	0.0	11.1	4.4	0.0	20.7	1.2	0.0	5.3	2.7	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.00	0.15		1.00	0.01		0.54
Lane Grp Cap(c), veh/h	166	0	848	209	0	920	316	0	208	291	0	0
V/C Ratio(X)	0.22	0.00	0.49	0.73	0.00	0.88	0.15	0.00	0.78	0.32	0.00	0.00
Avail Cap(c_a), veh/h	235	0	915	366	0	1083	316	0	208	291	0	0
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.9	0.0	16.6	22.7	0.0	12.0	20.6	0.0	22.4	21.3	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	1.8	4.8	0.0	11.6	0.2	0.0	17.5	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	0.0	9.9	4.4	0.0	19.3	1.1	0.0	6.0	2.3	0.0	0.0
LnGrp Delay(d),s/veh	24.5	0.0	18.5	27.5	0.0	23.7	20.8	0.0	39.9	21.9	0.0	0.0
LnGrp LOS	C		B	C		C	C		D	C		
Approach Vol, veh/h		448			960			210			94	
Approach Delay, s/veh		19.0			24.3			35.6			21.9	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.0	30.0		12.0	16.7	31.3		12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	27.0		7.0	7.0	31.0		7.0				
Max Q Clear Time (g_c+I1), s	6.4	13.1		4.7	3.0	22.7		7.3				
Green Ext Time (p_c), s	0.2	2.1		0.3	0.2	3.7		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	112	458	49	91	607	77	62	213	90	104	175	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		200	180		180	115		0	125		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
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
Fr _t			0.850			0.850		0.955			0.914	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1845	1568	1787	1881	1615	1770	3280	0	1752	3217	0
Fl _t Permitted	0.160			0.301			0.377			0.526		
Satd. Flow (perm)	264	1845	1568	566	1881	1615	702	3280	0	970	3217	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			154		78			249	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		365			1195			2431			1384	
Travel Time (s)		8.3			27.2			47.4			27.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	15%	3%	3%	1%	1%	0%	2%	6%	3%	3%	2%	3%
Adj. Flow (vph)	118	482	52	96	639	81	65	224	95	109	184	249
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	482	52	96	639	81	65	319	0	109	433	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
AM Peak Hour

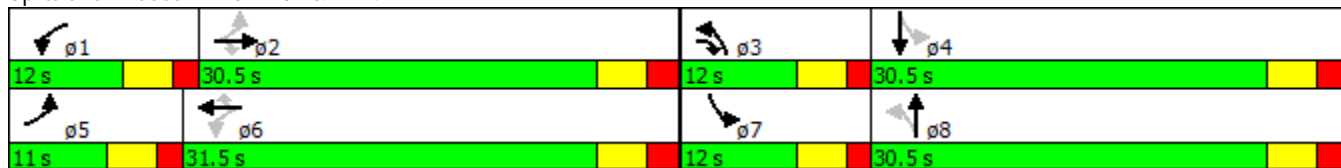


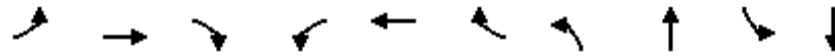
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	3	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	30.3	12.0	12.0	30.3	30.3	12.0	30.5		12.0	30.5	
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5		12.0	30.5	
Total Split (%)	12.9%	35.9%	14.1%	14.1%	37.1%	37.1%	14.1%	35.9%		14.1%	35.9%	
Maximum Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	25.0		7.3	25.0	
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3		1.5	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	None	None	Min	Min	None	None		None	None	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		18.0			18.0	18.0		18.0			17.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	31.8	26.7	39.1	33.0	27.3	27.3	16.6	10.6		17.0	10.7	
Actuated g/C Ratio	0.48	0.40	0.59	0.50	0.41	0.41	0.25	0.16		0.26	0.16	
v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.23	0.54		0.33	0.59	
Control Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
LOS	B	C	A	B	C	A	B	C		B	B	
Approach Delay		21.5			26.9			22.9			16.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	24	178	0	19	258	0	19	51		33	38	
Queue Length 95th (ft)	56	#344	6	45	#499	4	44	88		66	79	
Internal Link Dist (ft)		285			1115			2351			1304	
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	254	744	981	422	776	757	301	1339		339	1418	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.22	0.24		0.32	0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	66.1
Natural Cycle:	85
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	22.4
Intersection LOS:	C
Intersection Capacity Utilization:	71.7%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 10: IL 37 & IL 149





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Protected Phases	5	2	3	1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.3	12.0	12.0	30.3	30.3	12.0	30.5	12.0	30.5
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5	12.0	30.5
Total Split (%)	12.9%	35.9%	14.1%	14.1%	37.1%	37.1%	14.1%	35.9%	14.1%	35.9%
Maximum Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	25.0	7.3	25.0
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3	1.5	2.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	Min	None	None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0		7.0
Flash Dont Walk (s)		18.0			18.0	18.0		18.0		17.0
Pedestrian Calls (#/hr)		0			0	0		0		0
90th %ile Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	15.0	7.3	15.0
90th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Hold	Max	Gap
70th %ile Green (s)	6.2	25.2	7.3	7.2	26.2	26.2	7.3	12.0	7.3	12.0
70th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap	Max	Hold
50th %ile Green (s)	6.2	25.2	7.2	7.2	26.2	26.2	7.2	10.5	7.3	10.6
50th %ile Term Code	Max	Max	Gap	Max	Max	Max	Gap	Gap	Max	Hold
30th %ile Green (s)	6.2	25.8	6.5	6.6	26.2	26.2	6.5	9.2	7.3	10.0
30th %ile Term Code	Max	Hold	Gap	Gap	Max	Max	Gap	Gap	Max	Hold
10th %ile Green (s)	0.0	26.2	0.0	0.0	26.2	26.2	0.0	6.6	0.0	6.6
10th %ile Term Code	Skip	Hold	Skip	Skip	Max	Max	Skip	Gap	Skip	Hold

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 66.1
 Control Type: Actuated-Uncoordinated
 90th %ile Actuated Cycle: 75
 70th %ile Actuated Cycle: 72
 50th %ile Actuated Cycle: 70.5
 30th %ile Actuated Cycle: 69.2
 10th %ile Actuated Cycle: 43.6

Queues
10: IL 37 & IL 149

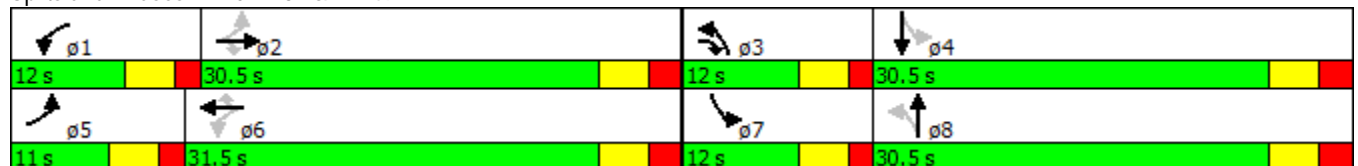
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	112	458	49	91	607	77	62	213	90	104	175	237
Satd. Flow (prot)	1570	1845	1568	1787	1881	1615	1770	3280	0	1752	3217	0
Flt Permitted	0.160			0.301			0.377			0.526		
Satd. Flow (perm)	264	1845	1568	566	1881	1615	702	3280	0	970	3217	0
Satd. Flow (RTOR)			94			154		78			249	
Lane Group Flow (vph)	118	482	52	96	639	81	65	319	0	109	433	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Total Split (s)	11.0	30.5	12.0	12.0	31.5	31.5	12.0	30.5		12.0	30.5	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Act Effct Green (s)	31.8	26.7	39.1	33.0	27.3	27.3	16.6	10.6		17.0	10.7	
Actuated g/C Ratio	0.48	0.40	0.59	0.50	0.41	0.41	0.25	0.16		0.26	0.16	
v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.23	0.54		0.33	0.59	
Control Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.0	25.0	0.9	10.5	32.7	0.6	18.2	23.9		19.6	15.4	
LOS	B	C	A	B	C	A	B	C		B	B	
Approach Delay		21.5			26.9			22.9			16.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	24	178	0	19	258	0	19	51		33	38	
Queue Length 95th (ft)	56	#344	6	45	#499	4	44	88		66	79	
Internal Link Dist (ft)		285			1115			2351			1304	
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	254	744	981	422	776	757	301	1339		339	1418	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.46	0.65	0.05	0.23	0.82	0.11	0.22	0.24		0.32	0.31	

Intersection Summary

























Cycle Length: 85
 Actuated Cycle Length: 66.1
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 22.4
 Intersection LOS: C
 Intersection Capacity Utilization 71.7%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: IL 37 & IL 149



HCM 2010 Signalized Intersection Summary
10: IL 37 & IL 149

2032 Design Year - Build
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	112	458	49	91	607	77	62	213	90	104	175	237
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1652	1845	1845	1881	1881	1900	1863	1808	1900	1845	1852	1900
Adj Flow Rate, veh/h	118	482	52	96	639	81	65	224	95	109	184	249
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	15	3	3	1	1	0	2	6	6	3	2	2
Cap, veh/h	233	684	662	341	684	588	272	500	206	353	399	357
Arrive On Green	0.07	0.37	0.37	0.06	0.36	0.36	0.05	0.21	0.21	0.07	0.23	0.23
Sat Flow, veh/h	1573	1845	1568	1792	1881	1615	1774	2376	976	1757	1760	1574
Grp Volume(v), veh/h	118	482	52	96	639	81	65	160	159	109	184	249
Grp Sat Flow(s),veh/h/ln	1573	1845	1568	1792	1881	1615	1774	1717	1635	1757	1760	1574
Q Serve(g_s), s	3.2	15.6	1.4	2.3	22.9	2.3	2.0	5.7	5.9	3.3	6.3	10.1
Cycle Q Clear(g_c), s	3.2	15.6	1.4	2.3	22.9	2.3	2.0	5.7	5.9	3.3	6.3	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	233	684	662	341	684	588	272	362	344	353	399	357
V/C Ratio(X)	0.51	0.70	0.08	0.28	0.93	0.14	0.24	0.44	0.46	0.31	0.46	0.70
Avail Cap(c_a), veh/h	266	684	662	417	705	605	366	614	585	418	629	563
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	18.7	12.1	14.1	21.4	14.9	20.4	24.0	24.1	19.7	23.3	24.8
Incr Delay (d2), s/veh	1.7	3.3	0.1	0.4	19.2	0.1	0.4	0.8	1.0	0.5	0.8	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.5	8.5	0.6	1.1	15.4	1.1	1.0	2.8	2.8	1.7	3.2	4.7
LnGrp Delay(d),s/veh	18.3	22.0	12.1	14.5	40.6	15.0	20.8	24.9	25.1	20.2	24.2	27.3
LnGrp LOS	B	C	B	B	D	B	C	C	C	C	C	C
Approach Vol, veh/h		652			816			384			542	
Approach Delay, s/veh		20.5			35.0			24.3			24.8	
Approach LOS		C			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	31.2	8.3	21.4	9.5	30.7	9.4	20.2				
Change Period (Y+Rc), s	* 4.8	* 5.3	* 4.7	5.5	* 4.8	* 5.3	* 4.7	5.5				
Max Green Setting (Gmax), s	* 7.2	* 25	* 7.3	25.0	* 6.2	* 26	* 7.3	25.0				
Max Q Clear Time (g_c+I1), s	4.3	17.6	4.0	12.1	5.2	24.9	5.3	7.9				
Green Ext Time (p_c), s	0.0	4.5	0.0	3.7	0.0	0.6	0.0	4.2				
Intersection Summary												
HCM 2010 Ctrl Delay			27.0									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 11: Winery Rd/New Winery Rd & Burlington

2032 Design Year - Build
 AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖		↗		↕			↕	
Volume (vph)	0	144	4	1	0	139	0	23	1	7	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	1		1	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.997				0.850		0.995				
Flt Protected				0.950							0.988	
Satd. Flow (prot)	0	1805	0	1770	0	1509	0	1853	0	0	1763	0
Flt Permitted				0.950							0.988	
Satd. Flow (perm)	0	1805	0	1770	0	1509	0	1853	0	0	1763	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		931			1144			1777			332	
Travel Time (s)		21.2			26.0			34.6			6.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	7%	2%	2%	2%	2%	8%	2%
Adj. Flow (vph)	0	152	4	1	0	146	0	24	1	7	21	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	1	0	146	0	25	0	0	28	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
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	29.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	144	4	1	0	139	0	23	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	5	2	2	2	7	2	2	2
Mvmt Flow	0	152	4	1	0	146	0	24	1

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	0	0	0	156	0	0	165	156	154
Stage 1	-	-	-	-	-	-	154	154	-
Stage 2	-	-	-	-	-	-	11	2	-
Critical Hdwy	-	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	-	1424	-	-	800	736	892
Stage 1	-	-	-	-	-	-	848	770	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	1424	-	-	-	735	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	735	-
Stage 1	-	-	-	-	-	-	848	770	-
Stage 2	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	-
HCM LOS	-	-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-	1424	-	-	-
HCM Lane V/C Ratio	-	-	-	-	0.001	-	-	-
HCM Control Delay (s)	-	0	-	-	7.5	-	-	-
HCM Lane LOS	-	A	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	7	20	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	8	2
Mvmt Flow	7	21	0

Major/Minor **Minor2**

Conflicting Flow All	166	158	0
Stage 1	0	2	-
Stage 2	166	156	-
Critical Hdwy	7.12	6.58	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	6.12	5.58	-
Follow-up Hdwy	3.518	4.072	-
Pot Cap-1 Maneuver	798	723	-
Stage 1	-	-	-
Stage 2	836	757	-
Platoon blocked, %			
Mov Cap-1 Maneuver	777	722	-
Mov Cap-2 Maneuver	777	722	-
Stage 1	-	-	-
Stage 2	809	757	-

Approach **SB**






















HCM Control Delay, s

HCM LOS -

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
12: Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	159	6	59	184	50	6	1	54	29	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		115	115		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.995			0.968				0.850		0.925	
Flt Protected	0.950			0.950				0.959		0.950		
Satd. Flow (prot)	1770	1819	0	1787	1746	0	0	1786	1583	1770	1723	0
Flt Permitted	0.950			0.950				0.959		0.950		
Satd. Flow (perm)	1770	1819	0	1787	1746	0	0	1786	1583	1770	1723	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1144			919			730			505	
Travel Time (s)		26.0			20.9			14.2			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	1%	6%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	14	167	6	62	194	53	6	1	57	31	1	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	173	0	62	247	0	0	7	57	31	2	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	34.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	13	159	6	59	184	50	6	1	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	4	2	1	6	3	2	2	2
Mvmt Flow	14	167	6	62	194	53	6	1	57

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	246	0	0	174	0	0	543	569	171
Stage 1	-	-	-	-	-	-	198	198	-
Stage 2	-	-	-	-	-	-	345	371	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1320	-	-	1409	-	-	451	432	873
Stage 1	-	-	-	-	-	-	804	737	-
Stage 2	-	-	-	-	-	-	671	620	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1320	-	-	1409	-	-	431	409	873
Mov Cap-2 Maneuver	-	-	-	-	-	-	431	409	-
Stage 1	-	-	-	-	-	-	795	729	-
Stage 2	-	-	-	-	-	-	640	593	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	1.5	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	428	873	1320	-	-	1409	-	-	403	557
HCM Lane V/C Ratio	0.017	0.065	0.01	-	-	0.044	-	-	0.076	0.004
HCM Control Delay (s)	13.6	9.4	7.8	-	-	7.7	-	-	14.7	11.5
HCM Lane LOS	B	A	A	-	-	A	-	-	B	B
HCM 95th %tile Q(veh)	0.1	0.2	0	-	-	0.1	-	-	0.2	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	29	1	1
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	31	1	1

Major/Minor	Minor2		
Conflicting Flow All	542	545	220
Stage 1	344	344	-
Stage 2	198	201	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	451	446	820
Stage 1	671	637	-
Stage 2	804	735	-
Platoon blocked, %			
Mov Cap-1 Maneuver	403	422	820
Mov Cap-2 Maneuver	403	422	-
Stage 1	664	609	-
Stage 2	743	727	-

Approach SB

HCM Control Delay, s	14.5
HCM LOS	B

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	150	85	474	207	50	78	1	446	58	1	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	280		115	115		0	115		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.985	
Flt Protected	0.950			0.950				0.953			0.958	
Satd. Flow (prot)	1770	1827	1583	3213	1810	1599	0	1775	1509	0	1775	0
Flt Permitted	0.950			0.950				0.677			0.695	
Satd. Flow (perm)	1770	1827	1583	3213	1810	1599	0	1261	1509	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			127			469			8
Link Speed (mph)		30			30			30				35
Link Distance (ft)		919			705			567				629
Travel Time (s)		20.9			16.0			12.9				12.3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	9%	5%	1%	2%	1%	7%	1%	0%	1%
Adj. Flow (vph)	7	158	89	499	218	53	82	1	469	61	1	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	158	89	499	218	53	0	83	469	0	70	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)		24			24			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
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	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	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
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	
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	
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	
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	
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	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8		Free	4		

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour

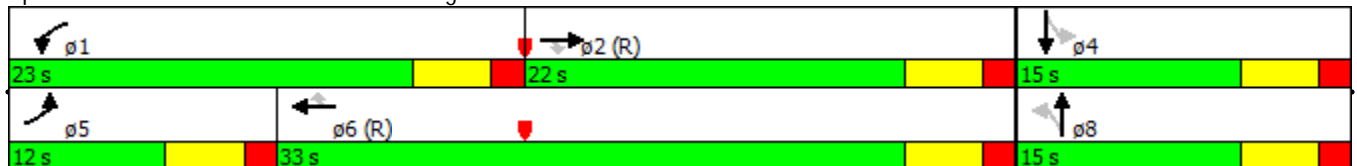


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0	
Total Split (s)	12.0	22.0	22.0	23.0	33.0	33.0	15.0	15.0		15.0	15.0	
Total Split (%)	20.0%	36.7%	36.7%	38.3%	55.0%	55.0%	25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	7.0	17.0	17.0	18.0	28.0	28.0	10.0	10.0		10.0	10.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None	
Act Effect Green (s)	7.0	23.6	23.6	14.3	41.6	41.6		9.4	60.0		9.4	
Actuated g/C Ratio	0.12	0.39	0.39	0.24	0.69	0.69		0.16	1.00		0.16	
v/c Ratio	0.03	0.22	0.12	0.65	0.17	0.05		0.42	0.31		0.33	
Control Delay	24.0	16.8	0.3	16.7	6.8	1.8		28.7	0.5		24.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	24.0	16.8	0.3	16.7	6.8	1.8		28.7	0.5		24.1	
LOS	C	B	A	B	A	A		C	A		C	
Approach Delay		11.2			12.8			4.8			24.1	
Approach LOS		B			B			A			C	
Queue Length 50th (ft)	2	39	0	60	27	0		28	0		20	
Queue Length 95th (ft)	12	93	0	69	120	7		60	0		49	
Internal Link Dist (ft)		839			625			487			549	
Turn Bay Length (ft)	150		150	280		115						
Base Capacity (vph)	206	735	767	963	1269	1159		225	1509		236	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.03	0.21	0.12	0.52	0.17	0.05		0.37	0.31		0.30	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.4
 Intersection LOS: B
 Intersection Capacity Utilization 44.8%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 13: Russell Rd & Burlington



Phasings
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2		1	6			8			4
Permitted Phases			2			6	8		Free	4	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0
Total Split (s)	12.0	22.0	22.0	23.0	33.0	33.0	15.0	15.0		15.0	15.0
Total Split (%)	20.0%	36.7%	36.7%	38.3%	55.0%	55.0%	25.0%	25.0%		25.0%	25.0%
Maximum Green (s)	7.0	17.0	17.0	18.0	28.0	28.0	10.0	10.0		10.0	10.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None
Walk Time (s)											
Flash Dont Walk (s)											
Pedestrian Calls (#/hr)											
90th %ile Green (s)	7.0	14.4	14.4	18.0	25.4	25.4	12.6	12.6		12.6	12.6
90th %ile Term Code	Max	Coord	Coord	Max	Coord	Coord	Max	Max		Hold	Hold
70th %ile Green (s)	0.0	18.1	18.1	16.0	39.1	39.1	10.9	10.9		10.9	10.9
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
50th %ile Green (s)	0.0	21.4	21.4	14.4	40.8	40.8	9.2	9.2		9.2	9.2
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
30th %ile Green (s)	0.0	24.7	24.7	12.8	42.5	42.5	7.5	7.5		7.5	7.5
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
10th %ile Green (s)	0.0	39.6	39.6	10.4	55.0	55.0	0.0	0.0		0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
13: Russell Rd & Burlington

2032 Design Year - Build
AM Peak Hour

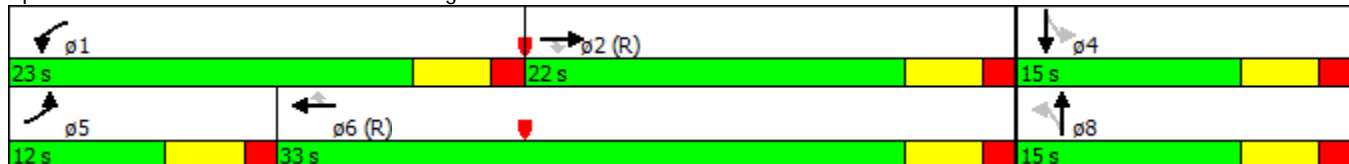


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖↗	↑	↗		↑	↗		↕	
Volume (vph)	7	150	85	474	207	50	78	1	446	58	1	8
Satd. Flow (prot)	1770	1827	1583	3213	1810	1599	0	1775	1509	0	1775	0
Flt Permitted	0.950			0.950				0.677			0.695	
Satd. Flow (perm)	1770	1827	1583	3213	1810	1599	0	1261	1509	0	1288	0
Satd. Flow (RTOR)			218			127			469		8	
Lane Group Flow (vph)	7	158	89	499	218	53	0	83	469	0	70	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8		Free	4		
Total Split (s)	12.0	22.0	22.0	23.0	33.0	33.0	15.0	15.0		15.0	15.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Act Effect Green (s)	7.0	23.6	23.6	14.3	41.6	41.6		9.4	60.0		9.4	
Actuated g/C Ratio	0.12	0.39	0.39	0.24	0.69	0.69		0.16	1.00		0.16	
v/c Ratio	0.03	0.22	0.12	0.65	0.17	0.05		0.42	0.31		0.33	
Control Delay	24.0	16.8	0.3	16.7	6.8	1.8		28.7	0.5		24.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	24.0	16.8	0.3	16.7	6.8	1.8		28.7	0.5		24.1	
LOS	C	B	A	B	A	A		C	A		C	
Approach Delay		11.2			12.8			4.8			24.1	
Approach LOS		B			B			A			C	
Queue Length 50th (ft)	2	39	0	60	27	0		28	0		20	
Queue Length 95th (ft)	12	93	0	69	120	7		60	0		49	
Internal Link Dist (ft)		839			625			487			549	
Turn Bay Length (ft)	150		150	280		115						
Base Capacity (vph)	206	735	767	963	1269	1159		225	1509		236	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.03	0.21	0.12	0.52	0.17	0.05		0.37	0.31		0.30	

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 8 (13%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 10.4
 Intersection LOS: B
 Intersection Capacity Utilization 44.8%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 13: Russell Rd & Burlington
























HCM 2010 Signalized Intersection Summary
 13: Russell Rd & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	150	85	474	207	50	78	1	446	58	1	8
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1827	1863	1743	1810	1881	1900	1863	1776	1900	1881	1900
Adj Flow Rate, veh/h	7	158	0	499	218	0	82	1	0	61	1	8
Adj No. of Lanes	1	1	1	2	1	1	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	4	2	9	5	1	1	1	7	0	0	0
Cap, veh/h	23	819	709	626	1139	1007	281	3	162	254	10	20
Arrive On Green	0.01	0.45	0.00	0.32	1.00	0.00	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1774	1827	1583	3221	1810	1599	1503	25	1509	1322	96	183
Grp Volume(v), veh/h	7	158	0	499	218	0	83	0	0	70	0	0
Grp Sat Flow(s),veh/h/ln	1774	1827	1583	1610	1810	1599	1529	0	1509	1601	0	0
Q Serve(g_s), s	0.2	3.1	0.0	8.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	3.1	0.0	8.5	0.0	0.0	2.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.99		1.00	0.87		0.11
Lane Grp Cap(c), veh/h	23	819	709	626	1139	1007	284	0	162	285	0	0
V/C Ratio(X)	0.31	0.19	0.00	0.80	0.19	0.00	0.29	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	207	819	709	966	1139	1007	367	0	252	370	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.96	0.96	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	29.3	10.0	0.0	19.2	0.0	0.0	25.1	0.0	0.0	24.9	0.0	0.0
Incr Delay (d2), s/veh	7.4	0.5	0.0	2.5	0.4	0.0	0.6	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.2	1.7	0.0	3.9	0.1	0.0	1.3	0.0	0.0	1.1	0.0	0.0
LnGrp Delay(d),s/veh	36.7	10.5	0.0	21.7	0.4	0.0	25.6	0.0	0.0	25.3	0.0	0.0
LnGrp LOS	D	B		C	A		C			C		
Approach Vol, veh/h		165			717			83			70	
Approach Delay, s/veh		11.6			15.2			25.6			25.3	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.7	31.9		11.5	5.8	42.8		11.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	18.0	17.0		10.0	7.0	28.0		10.0				
Max Q Clear Time (g_c+I1), s	10.5	5.1		4.2	2.2	2.0		4.8				
Green Ext Time (p_c), s	1.2	1.7		0.3	0.0	2.2		0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			16.2									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
 14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				 	 							
Volume (vph)	0	413	241	371	610	0	0	0	0	166	336	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		0	0		0	200		200
Storage Lanes	0		1	2		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected				0.950						0.950		
Satd. Flow (prot)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Fl _t Permitted				0.950						0.950		
Satd. Flow (perm)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			134									127
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		705			764			467			1000	
Travel Time (s)		16.0			17.4			7.1			15.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	10%	2%	5%	2%	2%	2%	2%	2%	3%	11%
Adj. Flow (vph)	0	435	254	391	642	0	0	0	0	175	354	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	435	254	391	642	0	0	0	0	175	354	127
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)		24			24			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
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		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
Detector 1 Queue (s)		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
Detector 2 Position(ft)		94			94							94
Detector 2 Size(ft)		6			6							6
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4

Lanes, Volumes, Timings
14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

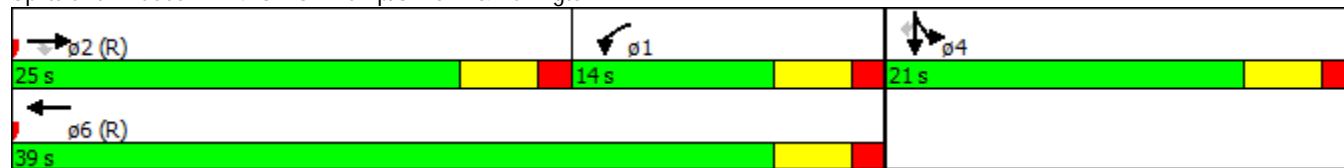


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0
Total Split (s)		25.0	25.0	14.0	39.0					21.0	21.0	21.0
Total Split (%)		41.7%	41.7%	23.3%	65.0%					35.0%	35.0%	35.0%
Maximum Green (s)		20.0	20.0	9.0	34.0					16.0	16.0	16.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		20.9	20.9	9.4	35.3					14.7	14.7	14.7
Actuated g/C Ratio		0.35	0.35	0.16	0.59					0.24	0.24	0.24
v/c Ratio		0.69	0.42	0.73	0.32					0.40	0.78	0.28
Control Delay		22.8	8.5	25.9	2.8					9.2	19.1	2.3
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		22.8	8.5	25.9	2.8					9.2	19.1	2.3
LOS		C	A	C	A					A	B	A
Approach Delay		17.5			11.6						13.2	
Approach LOS		B			B						B	
Queue Length 50th (ft)		141	19	69	2					28	73	3
Queue Length 95th (ft)		#186	59	#123	10					m33	m91	m6
Internal Link Dist (ft)		625			684			387			920	
Turn Bay Length (ft)				200						200		200
Base Capacity (vph)		633	600	536	2021					472	492	481
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.69	0.42	0.73	0.32					0.37	0.72	0.26

Intersection Summary

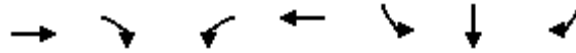
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 14 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 13.7
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB On-Ramp/SB C-D & Burlington



Phasings
14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	25.0	25.0	14.0	39.0	21.0	21.0	21.0
Total Split (%)	41.7%	41.7%	23.3%	65.0%	35.0%	35.0%	35.0%
Maximum Green (s)	20.0	20.0	9.0	34.0	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	20.0	20.0	9.0	34.0	16.0	16.0	16.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	20.0	20.0	9.0	34.0	16.0	16.0	16.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	20.0	20.0	9.0	34.0	16.0	16.0	16.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	19.6	19.6	10.9	35.5	14.5	14.5	14.5
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
10th %ile Green (s)	24.9	24.9	9.0	38.9	11.1	11.1	11.1
10th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 14 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
14: SB On-Ramp/SB C-D & Burlington

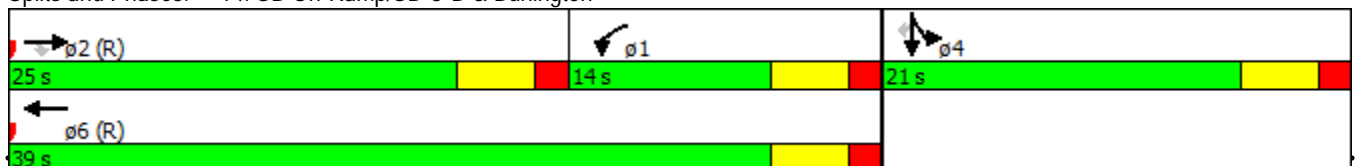
2032 Design Year - Build
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↘↗	↗↗					↘	↑	↗
Volume (vph)	0	413	241	371	610	0	0	0	0	166	336	121
Satd. Flow (prot)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Satd. Flow (RTOR)			134									127
Lane Group Flow (vph)	0	435	254	391	642	0	0	0	0	175	354	127
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Total Split (s)		25.0	25.0	14.0	39.0					21.0	21.0	21.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Act Effect Green (s)		20.9	20.9	9.4	35.3					14.7	14.7	14.7
Actuated g/C Ratio		0.35	0.35	0.16	0.59					0.24	0.24	0.24
v/c Ratio		0.69	0.42	0.73	0.32					0.40	0.78	0.28
Control Delay		22.8	8.5	25.9	2.8					9.2	19.1	2.3
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		22.8	8.5	25.9	2.8					9.2	19.1	2.3
LOS		C	A	C	A					A	B	A
Approach Delay		17.5			11.6						13.2	
Approach LOS		B			B						B	
Queue Length 50th (ft)		141	19	69	2					28	73	3
Queue Length 95th (ft)		#186	59	#123	10					m33	m91	m6
Internal Link Dist (ft)		625			684			387			920	
Turn Bay Length (ft)				200						200		200
Base Capacity (vph)		633	600	536	2021					472	492	481
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.69	0.42	0.73	0.32					0.37	0.72	0.26

Intersection Summary






















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 14 (23%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 13.7
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB On-Ramp/SB C-D & Burlington





















HCM 2010 Signalized Intersection Summary
 14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				 	 							
Volume (veh/h)	0	413	241	371	610	0	0	0	0	166	336	121
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	172.7	186.3	181.0	0.0				186.3	184.5	171.2
Adj Flow Rate, veh/h	0	435	0	391	642	0				175	354	0
Adj No. of Lanes	0	1	1	2	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	10	2	5	0				2	3	11
Cap, veh/h	0	525	426	566	1916	0				422	439	346
Arrive On Green	0.00	0.39	0.00	0.33	1.00	0.00				0.24	0.24	0.00
Sat Flow, veh/h	0	1810	1468	3442	3529	0				1774	1845	1455
Grp Volume(v), veh/h	0	435	0	391	642	0				175	354	0
Grp Sat Flow(s),veh/h/ln	0	1810	1468	1721	1719	0				1774	1845	1455
Q Serve(g_s), s	0.0	10.6	0.0	4.8	0.0	0.0				4.1	8.8	0.0
Cycle Q Clear(g_c), s	0.0	10.6	0.0	4.8	0.0	0.0				4.1	8.8	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	525	426	566	1916	0				422	439	346
V/C Ratio(X)	0.00	0.83	0.00	0.69	0.34	0.00				0.41	0.81	0.00
Avail Cap(c_a), veh/h	0	741	602	635	2395	0				581	605	477
HCM Platoon Ratio	1.00	1.33	1.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.00	0.84	0.84	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	13.9	0.0	15.3	0.0	0.0				15.7	17.5	0.0
Incr Delay (d2), s/veh	0.0	13.6	0.0	2.3	0.4	0.0				0.7	5.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	11.4	0.0	4.4	0.2	0.0				3.7	8.8	0.0
LnGrp Delay(d),s/veh	0.0	27.5	0.0	17.6	0.4	0.0				16.4	23.2	0.0
LnGrp LOS		C		B	A					B	C	
Approach Vol, veh/h		435			1033						529	
Approach Delay, s/veh		27.5			6.9						20.9	
Approach LOS		C			A						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	24.2	19.2		16.6		43.4						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	9.0	20.0		16.0		34.0						
Max Q Clear Time (g_c+I1), s	6.8	12.6		10.8		2.0						
Green Ext Time (p_c), s	1.2	1.6		0.8		6.7						
Intersection Summary												
HCM 2010 Ctrl Delay			15.1									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	474	0	0	708	129	273	32	375	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	150		150	0		0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t					0.977				0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1641	1845	0	0	3458	0	3183	1863	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1641	1845	0	0	3458	0	3183	1863	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					39				360			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		764			772			942			1563	
Travel Time (s)		17.4			17.5			14.3			23.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	3%	2%	2%	2%	2%	10%	2%	1%	2%	2%	2%
Adj. Flow (vph)	111	499	0	0	745	136	287	34	395	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	499	0	0	881	0	287	34	395	0	0	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)		24			24			24			24	
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
Number of Detectors	1	2			2		1	2	1			
Detector Template	Left	Thru			Thru		Left	Thru	Right			
Leading Detector (ft)	20	100			100		20	100	20			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		20	6	20			
Detector 1 Type	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			
Detector 1 Queue (s)	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			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	Prot	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases												8

Lanes, Volumes, Timings
 15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

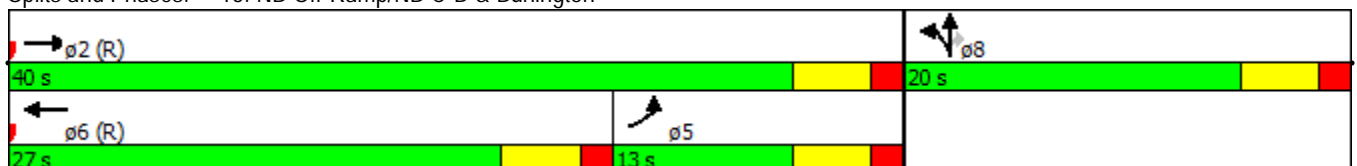


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0		7.0	7.0	7.0			
Minimum Split (s)	12.0	15.0			15.0		12.0	12.0	12.0			
Total Split (s)	13.0	40.0			27.0		20.0	20.0	20.0			
Total Split (%)	21.7%	66.7%			45.0%		33.3%	33.3%	33.3%			
Maximum Green (s)	8.0	35.0			22.0		15.0	15.0	15.0			
Yellow Time (s)	3.5	3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5		1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Lead/Lag	Lag				Lead							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min		None	None	None			
Act Effect Green (s)	8.0	38.6			27.9		11.4	11.4	11.4			
Actuated g/C Ratio	0.13	0.64			0.46		0.19	0.19	0.19			
v/c Ratio	0.51	0.42			0.54		0.47	0.10	0.66			
Control Delay	21.4	4.0			8.0		23.7	19.1	9.7			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	21.4	4.0			8.0		23.7	19.1	9.7			
LOS	C	A			A		C	B	A			
Approach Delay		7.2			8.0			15.7				
Approach LOS		A			A			B				
Queue Length 50th (ft)	18	12			91		47	10	11			
Queue Length 95th (ft)	m48	56			178		73	28	72			
Internal Link Dist (ft)		684			692			862			1483	
Turn Bay Length (ft)	200						150		150			
Base Capacity (vph)	226	1186			1631		795	465	669			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.49	0.42			0.54		0.36	0.07	0.59			

Intersection Summary

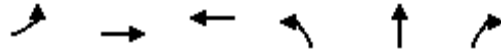
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 10.3
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB Off-Ramp/NB C-D & Burlington



Phasings
15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
AM Peak Hour





















Lane Group	EBL	EBT	WBT	NBL	NBT	NBR
Protected Phases	5	2	6	8	8	
Permitted Phases						8
Minimum Initial (s)	7.0	10.0	10.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	12.0	12.0
Total Split (s)	13.0	40.0	27.0	20.0	20.0	20.0
Total Split (%)	21.7%	66.7%	45.0%	33.3%	33.3%	33.3%
Maximum Green (s)	8.0	35.0	22.0	15.0	15.0	15.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	None	None
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
90th %ile Green (s)	8.0	35.0	22.0	15.0	15.0	15.0
90th %ile Term Code	Max	Coord	Coord	Max	Max	Max
70th %ile Green (s)	8.0	36.4	23.4	13.6	13.6	13.6
70th %ile Term Code	Max	Coord	Coord	Gap	Gap	Gap
50th %ile Green (s)	9.4	38.5	24.1	11.5	11.5	11.5
50th %ile Term Code	Gap	Coord	Coord	Gap	Gap	Gap
30th %ile Green (s)	7.8	40.6	27.8	9.4	9.4	9.4
30th %ile Term Code	Gap	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	42.4	42.4	7.6	7.6	7.6
10th %ile Term Code	Skip	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
15: NB Off-Ramp/NB C-D & Burlington

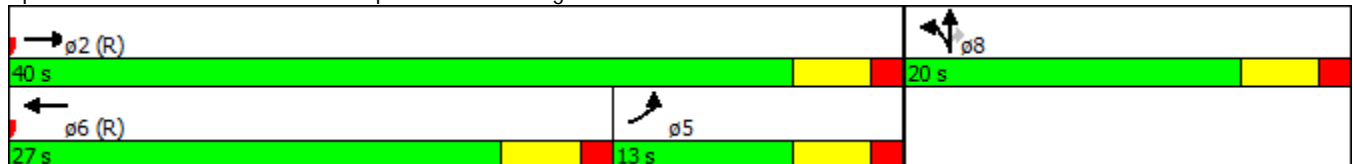
2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	474	0	0	708	129	273	32	375	0	0	0
Satd. Flow (prot)	1641	1845	0	0	3458	0	3183	1863	1599	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1641	1845	0	0	3458	0	3183	1863	1599	0	0	0
Satd. Flow (RTOR)	39						360					
Lane Group Flow (vph)	111	499	0	0	881	0	287	34	395	0	0	0
Turn Type	Prot	NA			NA		Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases										8		
Total Split (s)	13.0	40.0			27.0		20.0	20.0	20.0			
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Act Effct Green (s)	8.0	38.6			27.9		11.4	11.4	11.4			
Actuated g/C Ratio	0.13	0.64			0.46		0.19	0.19	0.19			
v/c Ratio	0.51	0.42			0.54		0.47	0.10	0.66			
Control Delay	21.4	4.0			8.0		23.7	19.1	9.7			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	21.4	4.0			8.0		23.7	19.1	9.7			
LOS	C	A			A		C	B	A			
Approach Delay		7.2			8.0			15.7				
Approach LOS		A			A			B				
Queue Length 50th (ft)	18	12			91		47	10	11			
Queue Length 95th (ft)	m48	56			178		73	28	72			
Internal Link Dist (ft)		684			692			862			1483	
Turn Bay Length (ft)	200						150		150			
Base Capacity (vph)	226	1186			1631		795	465	669			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.49	0.42			0.54		0.36	0.07	0.59			

Intersection Summary



















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 11 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 10.3
 Intersection LOS: B
 Intersection Capacity Utilization 62.5%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB Off-Ramp/NB C-D & Burlington



HCM 2010 Signalized Intersection Summary
 15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	474	0	0	708	129	273	32	375	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	172.7	184.5	0.0	0.0	186.3	190.0	172.7	186.3	188.1			
Adj Flow Rate, veh/h	111	499	0	0	745	0	287	34	0			
Adj No. of Lanes	1	1	0	0	2	0	2	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	10	3	0	0	2	2	10	2	1			
Cap, veh/h	201	1089	0	0	1226	0	530	309	265			
Arrive On Green	0.24	1.00	0.00	0.00	0.11	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	1645	1845	0	0	3725	0	3191	1863	1599			
Grp Volume(v), veh/h	111	499	0	0	745	0	287	34	0			
Grp Sat Flow(s),veh/h/ln	1645	1845	0	0	1770	0	1596	1863	1599			
Q Serve(g_s), s	2.4	0.0	0.0	0.0	8.2	0.0	3.4	0.6	0.0			
Cycle Q Clear(g_c), s	2.4	0.0	0.0	0.0	8.2	0.0	3.4	0.6	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	201	1089	0	0	1226	0	530	309	265			
V/C Ratio(X)	0.55	0.46	0.00	0.00	0.61	0.00	0.54	0.11	0.00			
Avail Cap(c_a), veh/h	320	1572	0	0	1895	0	1165	680	584			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00			
Upstream Filter(I)	0.76	0.76	0.00	0.00	0.76	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	14.5	0.0	0.0	0.0	15.5	0.0	15.7	14.6	0.0			
Incr Delay (d2), s/veh	1.8	1.1	0.0	0.0	1.7	0.0	0.9	0.2	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	2.1	0.6	0.0	0.0	7.3	0.0	2.8	0.6	0.0			
LnGrp Delay(d),s/veh	16.3	1.1	0.0	0.0	17.3	0.0	16.6	14.7	0.0			
LnGrp LOS	B	A			B		B	B				
Approach Vol, veh/h		610			745			321				
Approach Delay, s/veh		3.8			17.3			16.4				
Approach LOS		A			B			B				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		48.2			28.9	19.2		11.8				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		35.0			8.0	22.0		15.0				
Max Q Clear Time (g_c+I1), s		2.0			4.4	10.2		5.4				
Green Ext Time (p_c), s		3.9			1.2	4.0		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay				12.2								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	484	141	0	470	64	153	18	1	60	20	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	250		0	175		0	0		150
Storage Lanes	1		1	0		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
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
Flt			0.850		0.984			0.992				0.850
Flt Protected	0.950						0.950				0.964	
Satd. Flow (prot)	1770	1863	1583	0	1833	0	1770	1848	0	0	1796	1583
Flt Permitted	0.950						0.702				0.767	
Satd. Flow (perm)	1770	1863	1583	0	1833	0	1308	1848	0	0	1429	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			148		12			1				170
Link Speed (mph)		30			30			30				30
Link Distance (ft)		772			711			531				546
Travel Time (s)		17.5			16.2			12.1				12.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	236	509	148	0	495	67	161	19	1	63	21	225
Shared Lane Traffic (%)												
Lane Group Flow (vph)	236	509	148	0	562	0	161	20	0	0	84	225
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)		12			12			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
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		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
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
Detector 1 Queue (s)	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
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	NA	Perm		NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases			2	6			8		4			4
Detector Phase	5	2	2	6	6		8	8	4	4		5

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour

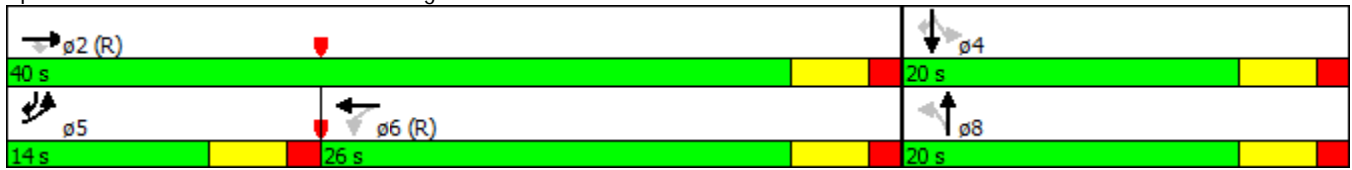


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	7.0
Minimum Split (s)	12.0	20.0	20.0	20.0	20.0		20.0	20.0		20.0	20.0	12.0
Total Split (s)	14.0	40.0	40.0	26.0	26.0		20.0	20.0		20.0	20.0	14.0
Total Split (%)	23.3%	66.7%	66.7%	43.3%	43.3%		33.3%	33.3%		33.3%	33.3%	23.3%
Maximum Green (s)	9.0	35.0	35.0	21.0	21.0		15.0	15.0		15.0	15.0	9.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag						Lead		
Lead-Lag Optimize?	Yes			Yes						Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	C-Min	C-Min		None	None		None	None	None
Act Effect Green (s)	10.7	41.5	41.5		24.9		12.5	12.5			12.5	25.1
Actuated g/C Ratio	0.18	0.69	0.69		0.42		0.21	0.21			0.21	0.42
v/c Ratio	0.75	0.39	0.13		0.73		0.59	0.05			0.28	0.30
Control Delay	42.5	5.3	1.1		17.8		30.5	17.4			20.5	3.4
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	42.5	5.3	1.1		17.8		30.5	17.4			20.5	3.4
LOS	D	A	A		B		C	B			C	A
Approach Delay		14.4				17.8		29.1				8.1
Approach LOS		B				B		C				A
Queue Length 50th (ft)	79	43	1		144		53	6			25	5
Queue Length 95th (ft)	#196	103	m6		#326		101	19			50	30
Internal Link Dist (ft)		692				631		451				466
Turn Bay Length (ft)	225						175					150
Base Capacity (vph)	314	1289	1141		766		327	462			357	761
Starvation Cap Reductn	0	0	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.75	0.39	0.13		0.73		0.49	0.04			0.24	0.30

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 40 (67%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.8 Intersection LOS: B
 Intersection Capacity Utilization 81.7% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Joiner St & Burlington



Phasings
16: Joiner St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2		6		8		4	5
Permitted Phases			2		8		4		4
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	12.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	12.0
Total Split (s)	14.0	40.0	40.0	26.0	20.0	20.0	20.0	20.0	14.0
Total Split (%)	23.3%	66.7%	66.7%	43.3%	33.3%	33.3%	33.3%	33.3%	23.3%
Maximum Green (s)	9.0	35.0	35.0	21.0	15.0	15.0	15.0	15.0	9.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead			Lag			Lead		
Lead-Lag Optimize?	Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	9.0	35.0	35.0	21.0	15.0	15.0	15.0	15.0	9.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Hold	Hold	Max
70th %ile Green (s)	9.3	35.3	35.3	21.0	14.7	14.7	14.7	14.7	9.3
70th %ile Term Code	Max	Coord	Coord	Coord	Gap	Gap	Hold	Hold	Max
50th %ile Green (s)	11.5	37.5	37.5	21.0	12.5	12.5	12.5	12.5	11.5
50th %ile Term Code	Max	Coord	Coord	Coord	Gap	Gap	Hold	Hold	Max
30th %ile Green (s)	13.2	39.8	39.8	21.6	10.2	10.2	10.2	10.2	13.2
30th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Hold	Hold	Gap
10th %ile Green (s)	10.3	55.0	55.0	39.7	0.0	0.0	0.0	0.0	10.3
10th %ile Term Code	Gap	Coord	Coord	Coord	Skip	Skip	Skip	Skip	Gap

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 40 (67%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues
16: Joiner St & Burlington

2032 Design Year - Build
 AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗		↔		↖	↗			↖	↗
Volume (vph)	224	484	141	0	470	64	153	18	1	60	20	214
Satd. Flow (prot)	1770	1863	1583	0	1833	0	1770	1848	0	0	1796	1583
Flt Permitted	0.950						0.702				0.767	
Satd. Flow (perm)	1770	1863	1583	0	1833	0	1308	1848	0	0	1429	1583
Satd. Flow (RTOR)			148		12			1				170
Lane Group Flow (vph)	236	509	148	0	562	0	161	20	0	0	84	225
Turn Type	Prot	NA	Perm		NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases			2	6			8			4		4
Total Split (s)	14.0	40.0	40.0	26.0	26.0		20.0	20.0		20.0	20.0	14.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0			5.0	5.0
Act Effct Green (s)	10.7	41.5	41.5		24.9		12.5	12.5			12.5	25.1
Actuated g/C Ratio	0.18	0.69	0.69		0.42		0.21	0.21			0.21	0.42
v/c Ratio	0.75	0.39	0.13		0.73		0.59	0.05			0.28	0.30
Control Delay	42.5	5.3	1.1		17.8		30.5	17.4			20.5	3.4
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	42.5	5.3	1.1		17.8		30.5	17.4			20.5	3.4
LOS	D	A	A		B		C	B			C	A
Approach Delay		14.4			17.8			29.1			8.1	
Approach LOS		B			B			C			A	
Queue Length 50th (ft)	79	43	1		144		53	6			25	5
Queue Length 95th (ft)	#196	103	m6		#326		101	19			50	30
Internal Link Dist (ft)		692			631			451			466	
Turn Bay Length (ft)	225						175					150
Base Capacity (vph)	314	1289	1141		766		327	462			357	761
Starvation Cap Reductn	0	0	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.75	0.39	0.13		0.73		0.49	0.04			0.24	0.30

Intersection Summary





















Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 40 (67%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.8
 Intersection LOS: B
 Intersection Capacity Utilization 81.7%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Joiner St & Burlington



















HCM 2010 Signalized Intersection Summary
 16: Joiner St & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	224	484	141	0	470	64	153	18	1	60	20	214
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	190.0	186.3	186.3	190.0	190.0	186.3	186.3
Adj Flow Rate, veh/h	236	509	148	0	495	0	161	19	1	63	21	225
Adj No. of Lanes	1	1	1	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	1103	937	0	642	0	338	398	21	353	102	607
Arrive On Green	0.31	1.00	1.00	0.00	0.11	0.00	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1774	1863	1583	0	1863	0	1129	1754	92	1052	450	1583
Grp Volume(v), veh/h	236	509	148	0	495	0	161	0	20	84	0	225
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	1863	0	1129	0	1846	1501	0	1583
Q Serve(g_s), s	6.9	0.0	0.0	0.0	14.3	0.0	7.5	0.0	0.5	1.7	0.0	5.6
Cycle Q Clear(g_c), s	6.9	0.0	0.0	0.0	14.3	0.0	9.9	0.0	0.5	2.4	0.0	5.6
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.05	0.75		1.00
Lane Grp Cap(c), veh/h	278	1103	937	0	642	0	338	0	419	455	0	607
V/C Ratio(X)	0.85	0.46	0.16	0.00	0.77	0.00	0.48	0.00	0.05	0.18	0.00	0.37
Avail Cap(c_a), veh/h	289	1180	1003	0	708	0	388	0	501	521	0	678
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	0.0	0.0	22.4	0.0	21.5	0.0	16.7	17.4	0.0	12.2
Incr Delay (d2), s/veh	17.3	1.2	0.3	0.0	8.7	0.0	1.0	0.0	0.0	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.6	0.1	0.0	13.8	0.0	4.4	0.0	0.4	1.9	0.0	4.5
LnGrp Delay(d),s/veh	35.7	1.2	0.3	0.0	31.0	0.0	22.5	0.0	16.7	17.6	0.0	12.6
LnGrp LOS	D	A	A		C		C		B	B		B
Approach Vol, veh/h		893			495			181			309	
Approach Delay, s/veh		10.2			31.0			21.9			14.0	
Approach LOS		B			C			C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		42.5		17.5	13.6	28.8		17.5				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		35.0		15.0	9.0	21.0		15.0				
Max Q Clear Time (g_c+I1), s		2.0		7.6	8.9	16.3		11.9				
Green Ext Time (p_c), s		8.5		1.3	0.0	2.8		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay			17.4									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
17: Burlington

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	507	29	8	520	11	7	0	8	11	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.993			0.997			0.928			0.950	
Flt Protected		0.999			0.999			0.977			0.969	
Satd. Flow (prot)	0	1848	0	0	1855	0	0	1689	0	0	1715	0
Flt Permitted		0.999			0.999			0.977			0.969	
Satd. Flow (perm)	0	1848	0	0	1855	0	0	1689	0	0	1715	0
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		711			534			179			296	
Travel Time (s)		16.2			12.1			3.5			6.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	534	31	8	547	12	7	0	8	12	0	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	573	0	0	567	0	0	15	0	0	19	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)		12			12			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	42.9%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	507	29	8	520	11	7	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	534	31	8	547	12	7	0	8

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	559	0	0	564	0	0	1140	1142	549
Stage 1	-	-	-	-	-	-	566	566	-
Stage 2	-	-	-	-	-	-	574	576	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1012	-	-	1008	-	-	178	200	535
Stage 1	-	-	-	-	-	-	509	507	-
Stage 2	-	-	-	-	-	-	504	502	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1012	-	-	1008	-	-	172	195	535
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	195	-
Stage 1	-	-	-	-	-	-	503	501	-
Stage 2	-	-	-	-	-	-	491	496	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.1	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	270	1012	-	-	1008	-	-	234
HCM Lane V/C Ratio	0.058	0.008	-	-	0.008	-	-	0.081
HCM Control Delay (s)	19.2	8.6	0	-	8.6	0	-	21.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	11	0	7
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	12	0	7

Major/Minor

	Minor2		
Conflicting Flow All	1140	1151	553
Stage 1	570	570	-
Stage 2	570	581	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	178	198	533
Stage 1	506	505	-
Stage 2	506	500	-
Platoon blocked, %			
Mov Cap-1 Maneuver	172	193	533
Mov Cap-2 Maneuver	172	193	-
Stage 1	500	499	-
Stage 2	492	494	-

Approach

	SB
HCM Control Delay, s	21.7
HCM LOS	C

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	435	1	51	420	1	1	28	47	1	31	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		150	115		115
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
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
Fr't									0.850			0.850
Flt Protected	0.950			0.950				0.998			0.999	
Satd. Flow (prot)	1770	1863	0	1770	1863	0	0	1859	1583	0	1861	1583
Flt Permitted	0.950			0.950				0.986			0.988	
Satd. Flow (perm)	1770	1863	0	1770	1863	0	0	1837	1583	0	1840	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)									127			127
Link Speed (mph)		30			30			30				30
Link Distance (ft)		534			684			690				921
Travel Time (s)		12.1			15.5			15.7				20.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	458	1	54	442	1	1	29	49	1	33	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	459	0	54	443	0	0	30	49	0	34	125
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)		12			12			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
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		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
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
Detector 1 Queue (s)	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
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	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases							8		8	4		4
Detector Phase	5	2		1	6		8	8	1	4	4	5

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour

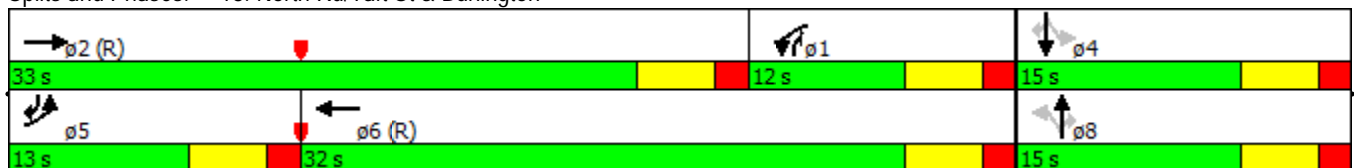


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	13.0	33.0		12.0	32.0		15.0	15.0	12.0	15.0	15.0	13.0
Total Split (%)	21.7%	55.0%		20.0%	53.3%		25.0%	25.0%	20.0%	25.0%	25.0%	21.7%
Maximum Green (s)	8.0	28.0		7.0	27.0		10.0	10.0	7.0	10.0	10.0	8.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lead		Lag	Lag				Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	8.1	43.3		7.5	39.3			10.0	13.5		10.0	14.1
Actuated g/C Ratio	0.14	0.72		0.12	0.66			0.17	0.22		0.17	0.24
v/c Ratio	0.40	0.34		0.24	0.36			0.10	0.11		0.11	0.27
Control Delay	25.5	6.9		21.2	6.6			22.2	0.5		16.3	11.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	25.5	6.9		21.2	6.6			22.2	0.5		16.3	11.3
LOS	C	A		C	A			C	A		B	B
Approach Delay		10.1			8.2			8.7			12.4	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)	32	77		14	12			9	0		10	0
Queue Length 95th (ft)	54	172		m42	m174			29	0		m30	73
Internal Link Dist (ft)		454			604			610			841	
Turn Bay Length (ft)	200			200					150			115
Base Capacity (vph)	249	1354		221	1230			306	454		306	478
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.39	0.34		0.24	0.36			0.10	0.11		0.11	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 9.5 Intersection LOS: A
 Intersection Capacity Utilization 50.4% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: North Rd/Taft St & Burlington



Phasings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
AM Peak Hour























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2	1	6		8	1		4	5
Permitted Phases					8		8	4		4
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	13.0	33.0	12.0	32.0	15.0	15.0	12.0	15.0	15.0	13.0
Total Split (%)	21.7%	55.0%	20.0%	53.3%	25.0%	25.0%	20.0%	25.0%	25.0%	21.7%
Maximum Green (s)	8.0	28.0	7.0	27.0	10.0	10.0	7.0	10.0	10.0	8.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	8.0	27.5	7.5	27.0	10.0	10.0	7.5	10.0	10.0	8.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	9.8	26.8	8.2	25.2	10.0	10.0	8.2	10.0	10.0	9.8
70th %ile Term Code	Gap	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Gap
50th %ile Green (s)	8.5	42.1	7.9	41.5	0.0	0.0	7.9	0.0	0.0	8.5
50th %ile Term Code	Gap	Coord	Hold	Coord	Skip	Skip	Hold	Skip	Skip	Gap
30th %ile Green (s)	7.3	55.0	0.0	42.7	0.0	0.0	0.0	0.0	0.0	7.3
30th %ile Term Code	Gap	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Skip	Gap
10th %ile Green (s)	0.0	55.0	0.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 12 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

HCM 2010 Signalized Intersection Summary
 18: North Rd/Taft St & Burlington

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	91	435	1	51	420	1	1	28	47	1	31	119
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	96	458	1	54	442	1	1	29	49	1	33	125
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	165	527	1	537	917	2	64	301	738	64	301	406
Arrive On Green	0.19	0.57	0.57	0.30	0.49	0.49	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	1858	4	1774	1858	4	15	1840	1583	14	1844	1583
Grp Volume(v), veh/h	96	0	459	54	0	443	30	0	49	34	0	125
Grp Sat Flow(s),veh/h/ln	1774	0	1862	1774	0	1862	1855	0	1583	1857	0	1583
Q Serve(g_s), s	3.0	0.0	12.6	1.3	0.0	9.5	0.0	0.0	0.0	0.0	0.0	3.8
Cycle Q Clear(g_c), s	3.0	0.0	12.6	1.3	0.0	9.5	0.8	0.0	0.0	0.9	0.0	3.8
Prop In Lane	1.00		0.00	1.00		0.00	0.03		1.00	0.03		1.00
Lane Grp Cap(c), veh/h	165	0	528	537	0	919	365	0	738	365	0	406
V/C Ratio(X)	0.58	0.00	0.87	0.10	0.00	0.48	0.08	0.00	0.07	0.09	0.00	0.31
Avail Cap(c_a), veh/h	237	0	869	537	0	919	371	0	743	371	0	411
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.3	0.0	12.0	15.0	0.0	10.1	21.3	0.0	8.8	21.4	0.0	18.0
Incr Delay (d2), s/veh	3.2	0.0	17.4	0.1	0.0	1.8	0.1	0.0	0.0	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.6	0.0	8.7	0.7	0.0	5.3	0.4	0.0	0.4	0.5	0.0	1.7
LnGrp Delay(d),s/veh	26.6	0.0	29.5	15.1	0.0	11.9	21.4	0.0	8.9	21.5	0.0	18.4
LnGrp LOS	C		C	B		B	C		A	C		B
Approach Vol, veh/h		555			497			79			159	
Approach Delay, s/veh		29.0			12.3			13.6			19.1	
Approach LOS		C			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	23.2	22.0		14.8	10.6	34.6		14.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	28.0		10.0	8.0	27.0		10.0				
Max Q Clear Time (g_c+I1), s	3.3	14.6		5.8	5.0	11.5		2.8				
Green Ext Time (p_c), s	1.0	2.4		0.3	0.1	2.6		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			20.4									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
20: Winery Rd & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	24	19	23	38	7	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940		0.916			
Flt Protected	0.973					0.958
Satd. Flow (prot)	1704	0	1706	0	0	1785
Flt Permitted	0.973					0.958
Satd. Flow (perm)	1704	0	1706	0	0	1785
Link Speed (mph)	30		35			35
Link Distance (ft)	864		1335			1777
Travel Time (s)	19.6		26.0			34.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	20	24	40	7	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	64	0	0	8
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
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)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	24	19	23	38	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	20	24	40	7	1

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	60	44	0
Stage 1	44	-	-
Stage 2	16	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	947	1026	1538
Stage 1	978	-	-
Stage 2	1007	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	942	1026	1538
Mov Cap-2 Maneuver	942	-	-
Stage 1	978	-	-
Stage 2	1002	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	6.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	977	1538	-
HCM Lane V/C Ratio	-	-	0.046	0.005	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lanes, Volumes, Timings
21: North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1	27	18	91	84	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.887			
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	1759	1652	0	1641	0
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	1759	1652	0	1641	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		864	1145		473	
Travel Time (s)		19.6	26.0		9.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	8%	2%	2%	10%	2%
Adj. Flow (vph)	1	28	19	96	88	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	115	0	88	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.9%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	27	18	91	84	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	8	2	2	10	2
Mvmt Flow	1	28	19	96	88	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	115	0	98
Stage 1	-	-	67
Stage 2	-	-	31
Critical Hdwy	4.12	-	6.5
Critical Hdwy Stg 1	-	-	5.5
Critical Hdwy Stg 2	-	-	5.5
Follow-up Hdwy	2.218	-	3.59
Pot Cap-1 Maneuver	1474	-	882
Stage 1	-	-	936
Stage 2	-	-	971
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1474	-	881
Mov Cap-2 Maneuver	-	-	881
Stage 1	-	-	936
Stage 2	-	-	970

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1474	-	-	-	881
HCM Lane V/C Ratio	0.001	-	-	-	0.1
HCM Control Delay (s)	7.4	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Lanes, Volumes, Timings
22: Russell Rd & North Rd

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	111	0	1	0	0	0	1	1	0	0	1	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	0		0	0		0	120		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999										0.866
Flt Protected		0.953						0.976				
Satd. Flow (prot)	0	1723	0	0	1863	0	0	1818	0	0	1497	0
Flt Permitted		0.953						0.976				
Satd. Flow (perm)	0	1723	0	0	1863	0	0	1818	0	0	1497	0
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		1145			462			1310			611	
Travel Time (s)		26.0			9.0			25.5			11.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	10%
Adj. Flow (vph)	117	0	1	0	0	0	1	1	0	0	1	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	0	0	0	2	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			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			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.7%
Analysis Period (min)	15
	ICU Level of Service A

Intersection												
Intersection Delay, s/veh	7.6											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	111	0	1	0	0	0	0	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	5	2	1	2	2	2	2	2	2	2	2
Mvmt Flow	0	117	0	1	0	0	0	0	0	1	1	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	0	7.4
HCM LOS	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	99%	0%	0%
Vol Thru, %	50%	0%	100%	1%
Vol Right, %	0%	1%	0%	99%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	112	0	110
LT Vol	1	0	0	1
Through Vol	0	1	0	109
RT Vol	1	111	0	0
Lane Flow Rate	2	118	0	116
Geometry Grp	1	1	1	1
Degree of Util (X)	0.003	0.144	0	0.114
Departure Headway (Hd)	4.332	4.383	4.232	3.53
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	818	0	999
Service Time	2.42	2.407	2.29	1.608
HCM Lane V/C Ratio	0.002	0.144	0	0.116
HCM Control Delay	7.4	8.1	7.3	7.1
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0	0.5	0	0.4

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	1	109
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	1	10
Mvmt Flow	0	0	1	115
Number of Lanes	0	0	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.1
HCM LOS	A

Lane

Lanes, Volumes, Timings
25: North Rd & Joiner St

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	104	37	1	28	41	19	1	48	27	0	46	115
Ideal Flow (vphp)	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		0.999			0.971			0.953			0.903	
Flt Protected		0.965			0.984			0.999				
Satd. Flow (prot)	0	1796	0	0	1780	0	0	1773	0	0	1682	0
Flt Permitted		0.965			0.984			0.999				
Satd. Flow (perm)	0	1796	0	0	1780	0	0	1773	0	0	1682	0
Link Speed (mph)		35			30			35			30	
Link Distance (ft)		285			656			552			531	
Travel Time (s)		5.6			14.9			10.8			12.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	39	1	29	43	20	1	51	28	0	48	121
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	149	0	0	92	0	0	80	0	0	169	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			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection												
Intersection Delay, s/veh	8.4											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	104	37	1	0	28	41	19	0	1	48	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	39	1	0	29	43	20	0	1	51	28
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.9	8.2	8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	73%	32%	0%
Vol Thru, %	63%	26%	47%	29%
Vol Right, %	36%	1%	22%	71%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	76	142	88	161
LT Vol	48	37	41	46
Through Vol	27	1	19	115
RT Vol	1	104	28	0
Lane Flow Rate	80	149	93	169
Geometry Grp	1	1	1	1
Degree of Util (X)	0.1	0.196	0.118	0.197
Departure Headway (Hd)	4.488	4.731	4.595	4.178
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	798	758	779	859
Service Time	2.517	2.762	2.629	2.202
HCM Lane V/C Ratio	0.1	0.197	0.119	0.197
HCM Control Delay	8	8.9	8.2	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.7	0.4	0.7

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	46	115
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	48	121
Number of Lanes	0	0	1	0























Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.2
HCM LOS	A

Lane

Lanes, Volumes, Timings
28: Joiner St

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	0	137	111	0	29	147	42	117	31	46	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	115		115	115		115
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.850			0.850				0.850		0.946	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1762	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1762	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		624			647			546			666	
Travel Time (s)		14.2			14.7			12.4			15.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	0	144	117	0	31	155	44	123	33	48	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	144	0	117	31	0	155	44	123	33	75	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)		12			12			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	39.4%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	24	0	137	111	0	29	147	42	117
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	Yeild	-	-	Yeild	-	-	Yeild
Storage Length	115	-	-	115	-	-	115	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	0	144	117	0	31	155	44	123

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	468	468	48	468	468	44	48	0	0
Stage 1	114	114	-	354	354	-	-	-	-
Stage 2	354	354	-	114	114	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	505	493	1021	505	493	1026	1559	-	-
Stage 1	891	801	-	663	630	-	-	-	-
Stage 2	663	630	-	891	801	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	446	435	1021	394	435	1026	1559	-	-
Mov Cap-2 Maneuver	446	435	-	394	435	-	-	-	-
Stage 1	802	784	-	597	567	-	-	-	-
Stage 2	579	567	-	749	784	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	9.2	16.8	3.6
HCM LOS	A	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	446	1200	394	497	1564	-	-
HCM Lane V/C Ratio	0.099	-	-	0.057	0.12	0.297	0.061	0.021	-	-
HCM Control Delay (s)	7.6	-	-	13.6	8.4	17.9	12.7	7.4	-	-
HCM Lane LOS	A	-	-	B	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0.4	1.2	0.2	0.1	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	31	46	26
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	33	48	27

Major/Minor Major2

Conflicting Flow All	44	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1564	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1564	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s	2.2
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	222	124	2	132	2	203	191	5	5	176	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	0		0	200		0	115		115
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850		0.998			0.996			0.935	
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1857	0	1770	3525	0	1770	3309	0
Flt Permitted	0.683				0.995		0.950			0.950		
Satd. Flow (perm)	1272	1863	1583	0	1850	0	1770	3525	0	1770	3309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		1			4			143	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1021			1076			1404			2431	
Travel Time (s)		23.2			24.5			27.4			47.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	143	234	131	2	139	2	214	201	5	5	185	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	234	131	0	143	0	214	206	0	5	328	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)		12			12			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
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5		8		5	2		1	6	
Permitted Phases	4		4	8								
Detector Phase	7	4	5	8	8		5	2		1	6	

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour

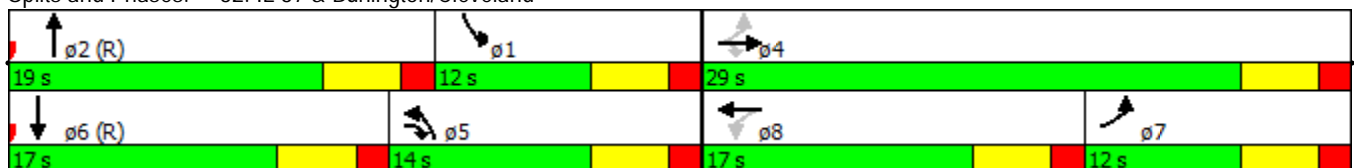


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	12.0	12.0		7.0	12.0		7.0	12.0	
Minimum Split (s)	12.0	17.0	12.0	17.0	17.0		12.0	17.0		12.0	17.0	
Total Split (s)	12.0	29.0	14.0	17.0	17.0		14.0	19.0		12.0	17.0	
Total Split (%)	20.0%	48.3%	23.3%	28.3%	28.3%		23.3%	31.7%		20.0%	28.3%	
Maximum Green (s)	7.0	24.0	9.0	12.0	12.0		9.0	14.0		7.0	12.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag		Lag	Lead	Lead		Lag	Lead		Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effect Green (s)	21.6	21.6	35.6		12.0		9.0	25.6		7.4	14.4	
Actuated g/C Ratio	0.36	0.36	0.59		0.20		0.15	0.43		0.12	0.24	
v/c Ratio	0.28	0.35	0.13		0.39		0.81	0.14		0.02	0.36	
Control Delay	9.1	10.0	1.2		24.3		51.2	13.6		22.8	12.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	9.1	10.0	1.2		24.3		51.2	13.6		22.8	12.9	
LOS	A	B	A		C		D	B		C	B	
Approach Delay		7.5			24.3			32.8			13.1	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)	52	88	7		45		76	22		2	30	
Queue Length 95th (ft)	6	9	0		90		#177	58		10	62	
Internal Link Dist (ft)		941			996			1324			2351	
Turn Bay Length (ft)	200			200			200			115		
Base Capacity (vph)	515	745	968		370		265	1529		218	905	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.28	0.31	0.14		0.39		0.81	0.13		0.02	0.36	

Intersection Summary

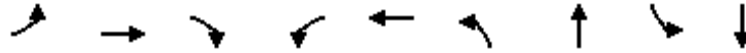
Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 10 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 18.1
 Intersection LOS: B
 Intersection Capacity Utilization 59.6%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 32: IL 37 & Burlington/Cleveland



Phasings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	7	4	5		8	5	2	1	6
Permitted Phases	4		4	8					
Minimum Initial (s)	7.0	12.0	7.0	12.0	12.0	7.0	12.0	7.0	12.0
Minimum Split (s)	12.0	17.0	12.0	17.0	17.0	12.0	17.0	12.0	17.0
Total Split (s)	12.0	29.0	14.0	17.0	17.0	14.0	19.0	12.0	17.0
Total Split (%)	20.0%	48.3%	23.3%	28.3%	28.3%	23.3%	31.7%	20.0%	28.3%
Maximum Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	14.0	7.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag		Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	None	None	C-Min	None	C-Min
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	12.0	9.0	12.0
90th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Hold	Coord
70th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
70th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
50th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
50th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
30th %ile Green (s)	7.0	24.0	9.0	12.0	12.0	9.0	26.0	0.0	12.0
30th %ile Term Code	Max	Hold	Max	Max	Max	Max	Coord	Skip	Coord
10th %ile Green (s)	0.0	12.0	8.8	12.0	12.0	8.8	38.0	0.0	24.2
10th %ile Term Code	Skip	Min	Gap	Hold	Hold	Gap	Coord	Skip	Coord

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 10 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
32: IL 37 & Burlington/Cleveland

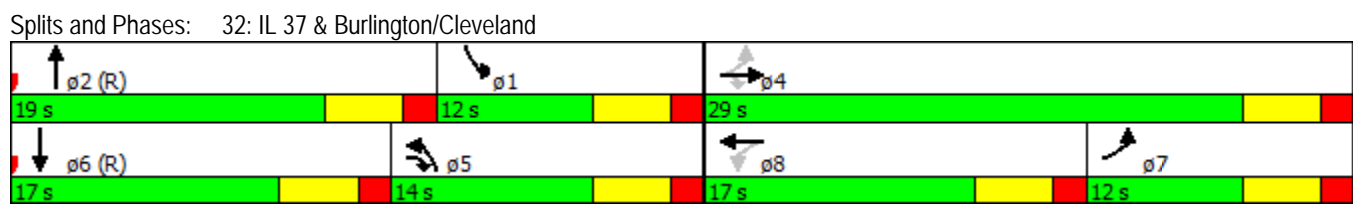
2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↑	↔		↔		↔	↕		↔	↕	
Volume (vph)	136	222	124	2	132	2	203	191	5	5	176	136
Satd. Flow (prot)	1770	1863	1583	0	1857	0	1770	3525	0	1770	3309	0
Flt Permitted	0.683				0.995		0.950			0.950		
Satd. Flow (perm)	1272	1863	1583	0	1850	0	1770	3525	0	1770	3309	0
Satd. Flow (RTOR)			131		1			4			143	
Lane Group Flow (vph)	143	234	131	0	143	0	214	206	0	5	328	0
Turn Type	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5		8		5	2		1	6	
Permitted Phases	4		4	8								
Total Split (s)	12.0	29.0	14.0	17.0	17.0		14.0	19.0		12.0	17.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Act Effect Green (s)	21.6	21.6	35.6		12.0		9.0	25.6		7.4	14.4	
Actuated g/C Ratio	0.36	0.36	0.59		0.20		0.15	0.43		0.12	0.24	
v/c Ratio	0.28	0.35	0.13		0.39		0.81	0.14		0.02	0.36	
Control Delay	9.1	10.0	1.2		24.3		51.2	13.6		22.8	12.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	9.1	10.0	1.2		24.3		51.2	13.6		22.8	12.9	
LOS	A	B	A		C		D	B		C	B	
Approach Delay		7.5			24.3			32.8			13.1	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)	52	88	7		45		76	22		2	30	
Queue Length 95th (ft)	6	9	0		90		#177	58		10	62	
Internal Link Dist (ft)		941			996			1324			2351	
Turn Bay Length (ft)	200		200				200			115		
Base Capacity (vph)	515	745	968		370		265	1529		218	905	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.28	0.31	0.14		0.39		0.81	0.13		0.02	0.36	





















Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 10 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 18.1 Intersection LOS: B
 Intersection Capacity Utilization 59.6% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



















HCM 2010 Signalized Intersection Summary
 32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	136	222	124	2	132	2	203	191	5	5	176	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	143	234	131	2	139	2	214	201	5	5	185	143
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	544	725	871	62	364	5	285	706	18	285	390	286
Arrive On Green	0.11	0.39	0.39	0.20	0.20	0.20	0.16	0.20	0.20	0.16	0.20	0.20
Sat Flow, veh/h	1774	1863	1583	7	1820	26	1774	3529	88	1774	1952	1428
Grp Volume(v), veh/h	143	234	131	143	0	0	214	101	105	5	167	161
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1853	0	0	1774	1770	1847	1774	1770	1611
Q Serve(g_s), s	0.0	5.3	0.0	0.0	0.0	0.0	6.9	2.9	2.9	0.1	5.0	5.3
Cycle Q Clear(g_c), s	0.0	5.3	0.0	4.0	0.0	0.0	6.9	2.9	2.9	0.1	5.0	5.3
Prop In Lane	1.00		1.00	0.01		0.01	1.00		0.05	1.00		0.89
Lane Grp Cap(c), veh/h	544	725	871	431	0	0	285	354	369	285	354	322
V/C Ratio(X)	0.26	0.32	0.15	0.33	0.00	0.00	0.75	0.28	0.29	0.02	0.47	0.50
Avail Cap(c_a), veh/h	563	745	888	431	0	0	285	413	431	285	354	322
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	17.4	12.8	6.6	20.8	0.0	0.0	24.0	20.4	20.4	21.2	21.2	21.3
Incr Delay (d2), s/veh	0.3	0.3	0.1	0.4	0.0	0.0	10.5	2.0	1.9	0.0	3.9	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.9	2.7	1.0	2.1	0.0	0.0	4.2	1.6	1.7	0.1	2.8	2.8
LnGrp Delay(d),s/veh	17.6	13.1	6.7	21.2	0.0	0.0	34.6	22.4	22.3	21.2	25.1	26.1
LnGrp LOS	B	B	A	C			C	C	C	C	C	C
Approach Vol, veh/h		508			143			420			333	
Approach Delay, s/veh		12.7			21.2			28.6			25.5	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.6	17.0		28.4	14.6	17.0	11.4	17.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	14.0		24.0	9.0	12.0	7.0	12.0				
Max Q Clear Time (g_c+I1), s	2.1	4.9		7.3	8.9	7.3	2.0	6.0				
Green Ext Time (p_c), s	0.3	0.6		2.0	0.0	0.8	1.1	0.3				
Intersection Summary												
HCM 2010 Ctrl Delay			21.4									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
35: North Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	64	0	0	69	13	0	0	0	11	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.978							0.916
Flt Protected												0.982
Satd. Flow (prot)	0	1863	0	0	1822	0	0	1863	0	0	1676	0
Flt Permitted												0.982
Satd. Flow (perm)	0	1863	0	0	1822	0	0	1863	0	0	1676	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		656			690			408			170	
Travel Time (s)		14.9			15.7			7.9			3.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	67	0	0	73	14	0	0	0	12	0	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	87	0	0	0	0	0	32	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		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	14.4%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	64	0	0	69	13	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	67	0	0	73	14	0	0	0

Major/Minor	Major1	Major2	Minor1						
Conflicting Flow All	86	0	0	67	0	0	156	153	67
Stage 1	-	-	-	-	-	-	67	67	-
Stage 2	-	-	-	-	-	-	89	86	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1510	-	-	1535	-	-	810	739	997
Stage 1	-	-	-	-	-	-	943	839	-
Stage 2	-	-	-	-	-	-	918	824	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1510	-	-	1535	-	-	793	739	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	793	739	-
Stage 1	-	-	-	-	-	-	943	839	-
Stage 2	-	-	-	-	-	-	899	824	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1510	-	-	1535	-	-	916
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.034
HCM Control Delay (s)	0	0	-	-	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	11	0	19
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	12	0	20

Major/Minor **Minor2**

Conflicting Flow All	146	146	79
Stage 1	79	79	-
Stage 2	67	67	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	823	745	981
Stage 1	930	829	-
Stage 2	943	839	-
Platoon blocked, %			
Mov Cap-1 Maneuver	823	745	981
Mov Cap-2 Maneuver	823	745	-
Stage 1	930	829	-
Stage 2	943	839	-






















Approach **SB**

HCM Control Delay, s	9.1
HCM LOS	A

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
38: Russell Rd

2032 Design Year - Build
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	236	1	1	1	1	177	1	111	1	189	109	261
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	115		0	0		200
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
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		0.925				0.850		0.999				0.850
Flt Protected	0.950				0.976		0.950			0.950		
Satd. Flow (prot)	1770	1723	0	0	1836	1404	1787	1808	0	1530	1727	1583
Flt Permitted	0.950				0.976		0.950			0.950		
Satd. Flow (perm)	1770	1723	0	0	1836	1404	1787	1808	0	1530	1727	1583
Link Speed (mph)		35			35			35				30
Link Distance (ft)		893			593			611				567
Travel Time (s)		17.4			11.6			11.9				12.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	15%	1%	5%	1%	18%	10%	2%
Adj. Flow (vph)	248	1	1	1	1	186	1	117	1	199	115	275
Shared Lane Traffic (%)												
Lane Group Flow (vph)	248	2	0	0	2	186	1	118	0	199	115	275
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)		12			12			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	43.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 18.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	236	1	1	1	1	177	1	111	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Yield
Storage Length	0	-	-	-	-	0	115	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	1	1	15	1	5	1
Mvmt Flow	248	1	1	1	1	186	1	117	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	632	632	115	633	632	117	115	0	0
Stage 1	513	513	-	119	119	-	-	-	-
Stage 2	119	119	-	514	513	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.11	6.51	6.35	4.11	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.11	5.51	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.11	5.51	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.509	4.009	3.435	2.209	-	-
Pot Cap-1 Maneuver	393	398	937	394	399	901	1480	-	-
Stage 1	544	536	-	888	799	-	-	-	-
Stage 2	885	797	-	545	538	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	276	340	937	349	341	901	1480	-	-
Mov Cap-2 Maneuver	276	340	-	349	341	-	-	-	-
Stage 1	544	459	-	887	798	-	-	-	-
Stage 2	701	796	-	465	460	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	71.1	10.1	0.1
HCM LOS	F	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1480	-	-	276	499	345	901	1378	-	-
HCM Lane V/C Ratio	0.001	-	-	0.9	0.004	0.006	0.207	0.144	-	-
HCM Control Delay (s)	7.4	-	-	71.6	12.2	15.5	10	8.1	-	-
HCM Lane LOS	A	-	-	F	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	8.1	0	0	0.8	0.5	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	189	109	261
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	18	10	2
Mvmt Flow	199	115	275

Major/Minor Major2

Conflicting Flow All	117	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.28	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.362	-	-
Pot Cap-1 Maneuver	1378	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1378	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s 2.7

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
42: Taft St & Jones St

2032 Design Year - Build
AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	39	1	1	1	1	1	1	175	1	1	151	39
Ideal Flow (vphp)	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		0.997			0.955			0.999			0.972	
Flt Protected		0.954			0.984							
Satd. Flow (prot)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Flt Permitted		0.954			0.984							
Satd. Flow (perm)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		377			767			921			350	
Travel Time (s)		7.3			14.9			20.9			8.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1	1	1	1	1	1	184	1	1	159	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	3	0	0	186	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	23.2%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	39	1	1	1	1	1	1	175	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	1	1	1	1	1	1	184	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	370	369	179	370	389	185	200	0	0
Stage 1	182	182	-	187	187	-	-	-	-
Stage 2	188	187	-	183	202	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	587	560	864	587	546	857	1372	-	-
Stage 1	820	749	-	815	745	-	-	-	-
Stage 2	814	745	-	819	734	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	585	559	864	585	545	857	1372	-	-
Mov Cap-2 Maneuver	585	559	-	585	545	-	-	-	-
Stage 1	819	748	-	814	744	-	-	-	-
Stage 2	811	744	-	816	733	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11.6	10.7	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	589	637	1390	-	-
HCM Lane V/C Ratio	0.001	-	-	0.073	0.005	0.001	-	-
HCM Control Delay (s)	7.6	0	-	11.6	10.7	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	151	39
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	1	159	41

Major/Minor Major2

Conflicting Flow All	185	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1390	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1390	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

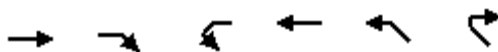
HCM Control Delay, s 0

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
1: Burlington & IL 149

2032 Design Year - Build
PM Peak Hour



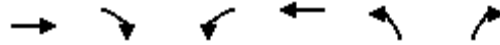
Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑			↑		
Volume (vph)	346	165	0	670	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.956					
Flt Protected						
Satd. Flow (prot)	1691	0	0	1792	0	0
Flt Permitted						
Satd. Flow (perm)	1691	0	0	1792	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	1214			886	922	
Travel Time (s)	27.6			20.1	21.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	2%	2%	6%	2%	2%
Adj. Flow (vph)	364	174	0	705	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	538	0	0	705	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
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	38.6%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	346	1	31	497	173	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	115		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t					0.977	
Fl _t Protected			0.950		0.960	
Satd. Flow (prot)	1728	0	1703	1792	1694	0
Fl _t Permitted			0.950		0.960	
Satd. Flow (perm)	1728	0	1703	1792	1694	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					14	
Link Speed (mph)	30			30	30	
Link Distance (ft)	886			1076	340	
Travel Time (s)	20.1			24.5	7.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	6%	6%	5%	6%
Adj. Flow (vph)	364	1	33	523	182	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	365	0	33	523	219	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	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
Turn Type	NA		Prot	NA	Prot	
Protected Phases	2		1	6	8	
Permitted Phases						
Detector Phase	2		1	6	8	
Switch Phase						
Minimum Initial (s)	7.0		7.0	10.0	7.0	
Minimum Split (s)	12.0		12.0	15.0	12.0	
Total Split (s)	36.0		12.0	48.0	22.0	
Total Split (%)	51.4%		17.1%	68.6%	31.4%	
Maximum Green (s)	31.0		7.0	43.0	17.0	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.5		1.5	1.5	1.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
Act Effect Green (s)	41.1		7.5	46.4	13.6	

Lanes, Volumes, Timings
2: New Winery Rd & IL 149

2032 Design Year - Build
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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.59		0.11	0.66	0.19	
v/c Ratio	0.36		0.18	0.44	0.64	
Control Delay	11.9		30.7	4.3	24.8	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	11.9		30.7	4.3	24.8	
LOS	B		C	A	C	
Approach Delay	11.9			5.9	24.8	
Approach LOS	B			A	C	
90th %ile Green (s)	27.4		8.7	41.1	18.9	
90th %ile Term Code	Coord		Max	Coord	Gap	
70th %ile Green (s)	31.5		7.6	44.1	15.9	
70th %ile Term Code	Coord		Gap	Coord	Gap	
50th %ile Green (s)	46.3		0.0	46.3	13.7	
50th %ile Term Code	Coord		Skip	Coord	Gap	
30th %ile Green (s)	48.6		0.0	48.6	11.4	
30th %ile Term Code	Coord		Skip	Coord	Gap	
10th %ile Green (s)	51.8		0.0	51.8	8.2	
10th %ile Term Code	Coord		Skip	Coord	Gap	
Queue Length 50th (ft)	57		10	19	64	
Queue Length 95th (ft)	195		m21	259	110	
Internal Link Dist (ft)	806			996	260	
Turn Bay Length (ft)			115			
Base Capacity (vph)	1032		181	1197	431	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.35		0.18	0.44	0.51	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 11 (16%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.5
 Intersection LOS: B
 Intersection Capacity Utilization 46.2%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: New Winery Rd & IL 149



Phasings
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	WBL	WBT	NBL
Protected Phases	2	1	6	8
Permitted Phases				
Minimum Initial (s)	7.0	7.0	10.0	7.0
Minimum Split (s)	12.0	12.0	15.0	12.0
Total Split (s)	36.0	12.0	48.0	22.0
Total Split (%)	51.4%	17.1%	68.6%	31.4%
Maximum Green (s)	31.0	7.0	43.0	17.0
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0
Recall Mode	C-Min	None	C-Min	None
Walk Time (s)				
Flash Dont Walk (s)				
Pedestrian Calls (#/hr)				
90th %ile Green (s)	27.4	8.7	41.1	18.9
90th %ile Term Code	Coord	Max	Coord	Gap
70th %ile Green (s)	31.5	7.6	44.1	15.9
70th %ile Term Code	Coord	Gap	Coord	Gap
50th %ile Green (s)	46.3	0.0	46.3	13.7
50th %ile Term Code	Coord	Skip	Coord	Gap
30th %ile Green (s)	48.6	0.0	48.6	11.4
30th %ile Term Code	Coord	Skip	Coord	Gap
10th %ile Green (s)	51.8	0.0	51.8	8.2
10th %ile Term Code	Coord	Skip	Coord	Gap

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 11 (16%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour














Lane Group	EBT	WBL	WBT	NBL
Lane Group Flow (vph)	365	33	523	219
v/c Ratio	0.36	0.18	0.44	0.64
Control Delay	11.9	30.7	4.3	24.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.9	30.7	4.3	24.8
Queue Length 50th (ft)	57	10	19	64
Queue Length 95th (ft)	195	m21	259	110
Internal Link Dist (ft)	806		996	260
Turn Bay Length (ft)		115		
Base Capacity (vph)	1032	181	1197	431
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.18	0.44	0.51

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
2: New Winery Rd & IL 149

2032 Design Year - Build
PM Peak Hour

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Volume (veh/h)	346	1	31	497	173	35		
Number	2	12	1	6	3	18		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	172.8	190.0	179.2	179.2	180.7	190.0		
Adj Flow Rate, veh/h	364	1	33	523	182	37		
Adj No. of Lanes	1	0	1	1	0	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	10	10	6	6	0	0		
Cap, veh/h	655	2	93	1017	233	47		
Arrive On Green	0.38	0.38	0.11	1.00	0.17	0.17		
Sat Flow, veh/h	1722	5	1707	1792	1395	284		
Grp Volume(v), veh/h	0	365	33	523	220	0		
Grp Sat Flow(s),veh/h/ln	0	1727	1707	1792	1687	0		
Q Serve(g_s), s	0.0	6.3	0.7	0.0	4.7	0.0		
Cycle Q Clear(g_c), s	0.0	6.3	0.7	0.0	4.7	0.0		
Prop In Lane		0.00	1.00		0.83	0.17		
Lane Grp Cap(c), veh/h	0	657	93	1017	282	0		
V/C Ratio(X)	0.00	0.56	0.36	0.51	0.78	0.00		
Avail Cap(c_a), veh/h	0	1421	317	2045	761	0		
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00		
Upstream Filter(I)	0.00	1.00	0.86	0.86	1.00	0.00		
Uniform Delay (d), s/veh	0.0	9.2	16.2	0.0	15.0	0.0		
Incr Delay (d2), s/veh	0.0	3.4	2.0	1.6	4.7	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.0	6.4	0.7	0.8	4.5	0.0		
LnGrp Delay(d),s/veh	0.0	12.5	18.2	1.6	19.7	0.0		
LnGrp LOS		B	B	A	B			
Approach Vol, veh/h	365			556	220			
Approach Delay, s/veh	12.5			2.6	19.7			
Approach LOS	B			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.0	51.7				58.7		11.3
Change Period (Y+Rc), s	5.0	5.0				5.0		5.0
Max Green Setting (Gmax), s	7.0	31.0				43.0		17.0
Max Q Clear Time (g_c+I1), s	2.7	8.3				2.0		6.7
Green Ext Time (p_c), s	0.0	6.1				6.9		0.0
Intersection Summary								
HCM 2010 Ctrl Delay			9.1					
HCM 2010 LOS			A					
Notes								
User approved volume balancing among the lanes for turning movement.								

Lanes, Volumes, Timings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	276	67	357	382	52	76	26	368	190	39	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	155		0	160		160	215		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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
Fr _t		0.971			0.982				0.850		0.932	
Fl _t Protected	0.950			0.950				0.964		0.950		
Satd. Flow (prot)	1805	1664	0	1787	1737	0	0	1805	1615	1787	1771	0
Fl _t Permitted	0.500			0.329				0.732		0.688		
Satd. Flow (perm)	950	1664	0	619	1737	0	0	1370	1615	1294	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			12				350			34
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1076			538			598				782
Travel Time (s)		24.5			12.2			13.6				17.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	13%	2%	1%	8%	3%	2%	0%	0%	1%	0%	0%
Adj. Flow (vph)	31	291	71	376	402	55	80	27	387	200	41	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	362	0	376	457	0	0	107	387	200	75	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)		12			12			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
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt		NA
Protected Phases	5	2		1	6			8	1	7		4
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	7		4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0		7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		12.0	12.0	12.0	12.0		12.0
Total Split (s)	12.0	28.0		17.0	33.0		13.0	13.0	17.0	12.0		25.0
Total Split (%)	17.1%	40.0%		24.3%	47.1%		18.6%	18.6%	24.3%	17.1%		35.7%
Maximum Green (s)	7.0	23.0		12.0	28.0		8.0	8.0	12.0	7.0		20.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5		1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0	5.0		5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	6.0		3.0	6.0		3.0	3.0	3.0	3.0		3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None		None
Act Effect Green (s)	32.2	25.2		41.4	36.6			8.2	17.9	18.6		18.6

Lanes, Volumes, Timings
 3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
 PM Peak Hour

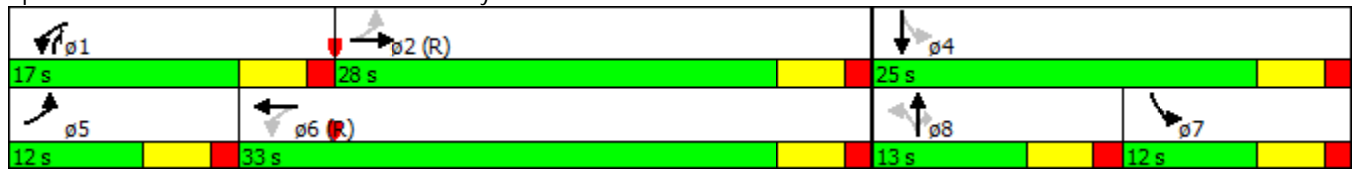


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.46	0.36		0.59	0.52			0.12	0.26	0.27	0.27	
v/c Ratio	0.06	0.59		0.68	0.50			0.67	0.58	0.50	0.15	
Control Delay	5.1	19.0		12.9	9.0			53.0	5.7	26.5	12.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	5.1	19.0		12.9	9.0			53.0	5.7	26.5	12.6	
LOS	A	B		B	A			D	A	C	B	
Approach Delay		17.9			10.8			15.9			22.7	
Approach LOS		B			B			B			C	
90th %ile Green (s)	7.0	23.0		12.0	28.0		8.0	8.0	12.0	7.0	20.0	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Hold	
70th %ile Green (s)	7.0	23.0		12.0	28.0		8.0	8.0	12.0	7.0	20.0	
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Hold	
50th %ile Green (s)	0.0	22.6		12.0	39.6		8.4	8.4	12.0	7.0	20.4	
50th %ile Term Code	Skip	Coord		Max	Coord		Max	Max	Max	Max	Hold	
30th %ile Green (s)	0.0	18.3		12.0	35.3		9.4	9.4	12.0	10.3	24.7	
30th %ile Term Code	Skip	Coord		Max	Coord		Gap	Gap	Max	Max	Hold	
10th %ile Green (s)	0.0	39.1		7.8	51.9		0.0	0.0	7.8	8.1	8.1	
10th %ile Term Code	Skip	Coord		Gap	Coord		Skip	Skip	Gap	Gap	Hold	
Queue Length 50th (ft)	8	148		11	11			45	7	68	13	
Queue Length 95th (ft)	m5	11		77	277			#117	45	124	41	
Internal Link Dist (ft)		996			458			518			702	
Turn Bay Length (ft)	150			155					160	215		
Base Capacity (vph)	522	635		565	912			163	688	400	555	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.06	0.57		0.67	0.50			0.66	0.56	0.50	0.14	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 37 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 15.1
 Intersection LOS: B
 Intersection Capacity Utilization 68.1%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Frankfort Plaza/Ken Gray Blvd & IL 149



Phasings
3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8	1	7	4
Permitted Phases	2		6		8		8	4	
Minimum Initial (s)	7.0	10.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	28.0	17.0	33.0	13.0	13.0	17.0	12.0	25.0
Total Split (%)	17.1%	40.0%	24.3%	47.1%	18.6%	18.6%	24.3%	17.1%	35.7%
Maximum Green (s)	7.0	23.0	12.0	28.0	8.0	8.0	12.0	7.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	6.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	23.0	12.0	28.0	8.0	8.0	12.0	7.0	20.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
70th %ile Green (s)	7.0	23.0	12.0	28.0	8.0	8.0	12.0	7.0	20.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Hold
50th %ile Green (s)	0.0	22.6	12.0	39.6	8.4	8.4	12.0	7.0	20.4
50th %ile Term Code	Skip	Coord	Max	Coord	Max	Max	Max	Max	Hold
30th %ile Green (s)	0.0	18.3	12.0	35.3	9.4	9.4	12.0	10.3	24.7
30th %ile Term Code	Skip	Coord	Max	Coord	Gap	Gap	Max	Max	Hold
10th %ile Green (s)	0.0	39.1	7.8	51.9	0.0	0.0	7.8	8.1	8.1
10th %ile Term Code	Skip	Coord	Gap	Coord	Skip	Skip	Gap	Gap	Hold

Intersection Summary

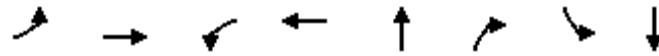
Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 37 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues

2032 Design Year - Build

3: Frankfort Plaza/Ken Gray Blvd & IL 149

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	362	376	457	107	387	200	75
v/c Ratio	0.06	0.59	0.68	0.50	0.67	0.58	0.50	0.15
Control Delay	5.1	19.0	12.9	9.0	53.0	5.7	26.5	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	19.0	12.9	9.0	53.0	5.7	26.5	12.6
Queue Length 50th (ft)	8	148	11	11	45	7	68	13
Queue Length 95th (ft)	m5	11	77	277	#117	45	124	41
Internal Link Dist (ft)		996		458	518			702
Turn Bay Length (ft)	150		155			160	215	
Base Capacity (vph)	522	635	565	912	163	688	400	555
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.57	0.67	0.50	0.66	0.56	0.50	0.14

Intersection Summary





















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 3: Frankfort Plaza/Ken Gray Blvd & IL 149

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	29	276	67	357	382	52	76	26	368	190	39	32
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	190.0	171.4	190.0	188.1	176.9	190.0	190.0	187.2	190.0	188.1	190.0	190.0
Adj Flow Rate, veh/h	31	291	71	376	402	55	80	27	387	200	41	34
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	13	13	1	8	8	0	0	0	1	0	0
Cap, veh/h	406	416	102	505	656	90	189	46	458	295	288	238
Arrive On Green	0.02	0.10	0.10	0.16	0.43	0.43	0.12	0.12	0.12	0.10	0.30	0.30
Sat Flow, veh/h	1810	1332	325	1792	1524	208	791	380	1615	1792	962	798
Grp Volume(v), veh/h	31	0	362	376	0	457	107	0	387	200	0	75
Grp Sat Flow(s),veh/h/ln	1810	0	1657	1792	0	1732	1171	0	1615	1792	0	1759
Q Serve(g_s), s	0.8	0.0	14.1	8.8	0.0	13.6	4.2	0.0	8.0	3.0	0.0	2.1
Cycle Q Clear(g_c), s	0.8	0.0	14.1	8.8	0.0	13.6	6.3	0.0	8.0	3.0	0.0	2.1
Prop In Lane	1.00		0.20	1.00		0.12	0.75		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	406	0	518	505	0	746	235	0	458	295	0	526
V/C Ratio(X)	0.08	0.00	0.70	0.74	0.00	0.61	0.46	0.00	0.85	0.68	0.00	0.14
Avail Cap(c_a), veh/h	512	0	571	534	0	746	235	0	458	296	0	527
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.00	0.94	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	26.9	13.3	0.0	14.7	29.1	0.0	8.1	27.3	0.0	17.1
Incr Delay (d2), s/veh	0.1	0.0	7.2	5.3	0.0	3.7	1.4	0.0	13.6	6.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	11.8	8.7	0.0	11.7	3.6	0.0	9.3	7.1	0.0	1.8
LnGrp Delay(d),s/veh	14.8	0.0	34.1	18.6	0.0	18.5	30.5	0.0	21.7	33.4	0.0	17.3
LnGrp LOS	B		C	B		B	C		C	C		B
Approach Vol, veh/h		393			833			494			275	
Approach Delay, s/veh		32.6			18.5			23.6			29.0	
Approach LOS		C			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.9	29.1		25.0	8.1	37.0	12.0	13.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	23.0		20.0	7.0	28.0	7.0	8.0				
Max Q Clear Time (g_c+I1), s	10.8	16.1		4.1	2.8	15.6	5.0	10.0				
Green Ext Time (p_c), s	0.2	4.8		0.9	0.0	7.8	0.2	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.0									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
4: IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	38	796	756	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			1	0	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1787	1810	1810	1863	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1787	1810	1810	1863	0	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		538	259		442	
Travel Time (s)		12.2	5.9		8.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	5%	2%	2%	2%
Adj. Flow (vph)	40	838	796	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	838	796	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↘	↑	↗
Volume (vph)	0	696	76	23	750	0	0	0	0	22	313	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	220		0	0		0	300		300
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
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
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3438	1568	1736	3539	0	0	0	0	1583	1863	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109									109
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		534			842			295			893	
Travel Time (s)		12.1			19.1			4.5			13.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	3%	4%	2%	2%	2%	2%	2%	14%	2%	7%
Adj. Flow (vph)	0	733	80	24	789	0	0	0	0	23	329	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	733	80	24	789	0	0	0	0	23	329	105
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)		12			12			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
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		25.0	25.0	7.0	25.0					7.0	7.0	7.0
Minimum Split (s)		30.0	30.0	12.0	30.0					12.0	12.0	12.0
Total Split (s)		33.0	33.0	12.0	45.0					25.0	25.0	25.0
Total Split (%)		47.1%	47.1%	17.1%	64.3%					35.7%	35.7%	35.7%
Maximum Green (s)		28.0	28.0	7.0	40.0					20.0	20.0	20.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		38.3	38.3	7.0	43.1					16.9	16.9	16.9

Lanes, Volumes, Timings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.55	0.55	0.10	0.62					0.24	0.24	0.24
v/c Ratio		0.39	0.09	0.14	0.36					0.06	0.73	0.24
Control Delay		9.1	0.9	32.3	3.1					19.1	34.3	5.7
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		9.1	0.9	32.3	3.1					19.1	34.3	5.7
LOS		A	A	C	A					B	C	A
Approach Delay		8.3			4.0						27.0	
Approach LOS		A			A						C	
90th %ile Green (s)		28.0	28.0	7.0	40.0					20.0	20.0	20.0
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		27.4	27.4	7.1	39.5					20.5	20.5	20.5
70th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
50th %ile Green (s)		42.6	42.6	0.0	42.6					17.4	17.4	17.4
50th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
30th %ile Green (s)		45.0	45.0	0.0	45.0					15.0	15.0	15.0
30th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
10th %ile Green (s)		48.6	48.6	0.0	48.6					11.4	11.4	11.4
10th %ile Term Code		Coord	Coord	Skip	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		40	0	7	10					8	129	0
Queue Length 95th (ft)		142	m3	m18	13					23	203	31
Internal Link Dist (ft)		454			762			215			813	
Turn Bay Length (ft)			200	220						300		300
Base Capacity (vph)		1888	909	174	2186					454	535	511
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.39	0.09	0.14	0.36					0.05	0.61	0.21

Intersection Summary

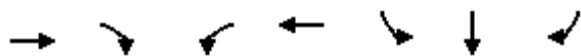
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 10.7
 Intersection LOS: B
 Intersection Capacity Utilization 55.6%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: SB C-D/SB Off Ramp & IL 149



Phasings
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	25.0	25.0	7.0	25.0	7.0	7.0	7.0
Minimum Split (s)	30.0	30.0	12.0	30.0	12.0	12.0	12.0
Total Split (s)	33.0	33.0	12.0	45.0	25.0	25.0	25.0
Total Split (%)	47.1%	47.1%	17.1%	64.3%	35.7%	35.7%	35.7%
Maximum Green (s)	28.0	28.0	7.0	40.0	20.0	20.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	28.0	28.0	7.0	40.0	20.0	20.0	20.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	27.4	27.4	7.1	39.5	20.5	20.5	20.5
70th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
50th %ile Green (s)	42.6	42.6	0.0	42.6	17.4	17.4	17.4
50th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap
30th %ile Green (s)	45.0	45.0	0.0	45.0	15.0	15.0	15.0
30th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap
10th %ile Green (s)	48.6	48.6	0.0	48.6	11.4	11.4	11.4
10th %ile Term Code	Coord	Coord	Skip	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 70

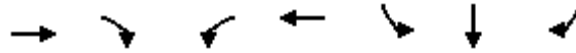
Actuated Cycle Length: 70

Offset: 8 (11%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour















Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	733	80	24	789	23	329	105
v/c Ratio	0.39	0.09	0.14	0.36	0.06	0.73	0.24
Control Delay	9.1	0.9	32.3	3.1	19.1	34.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	0.9	32.3	3.1	19.1	34.3	5.7
Queue Length 50th (ft)	40	0	7	10	8	129	0
Queue Length 95th (ft)	142	m3	m18	13	23	203	31
Internal Link Dist (ft)	454			762		813	
Turn Bay Length (ft)		200	220		300		300
Base Capacity (vph)	1888	909	174	2186	454	535	511
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.09	0.14	0.36	0.05	0.61	0.21

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.






















HCM 2010 Signalized Intersection Summary
5: SB C-D/SB Off Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖	↑	↗
Volume (veh/h)	0	696	76	23	750	0	0	0	0	22	313	100
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	184.5	182.7	186.3	0.0				166.7	186.3	177.6
Adj Flow Rate, veh/h	0	733	0	24	789	0				23	329	0
Adj No. of Lanes	0	2	1	1	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	3	4	2	0				14	2	7
Cap, veh/h	0	1599	729	68	2114	0				344	403	327
Arrive On Green	0.00	0.47	0.00	0.04	0.60	0.00				0.22	0.22	0.00
Sat Flow, veh/h	0	3529	1568	1740	3632	0				1587	1863	1509
Grp Volume(v), veh/h	0	733	0	24	789	0				23	329	0
Grp Sat Flow(s),veh/h/ln	0	1719	1568	1740	1770	0				1587	1863	1509
Q Serve(g_s), s	0.0	7.8	0.0	0.7	6.2	0.0				0.6	9.0	0.0
Cycle Q Clear(g_c), s	0.0	7.8	0.0	0.7	6.2	0.0				0.6	9.0	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1599	729	68	2114	0				344	403	327
V/C Ratio(X)	0.00	0.46	0.00	0.35	0.37	0.00				0.07	0.82	0.00
Avail Cap(c_a), veh/h	0	1791	817	227	2634	0				591	693	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.93	0.93	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	9.8	0.0	25.2	5.6	0.0				16.7	20.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	2.8	0.5	0.0				0.1	4.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	7.0	0.0	0.7	5.6	0.0				0.5	8.8	0.0
LnGrp Delay(d),s/veh	0.0	10.7	0.0	28.0	6.1	0.0				16.8	24.1	0.0
LnGrp LOS		B		C	A					B	C	
Approach Vol, veh/h		733			813						352	
Approach Delay, s/veh		10.7			6.7						23.6	
Approach LOS		B			A						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.1	46.2		16.6		53.4						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	7.0	28.0		20.0		40.0						
Max Q Clear Time (g_c+I1), s	2.7	9.8		11.0		8.2						
Green Ext Time (p_c), s	0.0	10.2		0.7		13.8						
Intersection Summary												
HCM 2010 Ctrl Delay				11.4								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	82	609	0	0	632	27	114	302	9	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		200	225		225	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	100			100			100			100		
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			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1671	3438	0	0	3539	1509	1752	1827	1538	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						109			109			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		842			517			1582			359	
Travel Time (s)		19.1			11.8			24.0			5.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	5%	2%	2%	2%	7%	3%	4%	5%	2%	2%	2%
Adj. Flow (vph)	86	641	0	0	665	28	120	318	9	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	641	0	0	665	28	120	318	9	0	0	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)		12			12			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
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	7.0	25.0			25.0	25.0	7.0	7.0	7.0			
Minimum Split (s)	12.0	30.0			30.0	30.0	12.0	12.0	12.0			
Total Split (s)	14.0	45.0			31.0	31.0	25.0	25.0	25.0			
Total Split (%)	20.0%	64.3%			44.3%	44.3%	35.7%	35.7%	35.7%			
Maximum Green (s)	9.0	40.0			26.0	26.0	20.0	20.0	20.0			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	1.5	1.5			1.5	1.5	1.5	1.5	1.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Recall Mode	None	C-Min			C-Min	C-Min	None	None	None			
Act Effect Green (s)	8.4	43.2			32.2	32.2	16.8	16.8	16.8			

Lanes, Volumes, Timings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.12	0.62			0.46	0.46	0.24	0.24	0.24			
v/c Ratio	0.43	0.30			0.41	0.04	0.29	0.73	0.02			
Control Delay	27.0	5.8			10.5	0.6	13.9	23.8	0.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	27.0	5.8			10.5	0.6	13.9	23.8	0.1			
LOS	C	A			B	A	B	C	A			
Approach Delay		8.3			10.1			20.7				
Approach LOS		A			B			C				
90th %ile Green (s)	9.0	39.6			25.6	25.6	20.4	20.4	20.4			
90th %ile Term Code	Max	Coord			Coord	Coord	Max	Max	Max			
70th %ile Green (s)	9.7	39.7			25.0	25.0	20.3	20.3	20.3			
70th %ile Term Code	Max	Coord			Coord	Coord	Gap	Gap	Gap			
50th %ile Green (s)	8.9	42.7			28.8	28.8	17.3	17.3	17.3			
50th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
30th %ile Green (s)	7.5	45.2			32.7	32.7	14.8	14.8	14.8			
30th %ile Term Code	Gap	Coord			Coord	Coord	Gap	Gap	Gap			
10th %ile Green (s)	0.0	48.8			48.8	48.8	11.2	11.2	11.2			
10th %ile Term Code	Skip	Coord			Coord	Coord	Gap	Gap	Gap			
Queue Length 50th (ft)	33	101			95	0	24	82	0			
Queue Length 95th (ft)	36	1			128	m0	m38	m166	m0			
Internal Link Dist (ft)		762			437			1502			279	
Turn Bay Length (ft)	260					200	225		225			
Base Capacity (vph)	217	2128			1641	758	504	525	520			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.40	0.30			0.41	0.04	0.24	0.61	0.02			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 45 (64%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 11.9
 Intersection LOS: B
 Intersection Capacity Utilization 55.6%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: NB C-D/NB On Ramp & IL 149



Phasings
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Protected Phases	5	2	6		8	8	
Permitted Phases				6			8
Minimum Initial (s)	7.0	25.0	25.0	25.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	30.0	30.0	12.0	12.0	12.0
Total Split (s)	14.0	45.0	31.0	31.0	25.0	25.0	25.0
Total Split (%)	20.0%	64.3%	44.3%	44.3%	35.7%	35.7%	35.7%
Maximum Green (s)	9.0	40.0	26.0	26.0	20.0	20.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	9.0	39.6	25.6	25.6	20.4	20.4	20.4
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max
70th %ile Green (s)	9.7	39.7	25.0	25.0	20.3	20.3	20.3
70th %ile Term Code	Max	Coord	Coord	Coord	Gap	Gap	Gap
50th %ile Green (s)	8.9	42.7	28.8	28.8	17.3	17.3	17.3
50th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Gap
30th %ile Green (s)	7.5	45.2	32.7	32.7	14.8	14.8	14.8
30th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Gap
10th %ile Green (s)	0.0	48.8	48.8	48.8	11.2	11.2	11.2
10th %ile Term Code	Skip	Coord	Coord	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 45 (64%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour
























Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	86	641	665	28	120	318	9
v/c Ratio	0.43	0.30	0.41	0.04	0.29	0.73	0.02
Control Delay	27.0	5.8	10.5	0.6	13.9	23.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	5.8	10.5	0.6	13.9	23.8	0.1
Queue Length 50th (ft)	33	101	95	0	24	82	0
Queue Length 95th (ft)	36	1	128	m0	m38	m166	m0
Internal Link Dist (ft)		762	437			1502	
Turn Bay Length (ft)	260			200	225		225
Base Capacity (vph)	217	2128	1641	758	504	525	520
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.30	0.41	0.04	0.24	0.61	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.




















HCM 2010 Signalized Intersection Summary
6: NB C-D/NB On Ramp & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (veh/h)	82	609	0	0	632	27	114	302	9	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	175.9	181.0	0.0	0.0	186.3	177.6	184.5	182.7	181.0			
Adj Flow Rate, veh/h	86	641	0	0	665	0	120	318	0			
Adj No. of Lanes	1	2	0	0	2	1	1	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	8	5	0	0	2	7	3	4	5			
Cap, veh/h	152	2103	0	0	1536	655	377	392	330			
Arrive On Green	0.09	0.61	0.00	0.00	0.14	0.00	0.21	0.21	0.00			
Sat Flow, veh/h	1675	3529	0	0	3632	1509	1757	1827	1538			
Grp Volume(v), veh/h	86	641	0	0	665	0	120	318	0			
Grp Sat Flow(s),veh/h/ln	1675	1719	0	0	1770	1509	1757	1827	1538			
Q Serve(g_s), s	2.8	5.1	0.0	0.0	9.9	0.0	3.3	9.5	0.0			
Cycle Q Clear(g_c), s	2.8	5.1	0.0	0.0	9.9	0.0	3.3	9.5	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	152	2103	0	0	1536	655	377	392	330			
V/C Ratio(X)	0.57	0.30	0.00	0.00	0.43	0.00	0.32	0.81	0.00			
Avail Cap(c_a), veh/h	262	2388	0	0	1598	681	610	634	534			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00			
Upstream Filter(I)	0.93	0.93	0.00	0.00	1.00	0.00	0.80	0.80	0.00			
Uniform Delay (d), s/veh	25.1	5.3	0.0	0.0	18.2	0.0	19.1	21.5	0.0			
Incr Delay (d2), s/veh	3.0	0.3	0.0	0.0	0.9	0.0	0.4	3.3	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	2.6	4.5	0.0	0.0	8.7	0.0	3.0	8.4	0.0			
LnGrp Delay(d),s/veh	28.1	5.7	0.0	0.0	19.1	0.0	19.4	24.8	0.0			
LnGrp LOS	C	A			B		B	C				
Approach Vol, veh/h		727			665			438				
Approach Delay, s/veh		8.3			19.1			23.3				
Approach LOS		A			B			C				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		52.6			10.2	42.4		17.4				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		40.0			9.0	26.0		20.0				
Max Q Clear Time (g_c+I1), s		7.1			4.8	11.9		11.5				
Green Ext Time (p_c), s		11.4			0.1	7.5		0.8				
Intersection Summary												
HCM 2010 Ctrl Delay				15.8								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	635	19	136	639	44	20	2	91	1	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		115	200		115	115		115	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.996			0.990			0.891			0.981	
Flt Protected	0.950			0.950				0.991			0.993	
Satd. Flow (prot)	1770	1804	0	1770	1844	0	0	1645	0	0	1815	0
Flt Permitted	0.950			0.950				0.936			0.927	
Satd. Flow (perm)	1770	1804	0	1770	1844	0	0	1553	0	0	1694	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8			96			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		511			1030			727			583	
Travel Time (s)		11.6			23.4			16.5			13.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	5	668	20	143	673	46	21	2	96	1	5	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	688	0	143	719	0	0	119	0	0	7	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0		12.0	12.0	
Total Split (s)	12.0	43.0		15.0	46.0		12.0	12.0		12.0	12.0	
Total Split (%)	17.1%	61.4%		21.4%	65.7%		17.1%	17.1%		17.1%	17.1%	
Maximum Green (s)	7.0	38.0		10.0	41.0		7.0	7.0		7.0	7.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	
Act Effect Green (s)	7.0	44.3		9.5	54.0			7.0			7.0	

Lanes, Volumes, Timings
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.10	0.63		0.14	0.77			0.10			0.10	
v/c Ratio	0.03	0.60		0.59	0.50			0.49			0.04	
Control Delay	19.0	11.5		27.5	3.3			20.7			27.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	19.0	11.5		27.5	3.3			20.7			27.6	
LOS	B	B		C	A			C			C	
Approach Delay		11.5			7.3			20.7			27.6	
Approach LOS		B			A			C			C	
90th %ile Green (s)	7.0	38.0		10.0	41.0		7.0	7.0		7.0	7.0	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	
70th %ile Green (s)	0.0	37.4		10.6	53.0		7.0	7.0		7.0	7.0	
70th %ile Term Code	Skip	Coord		Max	Coord		Max	Max		Hold	Hold	
50th %ile Green (s)	0.0	37.1		10.9	53.0		7.0	7.0		7.0	7.0	
50th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min		Hold	Hold	
30th %ile Green (s)	0.0	38.8		9.2	53.0		7.0	7.0		7.0	7.0	
30th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min		Hold	Hold	
10th %ile Green (s)	0.0	65.0		0.0	65.0		0.0	0.0		0.0	0.0	
10th %ile Term Code	Skip	Coord		Skip	Coord		Skip	Skip		Skip	Skip	
Queue Length 50th (ft)	1	241		48	40			8			2	
Queue Length 95th (ft)	m3	432		m82	83			m45			13	
Internal Link Dist (ft)		431			950			647			503	
Turn Bay Length (ft)	115			200								
Base Capacity (vph)	177	1149		260	1424			241			170	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.03	0.60		0.55	0.50			0.49			0.04	

Intersection Summary

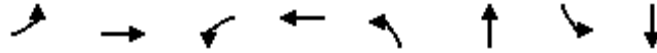
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 3 (4%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 10.1
 Intersection LOS: B
 Intersection Capacity Utilization 64.4%
 ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Joiner St & IL 149



Phasings
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	43.0	15.0	46.0	12.0	12.0	12.0	12.0
Total Split (%)	17.1%	61.4%	21.4%	65.7%	17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	7.0	38.0	10.0	41.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Walk Time (s)								
Flash Dont Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	7.0	38.0	10.0	41.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max
70th %ile Green (s)	0.0	37.4	10.6	53.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Skip	Coord	Max	Coord	Max	Max	Hold	Hold
50th %ile Green (s)	0.0	37.1	10.9	53.0	7.0	7.0	7.0	7.0
50th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
30th %ile Green (s)	0.0	38.8	9.2	53.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Hold	Hold
10th %ile Green (s)	0.0	65.0	0.0	65.0	0.0	0.0	0.0	0.0
10th %ile Term Code	Skip	Coord	Skip	Coord	Skip	Skip	Skip	Skip

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 3 (4%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour





















Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	5	688	143	719	119	7
v/c Ratio	0.03	0.60	0.59	0.50	0.49	0.04
Control Delay	19.0	11.5	27.5	3.3	20.7	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	11.5	27.5	3.3	20.7	27.6
Queue Length 50th (ft)	1	241	48	40	8	2
Queue Length 95th (ft)	m3	432	m82	83	m45	13
Internal Link Dist (ft)		431		950	647	503
Turn Bay Length (ft)	115		200			
Base Capacity (vph)	177	1149	260	1424	241	170
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.60	0.55	0.50	0.49	0.04

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
8: Joiner St & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	635	19	136	639	44	20	2	91	1	5	1
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	181.1	190.0	186.3	186.3	190.0	190.0	186.3	190.0	190.0	186.3	190.0
Adj Flow Rate, veh/h	5	668	20	143	673	46	21	2	96	1	5	1
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	17	829	25	231	1025	70	101	13	142	89	160	28
Arrive On Green	0.02	0.95	0.95	0.26	1.00	1.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1774	1749	52	1774	1724	118	185	120	1273	98	1429	254
Grp Volume(v), veh/h	5	0	688	143	0	719	119	0	0	7	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1802	1774	0	1842	1578	0	0	1781	0	0
Q Serve(g_s), s	0.1	0.0	4.5	3.8	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	4.5	3.8	0.0	0.0	3.8	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.06	0.18		0.81	0.14		0.14
Lane Grp Cap(c), veh/h	17	0	854	231	0	1095	257	0	0	277	0	0
V/C Ratio(X)	0.30	0.00	0.81	0.62	0.00	0.66	0.46	0.00	0.00	0.03	0.00	0.00
Avail Cap(c_a), veh/h	235	0	1298	336	0	1431	289	0	0	313	0	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.68	0.00	0.68	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.7	0.0	0.8	18.4	0.0	0.0	22.5	0.0	0.0	20.9	0.0	0.0
Incr Delay (d2), s/veh	9.8	0.0	8.0	1.8	0.0	2.1	1.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	5.2	3.4	0.0	1.2	3.1	0.0	0.0	0.2	0.0	0.0
LnGrp Delay(d),s/veh	35.5	0.0	8.9	20.2	0.0	2.1	23.8	0.0	0.0	20.9	0.0	0.0
LnGrp LOS	D		A	C		A	C			C		
Approach Vol, veh/h		693			862			119			7	
Approach Delay, s/veh		9.1			5.1			23.8			20.9	
Approach LOS		A			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	29.1	30.0		10.9	5.5	53.6		10.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	38.0		7.0	7.0	41.0		7.0				
Max Q Clear Time (g_c+I1), s	5.8	6.5		2.2	2.1	2.0		5.8				
Green Ext Time (p_c), s	2.1	5.5		0.2	0.0	6.6		0.1				
Intersection Summary												
HCM 2010 Ctrl Delay			8.1									
HCM 2010 LOS			A									

Lanes, Volumes, Timings
9: Taft St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	669	9	186	769	7	4	44	165	4	51	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	225		0	0		115	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
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		0.998			0.999				0.850		0.939	
Flt Protected	0.950			0.950				0.996			0.998	
Satd. Flow (prot)	1787	1807	0	1770	1861	0	0	1855	1583	0	1746	0
Flt Permitted	0.950			0.950				0.977			0.986	
Satd. Flow (perm)	1787	1807	0	1770	1861	0	0	1820	1583	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			1				187			47
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1030			1313			920				481
Travel Time (s)		23.4			29.8			20.9				10.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	5%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	51	704	9	196	809	7	4	46	174	4	54	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	713	0	196	816	0	0	50	174	0	106	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)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane		Yes			Yes							
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
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	7.0	7.0	7.0		7.0
Minimum Split (s)	12.0	30.0		12.0	30.0		12.0	12.0	12.0	12.0		12.0
Total Split (s)	12.0	42.0		16.0	46.0		12.0	12.0	12.0	12.0		12.0
Total Split (%)	17.1%	60.0%		22.9%	65.7%		17.1%	17.1%	17.1%	17.1%		17.1%
Maximum Green (s)	7.0	37.0		11.0	41.0		7.0	7.0	7.0	7.0		7.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5		3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5		1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0			5.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None		None
Act Effect Green (s)	7.4	36.8		11.0	45.3			7.2	7.2			7.2

Lanes, Volumes, Timings
9: Taft St & IL 149

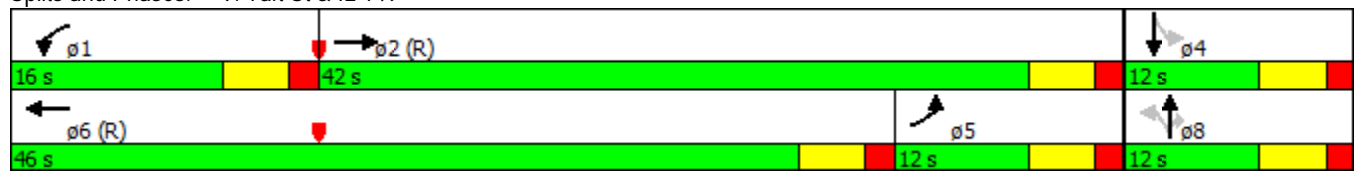
2032 Design Year - Build
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.11	0.53		0.16	0.65			0.10	0.10		0.10	
v/c Ratio	0.27	0.75		0.71	0.68			0.27	0.53		0.49	
Control Delay	22.6	10.0		43.5	13.1			20.0	14.6		26.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	22.6	10.0		43.5	13.1			20.0	14.6		26.5	
LOS	C	A		D	B			B	B		C	
Approach Delay		10.8			19.0			15.8			26.5	
Approach LOS		B			B			B			C	
90th %ile Green (s)	7.0	37.0		11.0	41.0		7.0	7.0	7.0	7.0	7.0	
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	
70th %ile Green (s)	7.0	37.0		11.0	41.0		7.0	7.0	7.0	7.0	7.0	
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	
50th %ile Green (s)	8.9	33.9		13.3	38.3		7.8	7.8	7.8	7.8	7.8	
50th %ile Term Code	Hold	Coord		Gap	Coord		Hold	Hold	Hold	Gap	Gap	
30th %ile Green (s)	0.0	36.7		11.3	53.0		7.0	7.0	7.0	7.0	7.0	
30th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min	Min	Min	Min	
10th %ile Green (s)	0.0	39.5		8.5	53.0		7.0	7.0	7.0	7.0	7.0	
10th %ile Term Code	Skip	Coord		Gap	Coord		Min	Min	Min	Hold	Hold	
Queue Length 50th (ft)	15	32		78	260			23	41		24	
Queue Length 95th (ft)	m31	171		#171	375			m17	0		68	
Internal Link Dist (ft)		950			1233			840			401	
Turn Bay Length (ft)	200			225					115			
Base Capacity (vph)	188	968		291	1218			186	329		218	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.27	0.74		0.67	0.67			0.27	0.53		0.49	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 2 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 16.0 Intersection LOS: B
 Intersection Capacity Utilization 68.2% ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Taft St & IL 149





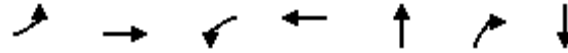
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2	1	6		8			4
Permitted Phases					8		8	4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	12.0	30.0	12.0	30.0	12.0	12.0	12.0	12.0	12.0
Total Split (s)	12.0	42.0	16.0	46.0	12.0	12.0	12.0	12.0	12.0
Total Split (%)	17.1%	60.0%	22.9%	65.7%	17.1%	17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	7.0	37.0	11.0	41.0	7.0	7.0	7.0	7.0	7.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lag	Lag	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	7.0	37.0	11.0	41.0	7.0	7.0	7.0	7.0	7.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	7.0	37.0	11.0	41.0	7.0	7.0	7.0	7.0	7.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max
50th %ile Green (s)	8.9	33.9	13.3	38.3	7.8	7.8	7.8	7.8	7.8
50th %ile Term Code	Hold	Coord	Gap	Coord	Hold	Hold	Hold	Gap	Gap
30th %ile Green (s)	0.0	36.7	11.3	53.0	7.0	7.0	7.0	7.0	7.0
30th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Min	Min
10th %ile Green (s)	0.0	39.5	8.5	53.0	7.0	7.0	7.0	7.0	7.0
10th %ile Term Code	Skip	Coord	Gap	Coord	Min	Min	Min	Hold	Hold

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 2 (3%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
9: Taft St & IL 149

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	51	713	196	816	50	174	106
v/c Ratio	0.27	0.75	0.71	0.68	0.27	0.53	0.49
Control Delay	22.6	10.0	43.5	13.1	20.0	14.6	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	10.0	43.5	13.1	20.0	14.6	26.5
Queue Length 50th (ft)	15	32	78	260	23	41	24
Queue Length 95th (ft)	m31	171	#171	375	m17	0	68
Internal Link Dist (ft)		950		1233	840		401
Turn Bay Length (ft)	200		225			115	
Base Capacity (vph)	188	968	291	1218	186	329	218
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.74	0.67	0.67	0.27	0.53	0.49

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

























HCM 2010 Signalized Intersection Summary
 9: Taft St & IL 149

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	669	9	186	769	7	4	44	165	4	51	46
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	188.1	181.0	190.0	186.3	186.3	190.0	190.0	186.3	186.3	190.0	186.3	190.0
Adj Flow Rate, veh/h	51	704	9	196	809	7	4	46	174	4	54	48
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	5	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	817	10	247	960	8	79	228	203	72	117	99
Arrive On Green	0.10	0.61	0.61	0.14	0.52	0.52	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1792	1784	23	1774	1844	16	57	1780	1583	27	909	774
Grp Volume(v), veh/h	51	0	713	196	0	816	50	0	174	106	0	0
Grp Sat Flow(s),veh/h/ln	1792	0	1806	1774	0	1860	1837	0	1583	1710	0	0
Q Serve(g_s), s	1.5	0.0	17.7	5.8	0.0	20.5	0.0	0.0	5.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.5	0.0	17.7	5.8	0.0	20.5	1.3	0.0	5.9	3.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.01	0.08		1.00	0.04		0.45
Lane Grp Cap(c), veh/h	137	0	827	247	0	968	307	0	203	288	0	0
V/C Ratio(X)	0.37	0.00	0.86	0.79	0.00	0.84	0.16	0.00	0.86	0.37	0.00	0.00
Avail Cap(c_a), veh/h	230	0	1224	357	0	1397	307	0	203	288	0	0
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.77	0.00	0.77	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.3	0.0	9.2	22.7	0.0	11.2	21.3	0.0	23.3	22.1	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	9.1	7.6	0.0	8.9	0.2	0.0	28.5	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.4	0.0	15.3	6.0	0.0	18.4	1.2	0.0	7.5	2.8	0.0	0.0
LnGrp Delay(d),s/veh	24.6	0.0	18.3	30.4	0.0	20.0	21.6	0.0	51.8	22.9	0.0	0.0
LnGrp LOS	C		B	C		C	C		D	C		
Approach Vol, veh/h		764			1012			224			106	
Approach Delay, s/veh		18.7			22.0			45.1			22.9	
Approach LOS		B			C			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	45.4		12.0	24.6	33.4		12.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	11.0	37.0		7.0	7.0	41.0		7.0				
Max Q Clear Time (g_c+I1), s	7.8	19.7		5.1	3.5	22.5		7.9				
Green Ext Time (p_c), s	0.2	4.9		0.3	1.7	6.0		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			23.3									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	508	81	103	495	80	92	290	121	103	227	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		200	180		180	115		0	125		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850			0.850		0.956			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1810	1583	1770	1863	1583	1770	3383	0	1770	3274	0
Flt Permitted	0.196			0.323			0.312			0.414		
Satd. Flow (perm)	362	1810	1583	602	1863	1583	581	3383	0	771	3274	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			154		76			241	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1690			1195			2471			1384	
Travel Time (s)		38.4			27.2			48.1			27.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	5%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	214	535	85	108	521	84	97	305	127	108	239	241
Shared Lane Traffic (%)												
Lane Group Flow (vph)	214	535	85	108	521	84	97	432	0	108	480	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	3	1	6	6	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.8	30.3	9.7	9.8	30.3	30.3	9.7	30.5		9.7	29.5	
Total Split (s)	12.4	35.0	10.5	9.8	32.4	32.4	10.5	30.5		9.7	29.7	
Total Split (%)	14.6%	41.2%	12.4%	11.5%	38.1%	38.1%	12.4%	35.9%		11.4%	34.9%	
Maximum Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	25.0		5.0	24.2	
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3		1.5	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	5.3	4.7	4.8	5.3	5.3	4.7	5.5		4.7	5.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	None	None	Min	Min	None	None		None	Min	
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	

Lanes, Volumes, Timings
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

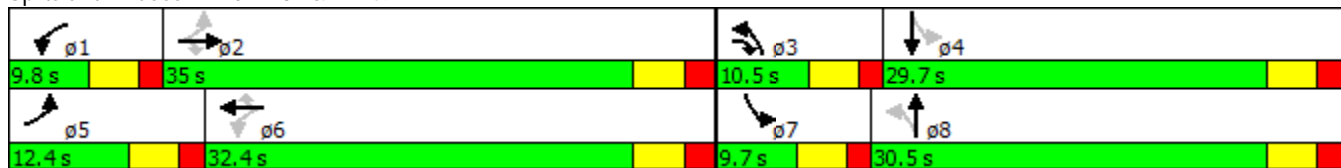


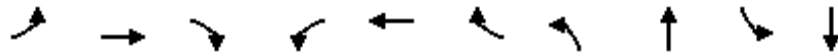
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0			18.0	18.0		18.0				17.0
Pedestrian Calls (#/hr)		0			0	0		0				0
Act Effct Green (s)	35.6	29.4	40.9	29.6	23.9	23.9	18.1	13.0		16.9	12.4	
Actuated g/C Ratio	0.52	0.43	0.60	0.43	0.35	0.35	0.27	0.19		0.25	0.18	
v/c Ratio	0.61	0.68	0.09	0.31	0.80	0.13	0.37	0.61		0.40	0.61	
Control Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6		22.7	16.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6		22.7	16.7	
LOS	B	C	A	B	C	A	C	C		C	B	
Approach Delay		20.8			25.3			24.9				17.8
Approach LOS		C			C			C				B
90th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	18.4		5.0	17.6	
90th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap		Max	Hold	
70th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	14.7		5.0	13.9	
70th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap		Max	Hold	
50th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	13.0		5.0	12.2	
50th %ile Term Code	Max	Hold	Max	Max	Max	Max	Max	Gap		Max	Hold	
30th %ile Green (s)	7.6	26.1	5.8	5.0	23.5	23.5	5.8	11.3		5.0	10.5	
30th %ile Term Code	Max	Hold	Max	Max	Gap	Gap	Max	Gap		Max	Hold	
10th %ile Green (s)	7.6	27.7	0.0	0.0	15.3	15.3	0.0	8.2		0.0	8.2	
10th %ile Term Code	Max	Hold	Skip	Skip	Gap	Gap	Skip	Gap		Skip	Hold	
Queue Length 50th (ft)	46	197	0	22	201	0	31	78		35	51	
Queue Length 95th (ft)	#114	#384	17	51	#389	4	63	123		69	96	
Internal Link Dist (ft)		1610			1115			2391				1304
Turn Bay Length (ft)	115		200	180		180	115			125		
Base Capacity (vph)	349	817	989	350	767	742	259	1333		267	1357	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.65	0.09	0.31	0.68	0.11	0.37	0.32		0.40	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 68.1
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 22.1
 Intersection LOS: C
 Intersection Capacity Utilization 72.9%
 ICU Level of Service C
 Analysis Period (min) 15
 90th %ile Actuated Cycle: 78.4
 70th %ile Actuated Cycle: 74.7
 50th %ile Actuated Cycle: 73
 30th %ile Actuated Cycle: 67.7
 10th %ile Actuated Cycle: 46.7
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 10: IL 37 & IL 149





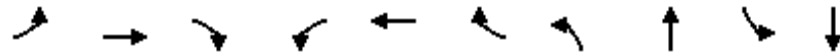
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Protected Phases	5	2	3	1	6		3	8	7	4
Permitted Phases	2		2	6		6	8		4	
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.8	30.3	9.7	9.8	30.3	30.3	9.7	30.5	9.7	29.5
Total Split (s)	12.4	35.0	10.5	9.8	32.4	32.4	10.5	30.5	9.7	29.7
Total Split (%)	14.6%	41.2%	12.4%	11.5%	38.1%	38.1%	12.4%	35.9%	11.4%	34.9%
Maximum Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	25.0	5.0	24.2
Yellow Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
All-Red Time (s)	1.6	2.1	1.5	1.6	2.1	2.1	1.5	2.3	1.5	2.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	None	None	Min	Min	None	None	None	Min
Walk Time (s)		7.0			7.0	7.0		7.0		7.0
Flash Dont Walk (s)		18.0			18.0	18.0		18.0		17.0
Pedestrian Calls (#/hr)		0			0	0		0		0
90th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	18.4	5.0	17.6
90th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap	Max	Hold
70th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	14.7	5.0	13.9
70th %ile Term Code	Max	Max	Max	Max	Max	Max	Max	Gap	Max	Hold
50th %ile Green (s)	7.6	29.7	5.8	5.0	27.1	27.1	5.8	13.0	5.0	12.2
50th %ile Term Code	Max	Hold	Max	Max	Max	Max	Max	Gap	Max	Hold
30th %ile Green (s)	7.6	26.1	5.8	5.0	23.5	23.5	5.8	11.3	5.0	10.5
30th %ile Term Code	Max	Hold	Max	Max	Gap	Gap	Max	Gap	Max	Hold
10th %ile Green (s)	7.6	27.7	0.0	0.0	15.3	15.3	0.0	8.2	0.0	8.2
10th %ile Term Code	Max	Hold	Skip	Skip	Gap	Gap	Skip	Gap	Skip	Hold

Intersection Summary

Cycle Length: 85
 Actuated Cycle Length: 68.1
 Control Type: Actuated-Uncoordinated
 90th %ile Actuated Cycle: 78.4
 70th %ile Actuated Cycle: 74.7
 50th %ile Actuated Cycle: 73
 30th %ile Actuated Cycle: 67.7
 10th %ile Actuated Cycle: 46.7

Queues
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	214	535	85	108	521	84	97	432	108	480
v/c Ratio	0.61	0.68	0.09	0.31	0.80	0.13	0.37	0.61	0.40	0.61
Control Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6	22.7	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	24.4	2.2	11.9	32.0	0.8	21.6	25.6	22.7	16.7
Queue Length 50th (ft)	46	197	0	22	201	0	31	78	35	51
Queue Length 95th (ft)	#114	#384	17	51	#389	4	63	123	69	96
Internal Link Dist (ft)		1610			1115			2391		1304
Turn Bay Length (ft)	115		200	180		180	115		125	
Base Capacity (vph)	349	817	989	350	767	742	259	1333	267	1357
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.65	0.09	0.31	0.68	0.11	0.37	0.32	0.40	0.35

Intersection Summary

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


















HCM 2010 Signalized Intersection Summary
10: IL 37 & IL 149

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	203	508	81	103	495	80	92	290	121	103	227	229
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1810	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	214	535	85	108	521	84	97	305	127	108	239	241
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	684	692	299	624	530	283	539	220	315	399	357
Arrive On Green	0.10	0.38	0.38	0.06	0.33	0.33	0.06	0.22	0.22	0.07	0.23	0.23
Sat Flow, veh/h	1757	1810	1583	1774	1863	1583	1774	2455	1001	1774	1770	1583
Grp Volume(v), veh/h	214	535	85	108	521	84	97	218	214	108	239	241
Grp Sat Flow(s),veh/h/ln	1757	1810	1583	1774	1863	1583	1774	1770	1686	1774	1770	1583
Q Serve(g_s), s	5.7	19.2	2.3	2.9	19.0	2.7	3.1	8.0	8.3	3.4	8.9	10.2
Cycle Q Clear(g_c), s	5.7	19.2	2.3	2.9	19.0	2.7	3.1	8.0	8.3	3.4	8.9	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.59	1.00		1.00
Lane Grp Cap(c), veh/h	342	684	692	299	624	530	283	389	370	315	399	357
V/C Ratio(X)	0.63	0.78	0.12	0.36	0.84	0.16	0.34	0.56	0.58	0.34	0.60	0.67
Avail Cap(c_a), veh/h	342	732	735	312	688	585	317	603	574	320	583	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	20.2	12.3	16.3	22.5	17.1	20.9	25.5	25.6	20.5	25.5	26.0
Incr Delay (d2), s/veh	3.6	5.2	0.1	0.7	8.2	0.1	0.7	1.3	1.4	0.6	1.4	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.0	10.5	1.0	1.4	11.1	1.2	1.5	4.1	4.0	1.7	4.5	4.6
LnGrp Delay(d),s/veh	20.0	25.4	12.4	17.0	30.7	17.3	21.6	26.8	27.0	21.1	26.9	28.2
LnGrp LOS	B	C	B	B	C	B	C	C	C	C	C	C
Approach Vol, veh/h		834			713			529			588	
Approach Delay, s/veh		22.7			27.1			25.9			26.4	
Approach LOS		C			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	33.0	9.1	22.1	12.4	29.9	9.5	21.6				
Change Period (Y+Rc), s	* 4.8	* 5.3	* 4.7	5.5	* 4.8	* 5.3	* 4.7	5.5				
Max Green Setting (Gmax), s	* 5	* 30	* 5.8	24.2	* 7.6	* 27	* 5	25.0				
Max Q Clear Time (g_c+I1), s	4.9	21.2	5.1	12.2	7.7	21.0	5.4	10.3				
Green Ext Time (p_c), s	0.0	4.6	0.0	4.3	0.0	3.6	0.0	4.8				
Intersection Summary												
HCM 2010 Ctrl Delay			25.3									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 11: Winery Rd/New Winery Rd & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	158	7	1	0	168	0	40	1	1	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		115	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.995				0.850		0.997				
Flt Protected				0.950								0.998
Satd. Flow (prot)	0	1803	0	1770	0	1509	0	1857	0	0	1759	0
Flt Permitted				0.950								0.998
Satd. Flow (perm)	0	1803	0	1770	0	1509	0	1857	0	0	1759	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		922			1154			1790			340	
Travel Time (s)		21.0			26.2			34.9			6.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	2%	2%	2%	7%	2%	2%	2%	2%	8%	2%
Adj. Flow (vph)	0	166	7	1	0	177	0	42	1	1	26	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	173	0	1	0	177	0	43	0	0	27	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)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes							
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	32.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection									
Int Delay, s/veh	0								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	158	7	1	0	168	0	40	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	5	2	2	2	7	2	2	2
Mvmt Flow	0	166	7	1	0	177	0	42	1

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	0	0	0	174	0	0	183	172	170
Stage 1	-	-	-	-	-	-	170	170	-
Stage 2	-	-	-	-	-	-	13	2	-
Critical Hdwy	-	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	-	1403	-	-	778	721	874
Stage 1	-	-	-	-	-	-	832	758	-
Stage 2	-	-	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	1403	-	-	-	720	874
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	720	-
Stage 1	-	-	-	-	-	-	832	758	-
Stage 2	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	-
HCM LOS	-	-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-	1403	-	-	-
HCM Lane V/C Ratio	-	-	-	-	0.001	-	-	-
HCM Control Delay (s)	-	0	-	-	7.6	-	-	-
HCM Lane LOS	-	A	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	25	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	8	2
Mvmt Flow	1	26	0

Major/Minor

	Minor2		
Conflicting Flow All	192	176	0
Stage 1	0	2	-
Stage 2	192	174	-
Critical Hdwy	7.12	6.58	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	6.12	5.58	-
Follow-up Hdwy	3.518	4.072	-
Pot Cap-1 Maneuver	768	707	-
Stage 1	-	-	-
Stage 2	810	744	-
Platoon blocked, %			
Mov Cap-1 Maneuver	732	706	-
Mov Cap-2 Maneuver	732	706	-
Stage 1	-	-	-
Stage 2	764	744	-

Approach






















HCM Control Delay, s

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
12: Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	205	8	72	190	38	8	1	75	56	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		115	115		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.995			0.975				0.850		0.887	
Flt Protected	0.950			0.950				0.957		0.950		
Satd. Flow (prot)	1770	1819	0	1787	1756	0	0	1783	1583	1770	1652	0
Flt Permitted	0.950			0.950				0.957		0.950		
Satd. Flow (perm)	1770	1819	0	1787	1756	0	0	1783	1583	1770	1652	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1154			919			730			505	
Travel Time (s)		26.2			20.9			14.2			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	1%	6%	3%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	216	8	76	200	40	8	1	79	59	1	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	224	0	76	240	0	0	9	79	59	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)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
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	35.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection									
Int Delay, s/veh	3.7								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	1	205	8	72	190	38	8	1	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	115	-	-	115	-	-	-	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	4	2	1	6	3	2	2	2
Mvmt Flow	1	216	8	76	200	40	8	1	79

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	240	0	0	224	0	0	596	614	220
Stage 1	-	-	-	-	-	-	222	222	-
Stage 2	-	-	-	-	-	-	374	392	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1327	-	-	1351	-	-	415	407	820
Stage 1	-	-	-	-	-	-	780	720	-
Stage 2	-	-	-	-	-	-	647	606	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1327	-	-	1351	-	-	395	384	820
Mov Cap-2 Maneuver	-	-	-	-	-	-	395	384	-
Stage 1	-	-	-	-	-	-	779	719	-
Stage 2	-	-	-	-	-	-	607	572	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.9	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	394	820	1327	-	-	1351	-	-	359	644
HCM Lane V/C Ratio	0.024	0.096	0.001	-	-	0.056	-	-	0.164	0.007
HCM Control Delay (s)	14.4	9.9	7.7	-	-	7.8	-	-	17	10.6
HCM Lane LOS	B	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.3	0	-	-	0.2	-	-	0.6	0

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	56	1	3
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	59	1	3

Major/Minor	Minor2		
Conflicting Flow All	595	598	220
Stage 1	372	372	-
Stage 2	223	226	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	416	416	820
Stage 1	648	619	-
Stage 2	780	717	-
Platoon blocked, %			
Mov Cap-1 Maneuver	359	392	820
Mov Cap-2 Maneuver	359	392	-
Stage 1	648	584	-
Stage 2	703	716	-

Approach SB

HCM Control Delay, s	16.6
HCM LOS	C

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	221	105	577	183	70	108	1	612	61	2	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	280		115	115		0	115		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.984	
Flt Protected	0.950			0.950				0.953			0.959	
Satd. Flow (prot)	1770	1827	1583	3213	1810	1599	0	1775	1509	0	1776	0
Flt Permitted	0.950			0.950				0.753			0.679	
Satd. Flow (perm)	1770	1827	1583	3213	1810	1599	0	1403	1509	0	1257	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			187			109			644		9	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		919			720			557			629	
Travel Time (s)		20.9			16.4			10.9			12.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	2%	9%	5%	1%	2%	1%	7%	1%	0%	1%
Adj. Flow (vph)	11	233	111	607	193	74	114	1	644	64	2	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	233	111	607	193	74	0	115	644	0	75	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)		24			24			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
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		Free	4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0	
Total Split (s)	12.0	25.0	25.0	27.0	40.0	40.0	18.0	18.0		18.0	18.0	
Total Split (%)	17.1%	35.7%	35.7%	38.6%	57.1%	57.1%	25.7%	25.7%		25.7%	25.7%	
Maximum Green (s)	7.0	20.0	20.0	22.0	35.0	35.0	13.0	13.0		13.0	13.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None	
Act Effect Green (s)	7.0	28.7	28.7	18.1	50.3	50.3		10.7	70.0		10.7	

Lanes, Volumes, Timings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour

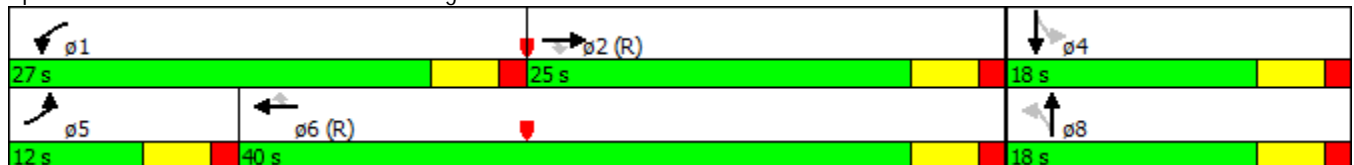


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.10	0.41	0.41	0.26	0.72	0.72		0.15	1.00		0.15	
v/c Ratio	0.06	0.31	0.15	0.73	0.15	0.06		0.54	0.43		0.38	
Control Delay	29.5	18.7	1.1	24.3	7.0	2.2		36.5	0.9		28.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	29.5	18.7	1.1	24.3	7.0	2.2		36.5	0.9		28.9	
LOS	C	B	A	C	A	A		D	A		C	
Approach Delay	13.5			18.6			6.3			28.9		
Approach LOS	B			B			A			C		
90th %ile Green (s)	7.0	19.9	19.9	22.0	34.9	34.9	13.1	13.1		13.1	13.1	
90th %ile Term Code	Max	Coord	Coord	Max	Coord	Coord	Max	Max		Max	Max	
70th %ile Green (s)	0.0	21.8	21.8	20.2	47.0	47.0	13.0	13.0		13.0	13.0	
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold	
50th %ile Green (s)	0.0	25.6	25.6	18.3	48.9	48.9	11.1	11.1		11.1	11.1	
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold	
30th %ile Green (s)	0.0	29.5	29.5	16.4	50.9	50.9	9.1	9.1		9.1	9.1	
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold	
10th %ile Green (s)	0.0	46.5	46.5	13.5	65.0	65.0	0.0	0.0		0.0	0.0	
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip	
Queue Length 50th (ft)	4	71	0	120	25	0		46	0		26	
Queue Length 95th (ft)	18	143	8	160	91	15		91	0		60	
Internal Link Dist (ft)	839			640			477			549		
Turn Bay Length (ft)	150		150	280		115						
Base Capacity (vph)	177	748	758	1009	1302	1181		260	1509		240	
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	
Reduced v/c Ratio	0.06	0.31	0.15	0.60	0.15	0.06		0.44	0.43		0.31	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 15 (21%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 45
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.6
 Intersection LOS: B
 Intersection Capacity Utilization 51.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 13: Russell Rd & Burlington



Phasings
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	5	2		1	6			8			4
Permitted Phases			2			6	8		Free	4	
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0		7.0	7.0
Minimum Split (s)	12.0	15.0	15.0	12.0	15.0	15.0	12.0	12.0		12.0	12.0
Total Split (s)	12.0	25.0	25.0	27.0	40.0	40.0	18.0	18.0		18.0	18.0
Total Split (%)	17.1%	35.7%	35.7%	38.6%	57.1%	57.1%	25.7%	25.7%		25.7%	25.7%
Maximum Green (s)	7.0	20.0	20.0	22.0	35.0	35.0	13.0	13.0		13.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None		None	None
Walk Time (s)											
Flash Dont Walk (s)											
Pedestrian Calls (#/hr)											
90th %ile Green (s)	7.0	19.9	19.9	22.0	34.9	34.9	13.1	13.1		13.1	13.1
90th %ile Term Code	Max	Coord	Coord	Max	Coord	Coord	Max	Max		Max	Max
70th %ile Green (s)	0.0	21.8	21.8	20.2	47.0	47.0	13.0	13.0		13.0	13.0
70th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
50th %ile Green (s)	0.0	25.6	25.6	18.3	48.9	48.9	11.1	11.1		11.1	11.1
50th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
30th %ile Green (s)	0.0	29.5	29.5	16.4	50.9	50.9	9.1	9.1		9.1	9.1
30th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Gap	Gap		Hold	Hold
10th %ile Green (s)	0.0	46.5	46.5	13.5	65.0	65.0	0.0	0.0		0.0	0.0
10th %ile Term Code	Skip	Coord	Coord	Gap	Coord	Coord	Skip	Skip		Skip	Skip

Intersection Summary

Cycle Length: 70

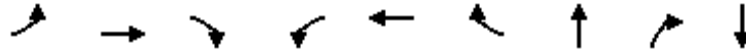
Actuated Cycle Length: 70

Offset: 15 (21%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
13: Russell Rd & Burlington

2032 Design Year - Build
PM Peak Hour
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	11	233	111	607	193	74	115	644	75
v/c Ratio	0.06	0.31	0.15	0.73	0.15	0.06	0.54	0.43	0.38
Control Delay	29.5	18.7	1.1	24.3	7.0	2.2	36.5	0.9	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	18.7	1.1	24.3	7.0	2.2	36.5	0.9	28.9
Queue Length 50th (ft)	4	71	0	120	25	0	46	0	26
Queue Length 95th (ft)	18	143	8	160	91	15	91	0	60
Internal Link Dist (ft)		839			640		477		549
Turn Bay Length (ft)	150		150	280		115			
Base Capacity (vph)	177	748	758	1009	1302	1181	260	1509	240
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.31	0.15	0.60	0.15	0.06	0.44	0.43	0.31

Intersection Summary




















HCM 2010 Signalized Intersection Summary
 13: Russell Rd & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	221	105	577	183	70	108	1	612	61	2	9
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1827	1863	1743	1810	1881	1900	1863	1776	1900	1882	1900
Adj Flow Rate, veh/h	11	233	0	607	193	0	114	1	0	64	2	9
Adj No. of Lanes	1	1	1	2	1	1	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	4	2	9	5	1	1	1	7	0	0	0
Cap, veh/h	34	842	730	719	1204	1063	258	1	153	234	12	21
Arrive On Green	0.02	0.46	0.00	0.37	1.00	0.00	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1774	1827	1583	3221	1810	1599	1531	13	1509	1370	121	203
Grp Volume(v), veh/h	11	233	0	607	193	0	115	0	0	75	0	0
Grp Sat Flow(s),veh/h/ln	1774	1827	1583	1610	1810	1599	1544	0	1509	1695	0	0
Q Serve(g_s), s	0.4	5.5	0.0	12.1	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.4	5.5	0.0	12.1	0.0	0.0	4.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.99		1.00	0.85		0.12
Lane Grp Cap(c), veh/h	34	842	730	719	1204	1063	259	0	153	267	0	0
V/C Ratio(X)	0.32	0.28	0.00	0.84	0.16	0.00	0.44	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	177	842	730	1012	1204	1063	377	0	280	390	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.96	0.96	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.9	11.7	0.0	20.8	0.0	0.0	30.3	0.0	0.0	29.5	0.0	0.0
Incr Delay (d2), s/veh	5.3	0.8	0.0	4.5	0.3	0.0	1.2	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.3	3.0	0.0	5.8	0.1	0.0	2.2	0.0	0.0	1.4	0.0	0.0
LnGrp Delay(d),s/veh	39.2	12.5	0.0	25.4	0.3	0.0	31.5	0.0	0.0	30.1	0.0	0.0
LnGrp LOS	D	B		C	A		C			C		
Approach Vol, veh/h		244			800			115			75	
Approach Delay, s/veh		13.7			19.3			31.5			30.1	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.6	37.3		12.1	6.3	51.6		12.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	22.0	20.0		13.0	7.0	35.0		13.0				
Max Q Clear Time (g_c+I1), s	14.1	7.5		4.7	2.4	2.0		6.8				
Green Ext Time (p_c), s	1.6	2.0		0.5	0.0	2.7		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			20.0									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
 14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	554	340	397	697	0	0	0	0	180	99	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		0	0		0	200		200
Storage Lanes	0		1	2		0	0		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected				0.950						0.950		
Satd. Flow (prot)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Fl _t Permitted				0.950						0.950		
Satd. Flow (perm)	0	1810	1468	3433	3438	0	0	0	0	1770	1845	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			270									140
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		720			743			464			1033	
Travel Time (s)		16.4			16.9			7.0			15.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	10%	2%	5%	2%	2%	2%	2%	2%	3%	11%
Adj. Flow (vph)	0	583	358	418	734	0	0	0	0	189	104	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	583	358	418	734	0	0	0	0	189	104	140
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)		24			24			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
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.0	15.0	12.0	15.0					12.0	12.0	12.0
Total Split (s)		36.0	36.0	17.0	53.0					17.0	17.0	17.0
Total Split (%)		51.4%	51.4%	24.3%	75.7%					24.3%	24.3%	24.3%
Maximum Green (s)		31.0	31.0	12.0	48.0					12.0	12.0	12.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.5	1.5	1.5	1.5					1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Lead/Lag		Lead	Lead	Lag								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min	C-Min	None	C-Min					None	None	None
Act Effect Green (s)		32.2	32.2	11.8	49.0					11.0	11.0	11.0

Lanes, Volumes, Timings
 14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

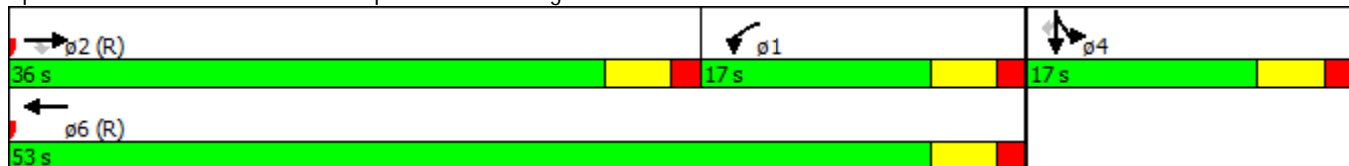


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.46	0.46	0.17	0.70					0.16	0.16	0.16
v/c Ratio		0.70	0.44	0.72	0.30					0.68	0.36	0.41
Control Delay		18.3	4.2	26.5	0.7					27.4	15.1	5.0
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		18.3	4.2	26.5	0.7					27.4	15.1	5.0
LOS		B	A	C	A					C	B	A
Approach Delay		12.9			10.1						17.2	
Approach LOS		B			B						B	
90th %ile Green (s)		31.0	31.0	12.0	48.0					12.0	12.0	12.0
90th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
70th %ile Green (s)		31.0	31.0	12.0	48.0					12.0	12.0	12.0
70th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
50th %ile Green (s)		30.1	30.1	12.9	48.0					12.0	12.0	12.0
50th %ile Term Code		Coord	Coord	Max	Coord					Max	Max	Max
30th %ile Green (s)		32.0	32.0	12.2	49.2					10.8	10.8	10.8
30th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
10th %ile Green (s)		37.0	37.0	10.0	52.0					8.0	8.0	8.0
10th %ile Term Code		Coord	Coord	Gap	Coord					Gap	Gap	Gap
Queue Length 50th (ft)		212	10	86	1					69	26	14
Queue Length 95th (ft)		223	46	#131	1					m#82	m28	m0
Internal Link Dist (ft)		640			663			384			953	
Turn Bay Length (ft)				200						200		200
Base Capacity (vph)		837	824	599	2408					303	316	365
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.70	0.43	0.70	0.30					0.62	0.33	0.38

Intersection Summary

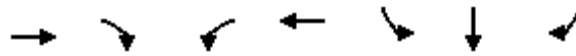
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 14 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 12.3 Intersection LOS: B
 Intersection Capacity Utilization 63.0% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: SB On-Ramp/SB C-D & Burlington



Phasings
14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



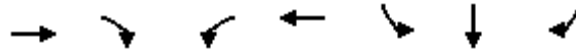
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Protected Phases	2		1	6	4	4	
Permitted Phases		2					4
Minimum Initial (s)	10.0	10.0	7.0	10.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	12.0	15.0	12.0	12.0	12.0
Total Split (s)	36.0	36.0	17.0	53.0	17.0	17.0	17.0
Total Split (%)	51.4%	51.4%	24.3%	75.7%	24.3%	24.3%	24.3%
Maximum Green (s)	31.0	31.0	12.0	48.0	12.0	12.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	31.0	31.0	12.0	48.0	12.0	12.0	12.0
90th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	31.0	31.0	12.0	48.0	12.0	12.0	12.0
70th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	30.1	30.1	12.9	48.0	12.0	12.0	12.0
50th %ile Term Code	Coord	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	32.0	32.0	12.2	49.2	10.8	10.8	10.8
30th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap
10th %ile Green (s)	37.0	37.0	10.0	52.0	8.0	8.0	8.0
10th %ile Term Code	Coord	Coord	Gap	Coord	Gap	Gap	Gap

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 14 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	583	358	418	734	189	104	140
v/c Ratio	0.70	0.44	0.72	0.30	0.68	0.36	0.41
Control Delay	18.3	4.2	26.5	0.7	27.4	15.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	4.2	26.5	0.7	27.4	15.1	5.0
Queue Length 50th (ft)	212	10	86	1	69	26	14
Queue Length 95th (ft)	223	46	#131	1	m#82	m28	m0
Internal Link Dist (ft)	640			663		953	
Turn Bay Length (ft)			200		200		200
Base Capacity (vph)	837	824	599	2408	303	316	365
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.43	0.70	0.30	0.62	0.33	0.38

Intersection Summary













95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



















HCM 2010 Signalized Intersection Summary
 14: SB On-Ramp/SB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖↗	↕					↖	↑	↗
Volume (veh/h)	0	554	340	397	697	0	0	0	0	180	99	133
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0.0	181.0	172.7	186.3	181.0	0.0				186.3	184.5	171.2
Adj Flow Rate, veh/h	0	583	0	418	734	0				189	104	0
Adj No. of Lanes	0	1	1	2	2	0				1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	5	10	2	5	0				2	3	11
Cap, veh/h	0	654	531	667	2252	0				259	270	213
Arrive On Green	0.00	0.72	0.00	0.39	1.00	0.00				0.15	0.15	0.00
Sat Flow, veh/h	0	1810	1468	3442	3529	0				1774	1845	1455
Grp Volume(v), veh/h	0	583	0	418	734	0				189	104	0
Grp Sat Flow(s),veh/h/ln	0	1810	1468	1721	1719	0				1774	1845	1455
Q Serve(g_s), s	0.0	12.6	0.0	4.9	0.0	0.0				5.1	2.6	0.0
Cycle Q Clear(g_c), s	0.0	12.6	0.0	4.9	0.0	0.0				5.1	2.6	0.0
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	654	531	667	2252	0				259	270	213
V/C Ratio(X)	0.00	0.89	0.00	0.63	0.33	0.00				0.73	0.39	0.00
Avail Cap(c_a), veh/h	0	1115	905	821	3281	0				423	440	347
HCM Platoon Ratio	1.00	2.00	2.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.93	0.00	0.78	0.78	0.00				1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	6.2	0.0	13.9	0.0	0.0				20.5	19.4	0.0
Incr Delay (d2), s/veh	0.0	15.7	0.0	0.8	0.3	0.0				3.9	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	13.3	0.0	4.3	0.2	0.0				5.0	2.5	0.0
LnGrp Delay(d),s/veh	0.0	21.9	0.0	14.7	0.3	0.0				24.4	20.3	0.0
LnGrp LOS		C		B	A					C	C	
Approach Vol, veh/h		583			1152						293	
Approach Delay, s/veh		21.9			5.5						23.0	
Approach LOS		C			A						C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	34.5	23.2		12.4		57.6						
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0						
Max Green Setting (Gmax), s	12.0	31.0		12.0		48.0						
Max Q Clear Time (g_c+I1), s	6.9	14.6		7.1		2.0						
Green Ext Time (p_c), s	2.8	3.6		0.4		8.3						
Intersection Summary												
HCM 2010 Ctrl Delay				12.8								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	588	0	0	784	156	310	136	489	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	150		150	0		0
Storage Lanes	1		0	0		0	2		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t					0.975				0.850			
Fl _t Protected	0.950						0.950					
Satd. Flow (prot)	1641	1845	0	0	3451	0	3183	1863	1599	0	0	0
Fl _t Permitted	0.950						0.950					
Satd. Flow (perm)	1641	1845	0	0	3451	0	3183	1863	1599	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					37				515			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		743			828			955			1582	
Travel Time (s)		16.9			18.8			14.5			24.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	10%	3%	2%	2%	2%	2%	10%	2%	1%	2%	2%	2%
Adj. Flow (vph)	154	619	0	0	825	164	326	143	515	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	619	0	0	989	0	326	143	515	0	0	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)		24			24			24			24	
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
Turn Type	Prot	NA			NA		Split	NA	Free			
Protected Phases	5	2			6		8	8				
Permitted Phases									Free			
Detector Phase	5	2			6		8	8				
Switch Phase												
Minimum Initial (s)	7.0	10.0			10.0		7.0	7.0				
Minimum Split (s)	12.0	15.0			15.0		12.0	12.0				
Total Split (s)	14.0	44.0			30.0		26.0	26.0				
Total Split (%)	20.0%	62.9%			42.9%		37.1%	37.1%				
Maximum Green (s)	9.0	39.0			25.0		21.0	21.0				
Yellow Time (s)	3.5	3.5			3.5		3.5	3.5				
All-Red Time (s)	1.5	1.5			1.5		1.5	1.5				
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0				
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0				
Lead/Lag	Lag				Lead							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0				
Recall Mode	None	C-Min			C-Min		None	None				
Act Effect Green (s)	9.2	47.2			33.0		12.8	12.8	70.0			

Lanes, Volumes, Timings
 15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

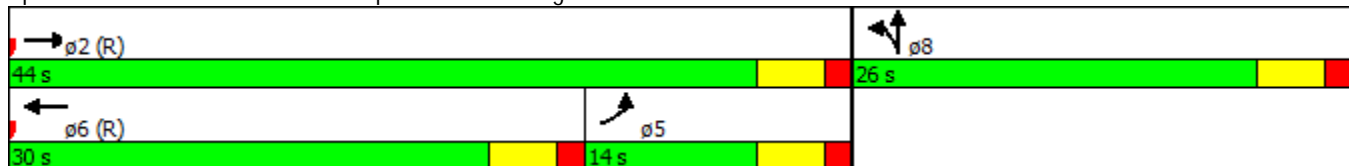


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.13	0.67			0.47		0.18	0.18	1.00			
v/c Ratio	0.71	0.50			0.60		0.56	0.42	0.32			
Control Delay	36.0	2.0			8.9		29.4	28.4	0.5			
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0			
Total Delay	36.0	2.0			8.9		29.4	28.4	0.5			
LOS	D	A			A		C	C	A			
Approach Delay		8.8			8.9			14.2				
Approach LOS		A			A			B				
90th %ile Green (s)	9.0	43.2			29.2		16.8	16.8				
90th %ile Term Code	Max	Coord			Coord		Gap	Gap				
70th %ile Green (s)	9.0	45.2			31.2		14.8	14.8				
70th %ile Term Code	Max	Coord			Coord		Gap	Gap				
50th %ile Green (s)	9.8	47.6			32.8		12.4	12.4				
50th %ile Term Code	Max	Coord			Coord		Gap	Gap				
30th %ile Green (s)	10.6	49.0			33.4		11.0	11.0				
30th %ile Term Code	Gap	Coord			Coord		Gap	Gap				
10th %ile Green (s)	7.8	51.1			38.3		8.9	8.9				
10th %ile Term Code	Gap	Coord			Coord		Gap	Gap				
Queue Length 50th (ft)	65	6			114		67	55	0			
Queue Length 95th (ft)	m#107	28			188		96	97	0			
Internal Link Dist (ft)		663			748			875			1502	
Turn Bay Length (ft)	200						150		150			
Base Capacity (vph)	221	1244			1645		954	558	1599			
Starvation Cap Reductn	0	0			0		0	0	0			
Spillback Cap Reductn	0	0			0		0	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.70	0.50			0.60		0.34	0.26	0.32			

Intersection Summary

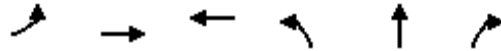
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 20 (29%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 10.7
 Intersection LOS: B
 Intersection Capacity Utilization 63.0%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: NB Off-Ramp/NB C-D & Burlington



Phasings
15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



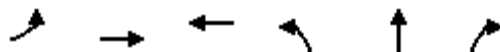
Lane Group	EBL	EBT	WBT	NBL	NBT	NBR
Protected Phases	5	2	6	8	8	
Permitted Phases	Free					
Minimum Initial (s)	7.0	10.0	10.0	7.0	7.0	
Minimum Split (s)	12.0	15.0	15.0	12.0	12.0	
Total Split (s)	14.0	44.0	30.0	26.0	26.0	
Total Split (%)	20.0%	62.9%	42.9%	37.1%	37.1%	
Maximum Green (s)	9.0	39.0	25.0	21.0	21.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	C-Min	C-Min	None	None	
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
90th %ile Green (s)	9.0	43.2	29.2	16.8	16.8	
90th %ile Term Code	Max	Coord	Coord	Gap	Gap	
70th %ile Green (s)	9.0	45.2	31.2	14.8	14.8	
70th %ile Term Code	Max	Coord	Coord	Gap	Gap	
50th %ile Green (s)	9.8	47.6	32.8	12.4	12.4	
50th %ile Term Code	Max	Coord	Coord	Gap	Gap	
30th %ile Green (s)	10.6	49.0	33.4	11.0	11.0	
30th %ile Term Code	Gap	Coord	Coord	Gap	Gap	
10th %ile Green (s)	7.8	51.1	38.3	8.9	8.9	
10th %ile Term Code	Gap	Coord	Coord	Gap	Gap	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 20 (29%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Control Type: Actuated-Coordinated

Queues
15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	NBL	NBT	NBR
Lane Group Flow (vph)	154	619	989	326	143	515
v/c Ratio	0.71	0.50	0.60	0.56	0.42	0.32
Control Delay	36.0	2.0	8.9	29.4	28.4	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	2.0	8.9	29.4	28.4	0.5
Queue Length 50th (ft)	65	6	114	67	55	0
Queue Length 95th (ft)	m#107	28	188	96	97	0
Internal Link Dist (ft)		663	748		875	
Turn Bay Length (ft)	200			150		150
Base Capacity (vph)	221	1244	1645	954	558	1599
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.50	0.60	0.34	0.26	0.32

Intersection Summary




















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 15: NB Off-Ramp/NB C-D & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	146	588	0	0	784	156	310	136	489	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	172.7	184.5	0.0	0.0	186.3	190.0	172.7	186.3	188.1			
Adj Flow Rate, veh/h	154	619	0	0	825	0	326	143	0			
Adj No. of Lanes	1	1	0	0	2	0	2	1	1			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	10	3	0	0	2	2	10	2	1			
Cap, veh/h	226	1116	0	0	1254	0	540	315	270			
Arrive On Green	0.27	1.00	0.00	0.00	0.35	0.00	0.17	0.17	0.00			
Sat Flow, veh/h	1645	1845	0	0	3725	0	3191	1863	1599			
Grp Volume(v), veh/h	154	619	0	0	825	0	326	143	0			
Grp Sat Flow(s),veh/h/ln	1645	1845	0	0	1770	0	1596	1863	1599			
Q Serve(g_s), s	3.7	0.0	0.0	0.0	8.7	0.0	4.2	3.1	0.0			
Cycle Q Clear(g_c), s	3.7	0.0	0.0	0.0	8.7	0.0	4.2	3.1	0.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	226	1116	0	0	1254	0	540	315	270			
V/C Ratio(X)	0.68	0.55	0.00	0.00	0.66	0.00	0.60	0.45	0.00			
Avail Cap(c_a), veh/h	335	1627	0	0	2001	0	1515	884	759			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.66	0.66	0.00	0.00	0.68	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	15.2	0.0	0.0	0.0	12.0	0.0	17.0	16.5	0.0			
Incr Delay (d2), s/veh	2.4	1.3	0.0	0.0	1.9	0.0	1.1	1.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	3.2	0.7	0.0	0.0	7.3	0.0	3.4	2.9	0.0			
LnGrp Delay(d),s/veh	17.5	1.3	0.0	0.0	13.9	0.0	18.1	17.6	0.0			
LnGrp LOS	B	A			B		B	B				
Approach Vol, veh/h		773			825			469				
Approach Delay, s/veh		4.5			13.9			17.9				
Approach LOS		A			B			B				
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		57.5			36.9	20.7		12.5				
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0				
Max Green Setting (Gmax), s		39.0			9.0	25.0		21.0				
Max Q Clear Time (g_c+I1), s		2.0			5.7	10.7		6.2				
Green Ext Time (p_c), s		5.3			1.5	5.0		1.3				
Intersection Summary												
HCM 2010 Ctrl Delay				11.3								
HCM 2010 LOS				B								

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	716	122	0	542	66	158	19	1	67	21	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	250		0	175		0	0		220
Storage Lanes	1		1	0		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
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			0.850		0.985			0.993				0.850
Flt Protected	0.950						0.950				0.963	
Satd. Flow (prot)	1770	1863	1583	0	1835	0	1770	1850	0	0	1794	1583
Flt Permitted	0.950						0.697				0.763	
Satd. Flow (perm)	1770	1863	1583	0	1835	0	1298	1850	0	0	1421	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128		11			1				190
Link Speed (mph)		30			30			30				30
Link Distance (ft)		828			677			517				525
Travel Time (s)		18.8			15.4			11.8				11.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	252	754	128	0	571	69	166	20	1	71	22	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	754	128	0	640	0	166	21	0	0	93	253
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)		12			12			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
Turn Type	Prot	NA	Perm		NA		Perm	NA		Perm	NA	pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases			2	6			8			4		4
Detector Phase	5	2	2	6	6		8	8		4	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	15.0		15.0	15.0		15.0	15.0	12.0
Total Split (s)	18.0	53.0	53.0	35.0	35.0		17.0	17.0		17.0	17.0	18.0
Total Split (%)	25.7%	75.7%	75.7%	50.0%	50.0%		24.3%	24.3%		24.3%	24.3%	25.7%
Maximum Green (s)	13.0	48.0	48.0	30.0	30.0		12.0	12.0		12.0	12.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	C-Min	C-Min		None	None		None	None	None
Act Effect Green (s)	12.5	48.3	48.3		30.8		11.7	11.7			11.7	29.2
Actuated g/C Ratio	0.18	0.69	0.69		0.44		0.17	0.17			0.17	0.42

Lanes, Volumes, Timings
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.80	0.59	0.11		0.79		0.77	0.07			0.39	0.33
Control Delay	50.4	4.5	0.2		23.5		52.9	24.2			29.9	5.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	50.4	4.5	0.2		23.5		52.9	24.2			29.9	5.5
LOS	D	A	A		C		D	C			C	A
Approach Delay		14.2			23.5			49.7			12.1	
Approach LOS		B			C			D			B	
90th %ile Green (s)	13.0	48.0	48.0	30.0	30.0		12.0	12.0		12.0	12.0	13.0
90th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Max		Max	Max	Max
70th %ile Green (s)	13.0	48.0	48.0	30.0	30.0		12.0	12.0		12.0	12.0	13.0
70th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Max		Hold	Hold	Max
50th %ile Green (s)	13.0	48.0	48.0	30.0	30.0		12.0	12.0		12.0	12.0	13.0
50th %ile Term Code	Max	Coord	Coord	Coord	Coord		Max	Max		Hold	Hold	Max
30th %ile Green (s)	13.4	47.5	47.5	29.1	29.1		12.5	12.5		12.5	12.5	13.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Gap	Gap		Hold	Hold	Gap
10th %ile Green (s)	10.2	50.0	50.0	34.8	34.8		10.0	10.0		10.0	10.0	10.2
10th %ile Term Code	Gap	Coord	Coord	Coord	Coord		Min	Min		Hold	Hold	Gap
Queue Length 50th (ft)	104	51	0		144		69	7			37	23
Queue Length 95th (ft)	#211	64	0		#405		#160	25			m78	71
Internal Link Dist (ft)		748			597			437			445	
Turn Bay Length (ft)	225						175					220
Base Capacity (vph)	330	1288	1133		817		224	320			245	782
Starvation Cap Reductn	0	0	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.76	0.59	0.11		0.78		0.74	0.07			0.38	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 51 (73%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 19.3 Intersection LOS: B
 Intersection Capacity Utilization 98.1% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 16: Joiner St & Burlington



Phasings
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Protected Phases	5	2		6		8		4	5
Permitted Phases			2		8		4		4
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0
Total Split (s)	18.0	53.0	53.0	35.0	17.0	17.0	17.0	17.0	18.0
Total Split (%)	25.7%	75.7%	75.7%	50.0%	24.3%	24.3%	24.3%	24.3%	25.7%
Maximum Green (s)	13.0	48.0	48.0	30.0	12.0	12.0	12.0	12.0	13.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead			Lag			Lead		
Lead-Lag Optimize?	Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	C-Min	None	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	13.0	48.0	48.0	30.0	12.0	12.0	12.0	12.0	13.0
90th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Max	Max	Max
70th %ile Green (s)	13.0	48.0	48.0	30.0	12.0	12.0	12.0	12.0	13.0
70th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Hold	Hold	Max
50th %ile Green (s)	13.0	48.0	48.0	30.0	12.0	12.0	12.0	12.0	13.0
50th %ile Term Code	Max	Coord	Coord	Coord	Max	Max	Hold	Hold	Max
30th %ile Green (s)	13.4	47.5	47.5	29.1	12.5	12.5	12.5	12.5	13.4
30th %ile Term Code	Gap	Coord	Coord	Coord	Gap	Gap	Hold	Hold	Gap
10th %ile Green (s)	10.2	50.0	50.0	34.8	10.0	10.0	10.0	10.0	10.2
10th %ile Term Code	Gap	Coord	Coord	Coord	Min	Min	Hold	Hold	Gap

Intersection Summary

Cycle Length: 70

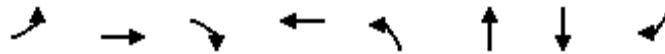
Actuated Cycle Length: 70

Offset: 51 (73%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Queues
16: Joiner St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	252	754	128	640	166	21	93	253
v/c Ratio	0.80	0.59	0.11	0.79	0.77	0.07	0.39	0.33
Control Delay	50.4	4.5	0.2	23.5	52.9	24.2	29.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	4.5	0.2	23.5	52.9	24.2	29.9	5.5
Queue Length 50th (ft)	104	51	0	144	69	7	37	23
Queue Length 95th (ft)	#211	64	0	#405	#160	25	m78	71
Internal Link Dist (ft)		748		597		437	445	
Turn Bay Length (ft)	225				175			220
Base Capacity (vph)	330	1288	1133	817	224	320	245	782
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.59	0.11	0.78	0.74	0.07	0.38	0.32

Intersection Summary





















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

















HCM 2010 Signalized Intersection Summary
 16: Joiner St & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	239	716	122	0	542	66	158	19	1	67	21	240
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	186.3	186.3	186.3	190.0	186.3	190.0	186.3	186.3	190.0	190.0	186.3	186.3
Adj Flow Rate, veh/h	252	754	128	0	571	0	166	20	1	71	22	253
Adj No. of Lanes	1	1	1	0	1	0	1	1	0	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	1227	1043	0	775	0	259	328	16	297	80	556
Arrive On Green	0.33	1.00	1.00	0.00	0.14	0.00	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1774	1863	1583	0	1863	0	1100	1759	88	1068	427	1583
Grp Volume(v), veh/h	252	754	128	0	571	0	166	0	21	93	0	253
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	1863	0	1100	0	1847	1495	0	1583
Q Serve(g_s), s	8.6	0.0	0.0	0.0	19.0	0.0	8.6	0.0	0.6	2.7	0.0	8.0
Cycle Q Clear(g_c), s	8.6	0.0	0.0	0.0	19.0	0.0	12.0	0.0	0.6	3.4	0.0	8.0
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.05	0.76		1.00
Lane Grp Cap(c), veh/h	293	1227	1043	0	775	0	259	0	344	377	0	556
V/C Ratio(X)	0.86	0.61	0.12	0.00	0.74	0.00	0.64	0.00	0.06	0.25	0.00	0.45
Avail Cap(c_a), veh/h	358	1388	1179	0	867	0	259	0	344	377	0	556
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	0.0	0.0	0.0	24.4	0.0	28.4	0.0	21.6	22.6	0.0	16.1
Incr Delay (d2), s/veh	15.0	2.1	0.2	0.0	6.2	0.0	5.2	0.0	0.1	0.3	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.0	1.3	0.1	0.0	16.6	0.0	5.9	0.0	0.6	2.6	0.0	6.3
LnGrp Delay(d),s/veh	35.9	2.1	0.2	0.0	30.6	0.0	33.6	0.0	21.7	23.0	0.0	16.7
LnGrp LOS	D	A	A		C		C		C	C		B
Approach Vol, veh/h		1134			571			187				346
Approach Delay, s/veh		9.4			30.6			32.3				18.4
Approach LOS		A			C			C				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		53.0		17.0	15.6	37.4		17.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s		48.0		12.0	13.0	30.0		12.0				
Max Q Clear Time (g_c+I1), s		2.0		10.0	10.6	21.0		14.0				
Green Ext Time (p_c), s		13.9		0.5	0.2	5.8		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			18.1									
HCM 2010 LOS			B									

Lanes, Volumes, Timings
17: Burlington

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	725	50	8	592	12	8	0	8	12	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.991			0.997			0.932			0.949	
Flt Protected					0.999			0.976			0.970	
Satd. Flow (prot)	0	1846	0	0	1855	0	0	1694	0	0	1715	0
Flt Permitted					0.999			0.976			0.970	
Satd. Flow (perm)	0	1846	0	0	1855	0	0	1694	0	0	1715	0
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		677			508			158			296	
Travel Time (s)		15.4			11.5			3.1			6.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	763	53	8	623	13	8	0	8	13	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	824	0	0	644	0	0	16	0	0	21	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)		12			12			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	55.8%
ICU Level of Service	B
Analysis Period (min)	15

Intersection									
Int Delay, s/veh	0.9								

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	725	50	8	592	12	8	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	763	53	8	623	13	8	0	8

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	636	0	0	816	0	0	1457	1459	789
Stage 1	-	-	-	-	-	-	806	806	-
Stage 2	-	-	-	-	-	-	651	653	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	947	-	-	812	-	-	108	129	391
Stage 1	-	-	-	-	-	-	376	395	-
Stage 2	-	-	-	-	-	-	457	464	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	947	-	-	812	-	-	104	125	391
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	125	-
Stage 1	-	-	-	-	-	-	370	389	-
Stage 2	-	-	-	-	-	-	442	457	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.1	29.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	947	-	-	812	-	-	150
HCM Lane V/C Ratio	0.103	0.009	-	-	0.01	-	-	0.14
HCM Control Delay (s)	29.4	8.8	0	-	9.5	0	-	32.9
HCM Lane LOS	D	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.5

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	12	0	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	13	0	8

Major/Minor

	Minor2		
Conflicting Flow All	1457	1479	629
Stage 1	646	646	-
Stage 2	811	833	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	108	126	482
Stage 1	460	467	-
Stage 2	373	384	-
Platoon blocked, %			
Mov Cap-1 Maneuver	103	122	482
Mov Cap-2 Maneuver	103	122	-
Stage 1	453	460	-
Stage 2	359	378	-

Approach

	SB
HCM Control Delay, s	32.9
HCM LOS	D

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	600	2	51	490	3	2	30	50	2	29	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		150	0		115
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
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					0.999				0.850			0.850
Flt Protected	0.950			0.950				0.997			0.997	
Satd. Flow (prot)	1770	1863	0	1770	1861	0	0	1857	1583	0	1857	1583
Flt Permitted	0.950			0.950				0.976			0.975	
Satd. Flow (perm)	1770	1863	0	1770	1861	0	0	1818	1583	0	1816	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					1				109			128
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		508			664			689			912	
Travel Time (s)		11.5			15.1			15.7			20.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	632	2	54	516	3	2	32	53	2	31	128
Shared Lane Traffic (%)												
Lane Group Flow (vph)	153	634	0	54	519	0	0	34	53	0	33	128
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)		12			12			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
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	pm+ov
Protected Phases	5	2		1	6			8	1		4	5
Permitted Phases							8		8	4		4
Detector Phase	5	2		1	6		8	8	1	4	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0		12.0	15.0		15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	17.0	43.0		12.0	38.0		15.0	15.0	12.0	15.0	15.0	17.0
Total Split (%)	24.3%	61.4%		17.1%	54.3%		21.4%	21.4%	17.1%	21.4%	21.4%	24.3%
Maximum Green (s)	12.0	38.0		7.0	33.0		10.0	10.0	7.0	10.0	10.0	12.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lead		Lag	Lag				Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	None	None
Act Effect Green (s)	10.6	49.3		8.1	43.4			10.0	14.1		10.0	16.6
Actuated g/C Ratio	0.15	0.70		0.12	0.62			0.14	0.20		0.14	0.24

Lanes, Volumes, Timings
18: North Rd/Taft St & Burlington

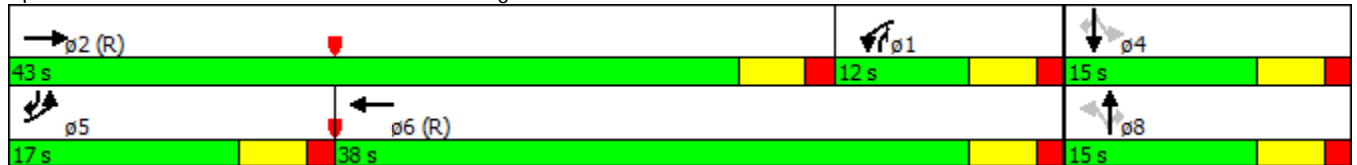
2032 Design Year - Build
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.57	0.48		0.26	0.45			0.13	0.13		0.13	0.27
Control Delay	35.4	7.7		34.8	12.4			27.7	1.3		10.7	4.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	35.4	7.7		34.8	12.4			27.7	1.3		10.7	4.8
LOS	D	A		C	B			C	A		B	A
Approach Delay		13.1			14.5			11.6			6.0	
Approach LOS		B			B			B			A	
90th %ile Green (s)	12.0	38.0		7.0	33.0		10.0	10.0	7.0	10.0	10.0	12.0
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max	Max	Max	Max	Max
70th %ile Green (s)	13.0	36.4		8.6	32.0		10.0	10.0	8.6	10.0	10.0	13.0
70th %ile Term Code	Gap	Coord		Gap	Coord		Min	Min	Gap	Min	Min	Gap
50th %ile Green (s)	11.3	50.7		9.3	48.7		0.0	0.0	9.3	0.0	0.0	11.3
50th %ile Term Code	Gap	Coord		Hold	Coord		Skip	Skip	Hold	Skip	Skip	Gap
30th %ile Green (s)	9.5	51.2		8.8	50.5		0.0	0.0	8.8	0.0	0.0	9.5
30th %ile Term Code	Gap	Coord		Hold	Coord		Skip	Skip	Hold	Skip	Skip	Gap
10th %ile Green (s)	7.0	65.0		0.0	53.0		0.0	0.0	0.0	0.0	0.0	7.0
10th %ile Term Code	Min	Coord		Skip	Coord		Skip	Skip	Skip	Skip	Skip	Min
Queue Length 50th (ft)	68	141		21	60			13	0		6	0
Queue Length 95th (ft)	m97	165		m38	238			37	5		m17	m66
Internal Link Dist (ft)		428			584			609			832	
Turn Bay Length (ft)	200			200					150			115
Base Capacity (vph)	308	1319		206	1160			259	406		259	506
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.50	0.48		0.26	0.45			0.13	0.13		0.13	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 8 (11%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 12.8 Intersection LOS: B
 Intersection Capacity Utilization 58.4% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: North Rd/Taft St & Burlington



Phasings
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	5	2	1	6		8	1		4	5
Permitted Phases					8		8	4		4
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	10.0	7.0	10.0	10.0	7.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	15.0	12.0	15.0	15.0	12.0
Total Split (s)	17.0	43.0	12.0	38.0	15.0	15.0	12.0	15.0	15.0	17.0
Total Split (%)	24.3%	61.4%	17.1%	54.3%	21.4%	21.4%	17.1%	21.4%	21.4%	24.3%
Maximum Green (s)	12.0	38.0	7.0	33.0	10.0	10.0	7.0	10.0	10.0	12.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead	Lead	Lag	Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
Walk Time (s)										
Flash Dont Walk (s)										
Pedestrian Calls (#/hr)										
90th %ile Green (s)	12.0	38.0	7.0	33.0	10.0	10.0	7.0	10.0	10.0	12.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max	Max	Max	Max
70th %ile Green (s)	13.0	36.4	8.6	32.0	10.0	10.0	8.6	10.0	10.0	13.0
70th %ile Term Code	Gap	Coord	Gap	Coord	Min	Min	Gap	Min	Min	Gap
50th %ile Green (s)	11.3	50.7	9.3	48.7	0.0	0.0	9.3	0.0	0.0	11.3
50th %ile Term Code	Gap	Coord	Hold	Coord	Skip	Skip	Hold	Skip	Skip	Gap
30th %ile Green (s)	9.5	51.2	8.8	50.5	0.0	0.0	8.8	0.0	0.0	9.5
30th %ile Term Code	Gap	Coord	Hold	Coord	Skip	Skip	Hold	Skip	Skip	Gap
10th %ile Green (s)	7.0	65.0	0.0	53.0	0.0	0.0	0.0	0.0	0.0	7.0
10th %ile Term Code	Min	Coord	Skip	Coord	Skip	Skip	Skip	Skip	Skip	Min

Intersection Summary

Cycle Length: 70

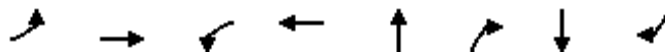
Actuated Cycle Length: 70

Offset: 8 (11%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Queues
18: North Rd/Taft St & Burlington

2032 Design Year - Build
PM Peak Hour























Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	153	634	54	519	34	53	33	128
v/c Ratio	0.57	0.48	0.26	0.45	0.13	0.13	0.13	0.27
Control Delay	35.4	7.7	34.8	12.4	27.7	1.3	10.7	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	7.7	34.8	12.4	27.7	1.3	10.7	4.8
Queue Length 50th (ft)	68	141	21	60	13	0	6	0
Queue Length 95th (ft)	m97	165	m38	238	37	5	m17	m66
Internal Link Dist (ft)		428		584	609		832	
Turn Bay Length (ft)	200		200			150		115
Base Capacity (vph)	308	1319	206	1160	259	406	259	506
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.48	0.26	0.45	0.13	0.13	0.13	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 18: North Rd/Taft St & Burlington

2032 Design Year - Build
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	600	2	51	490	3	2	30	50	2	29	122
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	153	632	2	54	516	3	2	32	53	2	31	128
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	189	682	2	490	994	6	59	257	662	59	258	393
Arrive On Green	0.21	0.74	0.74	0.28	0.54	0.54	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1774	1856	6	1774	1850	11	30	1817	1583	31	1818	1583
Grp Volume(v), veh/h	153	0	634	54	0	519	34	0	53	33	0	128
Grp Sat Flow(s),veh/h/ln	1774	0	1862	1774	0	1861	1847	0	1583	1849	0	1583
Q Serve(g_s), s	5.7	0.0	19.8	1.6	0.0	12.5	0.0	0.0	0.0	0.0	0.0	4.6
Cycle Q Clear(g_c), s	5.7	0.0	19.8	1.6	0.0	12.5	1.1	0.0	0.0	1.1	0.0	4.6
Prop In Lane	1.00		0.00	1.00		0.01	0.06		1.00	0.06		1.00
Lane Grp Cap(c), veh/h	189	0	685	490	0	1000	316	0	662	317	0	393
V/C Ratio(X)	0.81	0.00	0.93	0.11	0.00	0.52	0.11	0.00	0.08	0.10	0.00	0.33
Avail Cap(c_a), veh/h	304	0	1011	490	0	1000	318	0	664	319	0	395
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.8	0.0	8.5	18.9	0.0	10.4	26.3	0.0	12.3	26.2	0.0	21.5
Incr Delay (d2), s/veh	8.1	0.0	20.4	0.1	0.0	1.9	0.1	0.0	0.1	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.2	0.0	13.0	0.8	0.0	6.9	0.6	0.0	0.6	0.6	0.0	2.1
LnGrp Delay(d),s/veh	34.9	0.0	28.9	19.0	0.0	12.3	26.4	0.0	12.3	26.4	0.0	22.0
LnGrp LOS	C		C	B		B	C		B	C		C
Approach Vol, veh/h		787			573			87			161	
Approach Delay, s/veh		30.1			13.0			17.8			22.9	
Approach LOS		C			B			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.3	30.7		14.9	12.5	42.6		14.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	38.0		10.0	12.0	33.0		10.0				
Max Q Clear Time (g_c+I1), s	3.6	21.8		6.6	7.7	14.5		3.1				
Green Ext Time (p_c), s	1.1	4.0		0.3	0.1	3.4		0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			22.6									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
20: Winery Rd & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	27	3	16	33	14	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987		0.909			
Flt Protected	0.957					0.974
Satd. Flow (prot)	1759	0	1693	0	0	1814
Flt Permitted	0.957					0.974
Satd. Flow (perm)	1759	0	1693	0	0	1814
Link Speed (mph)	30		35			35
Link Distance (ft)	864		1335			1790
Travel Time (s)	19.6		26.0			34.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	3	17	35	15	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	31	0	52	0	0	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
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)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.1%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 3.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	27	3	16	33	14	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	3	17	35	15	13

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	76	34	0
Stage 1	34	-	-
Stage 2	42	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	927	1039	1554
Stage 1	988	-	-
Stage 2	980	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	918	1039	1554
Mov Cap-2 Maneuver	918	-	-
Stage 1	988	-	-
Stage 2	970	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	929	1554	-
HCM Lane V/C Ratio	-	-	0.034	0.009	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lanes, Volumes, Timings
21: North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1	37	16	112	116	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.882			
Flt Protected		0.999			0.950	
Satd. Flow (prot)	0	1760	1538	0	1641	0
Flt Permitted		0.999			0.950	
Satd. Flow (perm)	0	1760	1538	0	1641	0
Link Speed (mph)		30	30		35	
Link Distance (ft)		864	1164		673	
Travel Time (s)		19.6	26.5		13.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	8%	2%	10%	10%	2%
Adj. Flow (vph)	1	39	17	118	122	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	40	135	0	122	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		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)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.8%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	1	37	16	112	116	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	8	2	10	10	2
Mvmt Flow	1	39	17	118	122	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	135	0	117
Stage 1	-	-	76
Stage 2	-	-	41
Critical Hdwy	4.12	-	6.5
Critical Hdwy Stg 1	-	-	5.5
Critical Hdwy Stg 2	-	-	5.5
Follow-up Hdwy	2.218	-	3.59
Pot Cap-1 Maneuver	1449	-	860
Stage 1	-	-	927
Stage 2	-	-	961
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1449	-	859
Mov Cap-2 Maneuver	-	-	859
Stage 1	-	-	927
Stage 2	-	-	960

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1449	-	-	-	859
HCM Lane V/C Ratio	0.001	-	-	-	0.142
HCM Control Delay (s)	7.5	0	-	-	9.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Lanes, Volumes, Timings
22: Russell Rd & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	148	0	1	0	0	0	1	1	0	1	1	128
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	0		0	0		0	120		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999										0.867
Flt Protected		0.953						0.976				
Satd. Flow (prot)	0	1723	0	0	1863	0	0	1818	0	0	1499	0
Flt Permitted		0.953						0.976				
Satd. Flow (perm)	0	1723	0	0	1863	0	0	1818	0	0	1499	0
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		1164			489			1310			602	
Travel Time (s)		26.5			9.5			25.5			11.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	2%	1%	2%	2%	2%	2%	2%	2%	2%	1%	10%
Adj. Flow (vph)	156	0	1	0	0	0	1	1	0	1	1	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	157	0	0	0	0	0	2	0	0	137	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			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.0%
Analysis Period (min)	15
	ICU Level of Service A

Intersection												
Intersection Delay, s/veh	7.9											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	148	0	1	0	0	0	0	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	5	2	1	2	2	2	2	2	2	2	2
Mvmt Flow	0	156	0	1	0	0	0	0	0	1	1	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.5	0	7.6
HCM LOS	A	-	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	99%	0%	1%
Vol Thru, %	50%	0%	100%	1%
Vol Right, %	0%	1%	0%	98%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	149	0	130
LT Vol	1	0	0	1
Through Vol	0	1	0	128
RT Vol	1	148	0	1
Lane Flow Rate	2	157	0	137
Geometry Grp	1	1	1	1
Degree of Util (X)	0.003	0.193	0	0.142
Departure Headway (Hd)	4.542	4.422	4.3	3.726
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	792	809	0	969
Service Time	2.545	2.463	2.391	1.726
HCM Lane V/C Ratio	0.003	0.194	0	0.141
HCM Control Delay	7.6	8.5	7.4	7.3
HCM Lane LOS	A	A	N	A
HCM 95th-tile Q	0	0.7	0	0.5

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	1	1	128
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	1	10
Mvmt Flow	0	1	1	135
Number of Lanes	0	0	1	0























Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.3
HCM LOS	A

Lane

Lanes, Volumes, Timings
28: Joiner St

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	0	146	129	0	32	142	52	130	33	53	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	115		115	115		115
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	100			100			100			100		
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		0.850			0.850				0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1773	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1583	0	1770	1583	0	1770	1863	1583	1770	1773	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		624			647			525			582	
Travel Time (s)		14.2			14.7			11.9			13.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	0	154	136	0	34	149	55	137	35	56	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	154	0	136	34	0	149	55	137	35	82	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)		12			12			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	40.7%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	27	0	146	129	0	32	142	52	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	Yeild	-	-	Yeild	-	-	Yeild
Storage Length	115	-	-	115	-	-	115	-	115
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	0	154	136	0	34	149	55	137

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	479	479	56	479	479	55	56	0	0
Stage 1	125	125	-	354	354	-	-	-	-
Stage 2	354	354	-	125	125	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	497	486	1011	497	486	1012	1549	-	-
Stage 1	879	792	-	663	630	-	-	-	-
Stage 2	663	630	-	879	792	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	438	429	1011	384	429	1012	1549	-	-
Mov Cap-2 Maneuver	438	429	-	384	429	-	-	-	-
Stage 1	794	774	-	599	569	-	-	-	-
Stage 2	579	569	-	729	774	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	9.2	18.1	3.3
HCM LOS	A	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	438	1198	384	479	1550	-	-
HCM Lane V/C Ratio	0.096	-	-	0.065	0.128	0.354	0.07	0.022	-	-
HCM Control Delay (s)	7.6	-	-	13.8	8.4	19.4	13.1	7.4	-	-
HCM Lane LOS	A	-	-	B	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	0.4	1.6	0.2	0.1	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	33	53	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	115	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	35	56	26

Major/Minor Major2

Conflicting Flow All	55	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1550	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1550	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s	2.2
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	233	195	2	93	2	269	253	5	5	227	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	0		0	200		0	115		115
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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			0.850		0.997			0.997			0.934	
Flt Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1855	0	1770	3529	0	1770	3306	0
Flt Permitted	0.506				0.991		0.950			0.950		
Satd. Flow (perm)	943	1863	1583	0	1840	0	1770	3529	0	1770	3306	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147		1			3			188	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1069			1076			386			2471	
Travel Time (s)		24.3			24.5			7.5			48.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	234	245	205	2	98	2	283	266	5	5	239	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	245	205	0	102	0	283	271	0	5	427	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)		12			12			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
Turn Type	pm+pt	NA	pm+ov	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3		6		3	8		7	4	
Permitted Phases	2		2	6								
Detector Phase	5	2	3	6	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0		12.0	15.0		12.0	15.0	
Total Split (s)	14.0	30.0	24.0	16.0	16.0		24.0	28.0		12.0	16.0	
Total Split (%)	20.0%	42.9%	34.3%	22.9%	22.9%		34.3%	40.0%		17.1%	22.9%	
Maximum Green (s)	9.0	25.0	19.0	11.0	11.0		19.0	23.0		7.0	11.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead		Lag	Lag	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Min	None	C-Min	C-Min		None	None		None	None	
Act Effect Green (s)	28.7	28.7	49.4		14.3		15.6	28.9		7.0	10.6	
Actuated g/C Ratio	0.41	0.41	0.71		0.20		0.22	0.41		0.10	0.15	

Lanes, Volumes, Timings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
PM Peak Hour

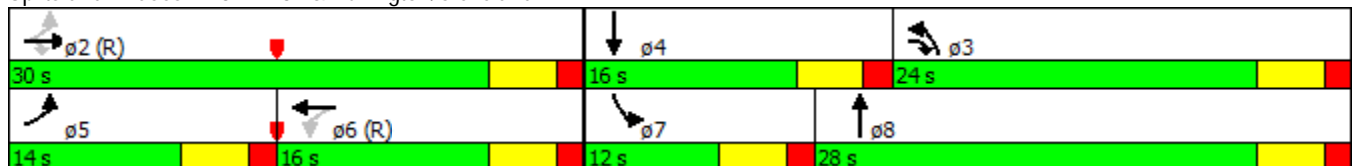


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.47	0.32	0.18		0.27		0.72	0.19		0.03	0.65	
Control Delay	13.1	11.2	1.6		27.8		35.4	13.6		29.0	20.4	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	13.1	11.2	1.6		27.8		35.4	13.6		29.0	20.4	
LOS	B	B	A		C		D	B		C	C	
Approach Delay		9.0			27.8			24.7			20.5	
Approach LOS		A			C			C			C	
90th %ile Green (s)	9.0	25.0	19.0	11.0	11.0		19.0	23.0		7.0	11.0	
90th %ile Term Code	Max	Coord	Max	Coord	Coord		Max	Hold		Max	Max	
70th %ile Green (s)	9.4	24.9	18.6	10.5	10.5		18.6	35.1		0.0	11.5	
70th %ile Term Code	Max	Coord	Gap	Coord	Coord		Gap	Hold		Skip	Max	
50th %ile Green (s)	11.8	28.1	16.3	11.3	11.3		16.3	31.9		0.0	10.6	
50th %ile Term Code	Gap	Coord	Gap	Coord	Coord		Gap	Hold		Skip	Gap	
30th %ile Green (s)	9.7	31.1	13.9	16.4	16.4		13.9	28.9		0.0	10.0	
30th %ile Term Code	Gap	Coord	Gap	Coord	Coord		Gap	Hold		Skip	Min	
10th %ile Green (s)	7.4	34.6	10.4	22.2	22.2		10.4	25.4		0.0	10.0	
10th %ile Term Code	Gap	Coord	Gap	Coord	Coord		Gap	Hold		Skip	Min	
Queue Length 50th (ft)	67	69	19		39		112	34		2	50	
Queue Length 95th (ft)	44	45	8		82		179	70		11	93	
Internal Link Dist (ft)		989			996			306			2391	
Turn Bay Length (ft)	200		200				200			115		
Base Capacity (vph)	502	765	1131		378		480	1456		177	682	
Starvation Cap Reductn	0	0	0		0		0	0		0	0	
Spillback Cap Reductn	0	0	0		0		0	0		0	0	
Storage Cap Reductn	0	0	0		0		0	0		0	0	
Reduced v/c Ratio	0.47	0.32	0.18		0.27		0.59	0.19		0.03	0.63	

Intersection Summary

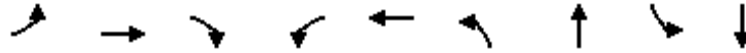
Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 48 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 17.8
 Intersection LOS: B
 Intersection Capacity Utilization 58.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 32: IL 37 & Burlington/Cleveland



Phasings
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
PM Peak Hour



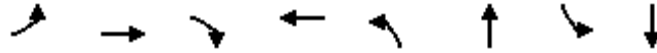
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	5	2	3		6	3	8	7	4
Permitted Phases	2		2	6					
Minimum Initial (s)	7.0	10.0	7.0	10.0	10.0	7.0	10.0	7.0	10.0
Minimum Split (s)	12.0	15.0	12.0	15.0	15.0	12.0	15.0	12.0	15.0
Total Split (s)	14.0	30.0	24.0	16.0	16.0	24.0	28.0	12.0	16.0
Total Split (%)	20.0%	42.9%	34.3%	22.9%	22.9%	34.3%	40.0%	17.1%	22.9%
Maximum Green (s)	9.0	25.0	19.0	11.0	11.0	19.0	23.0	7.0	11.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	C-Min	None	None	None	None
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									
90th %ile Green (s)	9.0	25.0	19.0	11.0	11.0	19.0	23.0	7.0	11.0
90th %ile Term Code	Max	Coord	Max	Coord	Coord	Max	Hold	Max	Max
70th %ile Green (s)	9.4	24.9	18.6	10.5	10.5	18.6	35.1	0.0	11.5
70th %ile Term Code	Max	Coord	Gap	Coord	Coord	Gap	Hold	Skip	Max
50th %ile Green (s)	11.8	28.1	16.3	11.3	11.3	16.3	31.9	0.0	10.6
50th %ile Term Code	Gap	Coord	Gap	Coord	Coord	Gap	Hold	Skip	Gap
30th %ile Green (s)	9.7	31.1	13.9	16.4	16.4	13.9	28.9	0.0	10.0
30th %ile Term Code	Gap	Coord	Gap	Coord	Coord	Gap	Hold	Skip	Min
10th %ile Green (s)	7.4	34.6	10.4	22.2	22.2	10.4	25.4	0.0	10.0
10th %ile Term Code	Gap	Coord	Gap	Coord	Coord	Gap	Hold	Skip	Min

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 48 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Control Type: Actuated-Coordinated

Queues
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
PM Peak Hour























Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	245	205	102	283	271	5	427
v/c Ratio	0.47	0.32	0.18	0.27	0.72	0.19	0.03	0.65
Control Delay	13.1	11.2	1.6	27.8	35.4	13.6	29.0	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	11.2	1.6	27.8	35.4	13.6	29.0	20.4
Queue Length 50th (ft)	67	69	19	39	112	34	2	50
Queue Length 95th (ft)	44	45	8	82	179	70	11	93
Internal Link Dist (ft)		989		996		306		2391
Turn Bay Length (ft)	200		200		200		115	
Base Capacity (vph)	502	765	1131	378	480	1456	177	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.32	0.18	0.27	0.59	0.19	0.03	0.63

Intersection Summary

















HCM 2010 Signalized Intersection Summary
32: IL 37 & Burlington/Cleveland

2032 Design Year - Build
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	222	233	195	2	93	2	269	253	5	5	227	179
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	234	245	205	2	98	2	283	266	5	5	239	188
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	675	818	999	54	447	9	340	1199	23	16	298	225
Arrive On Green	0.12	0.44	0.44	0.25	0.25	0.25	0.19	0.34	0.34	0.01	0.16	0.16
Sat Flow, veh/h	1774	1863	1583	8	1804	36	1774	3554	67	1774	1923	1453
Grp Volume(v), veh/h	234	245	205	102	0	0	283	132	139	5	219	208
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1849	0	0	1774	1770	1851	1774	1770	1606
Q Serve(g_s), s	6.4	5.9	0.0	0.0	0.0	0.0	10.7	3.7	3.8	0.2	8.4	8.8
Cycle Q Clear(g_c), s	6.4	5.9	0.0	3.1	0.0	0.0	10.7	3.7	3.8	0.2	8.4	8.8
Prop In Lane	1.00		1.00	0.02		0.02	1.00		0.04	1.00		0.90
Lane Grp Cap(c), veh/h	675	818	999	511	0	0	340	597	625	16	274	249
V/C Ratio(X)	0.35	0.30	0.21	0.20	0.00	0.00	0.83	0.22	0.22	0.30	0.80	0.83
Avail Cap(c_a), veh/h	691	818	999	511	0	0	482	597	625	177	278	252
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	14.7	12.7	5.5	20.9	0.0	0.0	27.2	16.6	16.6	34.5	28.5	28.7
Incr Delay (d2), s/veh	0.3	0.9	0.5	0.9	0.0	0.0	8.4	0.2	0.2	8.7	13.1	18.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	3.1	3.3	1.8	1.7	0.0	0.0	6.1	1.9	2.0	0.1	5.1	5.1
LnGrp Delay(d),s/veh	15.0	13.6	5.9	21.8	0.0	0.0	35.6	16.8	16.8	43.1	41.6	47.0
LnGrp LOS	B	B	A	C			D	B	B	D	D	D
Approach Vol, veh/h		684			102			554			432	
Approach Delay, s/veh		11.8			21.8			26.4			44.2	
Approach LOS		B			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		35.7	18.4	15.9	13.4	22.4	5.6	28.6				
Change Period (Y+Rc), s		5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s		25.0	19.0	11.0	9.0	11.0	7.0	23.0				
Max Q Clear Time (g_c+I1), s		7.9	12.7	10.8	8.4	5.1	2.2	5.8				
Green Ext Time (p_c), s		2.5	0.7	0.1	0.0	1.4	0.0	2.2				
Intersection Summary												
HCM 2010 Ctrl Delay			24.8									
HCM 2010 LOS			C									

Lanes, Volumes, Timings
35: North Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	60	0	0	57	23	0	0	0	20	0	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.961							0.911
Flt Protected												0.983
Satd. Flow (prot)	0	1863	0	0	1790	0	0	1863	0	0	1668	0
Flt Permitted												0.983
Satd. Flow (perm)	0	1863	0	0	1790	0	0	1863	0	0	1668	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		655			689			460			195	
Travel Time (s)		14.9			15.7			9.0			3.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	63	0	0	60	24	0	0	0	21	0	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	84	0	0	0	0	0	61	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		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	14.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	60	0	0	57	23	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	63	0	0	60	24	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	84	63	155
Stage 1	-	-	63
Stage 2	-	-	92
Critical Hdwy	4.12	4.12	7.12
Critical Hdwy Stg 1	-	-	6.12
Critical Hdwy Stg 2	-	-	6.12
Follow-up Hdwy	2.218	2.218	3.518
Pot Cap-1 Maneuver	1513	1540	812
Stage 1	-	-	948
Stage 2	-	-	915
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1513	1540	779
Mov Cap-2 Maneuver	-	-	779
Stage 1	-	-	948
Stage 2	-	-	878

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1513	-	-	1540	-	-	931
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.066
HCM Control Delay (s)	0	0	-	-	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	20	0	38
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	21	0	40

Major/Minor

	Minor2		
Conflicting Flow All	135	135	72
Stage 1	72	72	-
Stage 2	63	63	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	836	756	990
Stage 1	938	835	-
Stage 2	948	842	-
Platoon blocked, %			
Mov Cap-1 Maneuver	836	756	990
Mov Cap-2 Maneuver	836	756	-
Stage 1	938	835	-
Stage 2	948	842	-






















Approach

	SB
HCM Control Delay, s	9.1
HCM LOS	A

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
38: Russell Rd

2032 Design Year - Build
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	0	1	1	1	267	1	148	1	233	128	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	115		0	0		200
Storage Lanes	1		0	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
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		0.850				0.850		0.999				0.850
Flt Protected	0.950				0.976		0.950			0.950		
Satd. Flow (prot)	1770	1583	0	0	1836	1404	1787	1808	0	1530	1727	1583
Flt Permitted	0.950				0.976		0.950			0.950		
Satd. Flow (perm)	1770	1583	0	0	1836	1404	1787	1808	0	1530	1727	1583
Link Speed (mph)		35			35			35				35
Link Distance (ft)		796			593			602				557
Travel Time (s)		15.5			11.6			11.7				10.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	15%	1%	5%	1%	18%	10%	2%
Adj. Flow (vph)	321	0	1	1	1	281	1	156	1	245	135	338
Shared Lane Traffic (%)												
Lane Group Flow (vph)	321	1	0	0	2	281	1	157	0	245	135	338
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)		12			12			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	54.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 95.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	305	0	1	1	1	267	1	148	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Yield	-	-	Yield
Storage Length	0	-	-	-	-	0	115	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	1	1	15	1	5	1
Mvmt Flow	321	0	1	1	1	281	1	156	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	783	783	135	784	783	156	135	0	0
Stage 1	625	625	-	158	158	-	-	-	-
Stage 2	158	158	-	626	625	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.11	6.51	6.35	4.11	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.11	5.51	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.11	5.51	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.509	4.009	3.435	2.209	-	-
Pot Cap-1 Maneuver	~ 311	325	914	312	327	857	1456	-	-
Stage 1	473	477	-	847	769	-	-	-	-
Stage 2	844	767	-	474	479	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 179	265	914	267	267	857	1456	-	-
Mov Cap-2 Maneuver	~ 179	265	-	267	267	-	-	-	-
Stage 1	473	389	-	846	768	-	-	-	-
Stage 2	566	766	-	386	391	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	\$ 421.6	11.3	0
HCM LOS	F	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1456	-	-	179	914	267	857	1332	-	-
HCM Lane V/C Ratio	0.001	-	-	1.794	0.001	0.008	0.328	0.184	-	-
HCM Control Delay (s)	7.5	-	-	\$ 423	8.9	18.6	11.2	8.3	-	-
HCM Lane LOS	A	-	-	F	A	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	23	0	0	1.4	0.7	-	-

Notes

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

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	233	128	321
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	Yield
Storage Length	0	-	200
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	18	10	2
Mvmt Flow	245	135	338

Major/Minor Major2

Conflicting Flow All	156	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.28	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.362	-	-
Pot Cap-1 Maneuver	1332	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1332	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach SB

HCM Control Delay, s 2.8

HCM LOS

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
42: Taft St & Jones St

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	39	1	1	1	1	1	1	175	1	1	151	39
Ideal Flow (vphp)	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		0.997			0.955			0.999			0.972	
Flt Protected		0.954			0.984							
Satd. Flow (prot)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Flt Permitted		0.954			0.984							
Satd. Flow (perm)	0	1772	0	0	1750	0	0	1861	0	0	1811	0
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		377			767			912			350	
Travel Time (s)		7.3			14.9			20.7			8.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	1	1	1	1	1	1	184	1	1	159	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	3	0	0	186	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	23.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	39	1	1	1	1	1	1	175	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	1	1	1	1	1	1	184	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	370	369	179	370	389	185	200	0	0
Stage 1	182	182	-	187	187	-	-	-	-
Stage 2	188	187	-	183	202	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-
Pot Cap-1 Maneuver	587	560	864	587	546	857	1372	-	-
Stage 1	820	749	-	815	745	-	-	-	-
Stage 2	814	745	-	819	734	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	585	559	864	585	545	857	1372	-	-
Mov Cap-2 Maneuver	585	559	-	585	545	-	-	-	-
Stage 1	819	748	-	814	744	-	-	-	-
Stage 2	811	744	-	816	733	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11.6	10.7	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	589	637	1390	-	-
HCM Lane V/C Ratio	0.001	-	-	0.073	0.005	0.001	-	-
HCM Control Delay (s)	7.6	0	-	11.6	10.7	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	151	39
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	2	2	2
Mvmt Flow	1	159	41

Major/Minor

Major2

Conflicting Flow All	185	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1390	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1390	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

SB

HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Lanes, Volumes, Timings
49: Relocated S.W. Rd/Joiner St & North Rd

2032 Design Year - Build
PM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	87	29	1	25	32	38	0	52	31	0	46	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999			0.946			0.949			0.908	
Flt Protected		0.964			0.987							
Satd. Flow (prot)	0	1794	0	0	1739	0	0	1768	0	0	1691	0
Flt Permitted		0.964			0.987							
Satd. Flow (perm)	0	1794	0	0	1739	0	0	1768	0	0	1691	0
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		235			655			589			517	
Travel Time (s)		5.3			14.9			11.5			11.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	31	1	26	34	40	0	55	33	0	48	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	124	0	0	100	0	0	88	0	0	150	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			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.1%
Analysis Period (min)	15
	ICU Level of Service A

Intersection												
Intersection Delay, s/veh	8.2											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	87	29	1	0	25	32	38	0	0	52	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	92	31	1	0	26	34	40	0	0	55	33
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.6	8.1	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	74%	26%	0%
Vol Thru, %	63%	25%	34%	32%
Vol Right, %	37%	1%	40%	68%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	83	117	95	143
LT Vol	52	29	32	46
Through Vol	31	1	38	97
RT Vol	0	87	25	0
Lane Flow Rate	87	123	100	151
Geometry Grp	1	1	1	1
Degree of Util (X)	0.107	0.161	0.123	0.173
Departure Headway (Hd)	4.394	4.706	4.41	4.148
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	816	762	813	866
Service Time	2.42	2.734	2.438	2.172
HCM Lane V/C Ratio	0.107	0.161	0.123	0.174
HCM Control Delay	7.9	8.6	8.1	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.6	0.4	0.6

Intersection

Intersection Delay, s/veh
 Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	0	46	97
Peak Hour Factor	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	0	48	102
Number of Lanes	0	0	1	0

Approach SB

Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane



**APPENDIX F – HCS PROGRAM PRINTOUTS FOR I-57 SEGMENTS & RAMPS
ANALYSIS**

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing AM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	932	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	555	pc/h/ln	
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)
D = v _p / S	7.4	pc/mi/ln	
LOS	A		S
			mph
			D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR149
Date Performed	10/3/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing AM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1000	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	595	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.9	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing PM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1193	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	710	pc/h/ln	Design LOS
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)
D = v _p / S	9.5	pc/mi/ln	S
LOS	A		mph
			D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR 149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing PM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1223	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	728	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	9.7	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	Bewtween SR 149 On & Off Ramps
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2012 - Existing
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	780	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	464	pc/h/ln	
x f _p)			
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV})
D = v _p / S	6.2	pc/mi/ln	x f _p)
LOS	A		S
			D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	Bewtween SR 149 On & Off Ramps
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2012 - Existing
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
		<input type="checkbox"/> Planning Data	
Flow Inputs			
Volume, V	895	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	533	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.1	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	Bewtween SR 149 On & Off Ramps
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2012 - Existing
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1092	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	650	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	8.7	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	Bewtween SR 149 On & Off Ramps
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2012 - Existing
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1086	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	646	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	8.6	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing AM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	937	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	558	pc/h/ln	
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)
D = v _p / S	7.4	pc/mi/ln	
LOS	A		S
			D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing AM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1292	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			mi
			Up/Down %
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	769	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	10.3	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing PM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1426	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	849	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	11.3	pc/mi/ln	S
LOS	B		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	Existing PM Peak Hour	Analysis Year	2012
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1311	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	2		0.0
Total Ramp Density, TRD	0.33	ramps/mi	f _{LC}
FFS (measured)		mph	0.0
Base free-flow Speed, BFFS	75.4	mph	TRD Adjustment
			1.3
			FFS
			74.1
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	780	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	10.4	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 NB
Agency or Company	CHA	Junction	NB Exit to SR149
Date Performed	10-30-13	Jurisdiction	IDOT
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L _A Deceleration Lane Length L _D 250 Freeway Volume, V _F 1141 Ramp Volume, V _R 189 Freeway Free-Flow Speed, S _{FF} 65.0 Ramp Free-Flow Speed, S _{FR} 45.0	Downstream Adj Ramp <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = 2235 ft V _D = 198 veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1141	0.94	Level	23	2	0.894	1.00	1358
Ramp	189	0.94	Level	4	1	0.978	1.00	205
UpStream								
DownStream	198	0.94	Level	4	1	0.978	1.00	215

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.717 using Equation (Exhibit 13-7) V ₁₂ = 1031 pc/h V ₃ or V _{av34} 327 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?	
V _{FO}		Exhibit 13-8		V _F	1358	Exhibit 13-8	7050	No
				V _{FO} = V _F - V _R	1153	Exhibit 13-8	7050	No
				V _R	205	Exhibit 13-10	2100	No

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?	
V _{R12}		Exhibit 13-8		V ₁₂	1031	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 10.9 (pc/mi/ln) LOS = B (Exhibit 13-2)
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Speed Determination	Speed Determination
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M _S = (Exhibit 13-11) S _R = mph (Exhibit 13-11) S ₀ = mph (Exhibit 13-11) S = mph (Exhibit 13-13)	D _S = 0.316 (Exhibit 13-12) S _R = 57.7 mph (Exhibit 13-12) S ₀ = 71.3 mph (Exhibit 13-12) S = 60.5 mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 SB
Agency or Company	CHA	Junction	Existing SB Diverge to SR149
Date Performed	10-30-13	Jurisdiction	IDOT
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L _A Deceleration Lane Length L _D 250 Freeway Volume, V _F 1295 Ramp Volume, V _R 127 Freeway Free-Flow Speed, S _{FF} 65.0 Ramp Free-Flow Speed, S _{FR} 45.0	Downstream Adj Ramp <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On <input type="checkbox"/> No <input type="checkbox"/> Off L _{down} = 2200 ft V _D = 517 veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1295	0.94	Level	23	2	0.894	1.00	1542
Ramp	127	0.94	Level	4	1	0.978	1.00	138
UpStream								
DownStream	517	0.94	Level	4	1	0.978	1.00	562

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.715 using Equation (Exhibit 13-7) V ₁₂ = 1142 pc/h V ₃ or V _{av34} 400 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?	
V _{FO}		Exhibit 13-8		V _F	1542	Exhibit 13-8	7050	No
				V _{FO} = V _F - V _R	1404	Exhibit 13-8	7050	No
				V _R	138	Exhibit 13-10	2100	No

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?	
V _{R12}		Exhibit 13-8		V ₁₂	1142	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 11.8 (pc/mi/ln) LOS = B (Exhibit 13-2)
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Speed Determination	Speed Determination
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M _S = (Exhibit 13-11) S _R = mph (Exhibit 13-11) S ₀ = mph (Exhibit 13-11) S = mph (Exhibit 13-13)	D _S = 0.310 (Exhibit 13-12) S _R = 57.9 mph (Exhibit 13-12) S ₀ = 71.3 mph (Exhibit 13-12) S = 60.8 mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET											
General Information					Site Information						
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB		Agency or Company	CHA		Junction	NB Exit to SR149	
Date Performed	10-30-13		Jurisdiction	IDOT		Analysis Time Period	PM Peak Hour		Analysis Year	2032 - NO BUILD	
Project Description Little Egypt - West Frankfort Access Justification Report											
Inputs											
Upstream Adj Ramp	Freeway Number of Lanes, N		3		Downstream Adj Ramp						
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N		1		<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On						
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A				<input type="checkbox"/> No <input type="checkbox"/> Off						
L _{up} = ft	Deceleration Lane Length L _D		250		L _{down} = 2235 ft						
V _u = veh/h	Freeway Volume, V _F		1561		V _D = 132 veh/h						
	Ramp Volume, V _R		401								
	Freeway Free-Flow Speed, S _{FF}		65.0								
	Ramp Free-Flow Speed, S _{FR}		45.0								
Conversion to pc/h Under Base Conditions											
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p			
Freeway	1561	0.94	Level	23	2	0.894	1.00	1858			
Ramp	401	0.94	Level	4	1	0.978	1.00	436			
UpStream											
DownStream	132	0.94	Level	4	1	0.978	1.00	144			
Merge Areas					Diverge Areas						
Estimation of v₁₂					Estimation of v₁₂						
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) P _{FD} = 0.693 using Equation (Exhibit 13-7) V ₁₂ = 1422 pc/h V ₃ or V _{av34} 436 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)						
Capacity Checks					Capacity Checks						
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?		
V _{FO}		Exhibit 13-8			V _F	1858	Exhibit 13-8	7050	No		
					V _{FO} = V _F - V _R	1422	Exhibit 13-8	7050	No		
					V _R	436	Exhibit 13-10	2100	No		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area						
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?		
V _{R12}		Exhibit 13-8			V ₁₂	1422	Exhibit 13-8	4400:All	No		
Level of Service Determination (if not F)					Level of Service Determination (if not F)						
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 14.2 (pc/mi/ln) LOS = B (Exhibit 13-2)						
Speed Determination					Speed Determination						
M _S = (Exhibit 13-11)					D _S = 0.337 (Exhibit 13-12)						
S _R = mph (Exhibit 13-11)					S _R = 57.2 mph (Exhibit 13-12)						
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)						
S = mph (Exhibit 13-13)					S = 60.0 mph (Exhibit 13-13)						

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	Existing SB Diverge to SR149					
Date Performed	11/11/13		Jurisdiction	IDOT					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - NO BUILD					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N		3	Downstream Adj Ramp					
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N		1	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On					
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A			<input type="checkbox"/> No <input type="checkbox"/> Off					
L _{up} = ft	Deceleration Lane Length L _D		250	L _{down} = 2200 ft					
V _u = veh/h	Freeway Volume, V _F		1586	V _D = 293 veh/h					
	Ramp Volume, V _R		165						
	Freeway Free-Flow Speed, S _{FF}		65.0						
	Ramp Free-Flow Speed, S _{FR}		45.0						
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1586	0.94	Level	23	2	0.894	1.00	1888	
Ramp	165	0.94	Level	4	1	0.978	1.00	179	
UpStream									
DownStream	293	0.94	Level	4	1	0.978	1.00	319	
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.705 using Equation (Exhibit 13-7) V ₁₂ = 1383 pc/h V ₃ or V _{av34} 505 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	1888	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1709	Exhibit 13-8	7050	No
					V _R	179	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1383	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 13.9 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.314 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 57.8 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 60.9 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 NB
Agency or Company	CHA	Junction	NB Merge from SR 149
Date Performed	11-11-13	Jurisdiction	IDOT
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off L _{up} = 2235 ft V _u = 189 veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L _A 785 Deceleration Lane Length L _D Freeway Volume, V _F 952 Ramp Volume, V _R 198 Freeway Free-Flow Speed, S _{FF} 65.0 Ramp Free-Flow Speed, S _{FR} 45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	952	0.94	Level	23	2	0.894	1.00	1133
Ramp	198	0.94	Level	4	1	0.978	1.00	215
UpStream	189	0.94	Level	4	1	0.978	1.00	205
DownStream								

Merge Areas

Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = 588.41 (Equation 13-6 or 13-7) P _{FM} = 0.599 using Equation (Exhibit 13-6) V ₁₂ = 679 pc/h V ₃ or V _{av34} = 454 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = 679 pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V _{FO}	1348	Exhibit 13-8	No	V _F		Exhibit 13-8	
				V _{FO} = V _F - V _R		Exhibit 13-8	
				V _R		Exhibit 13-10	

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V _{R12}	894	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8	

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 7.4 (pc/mi/ln) LOS = A (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)
--	--

Speed Determination	Speed Determination
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M _S = 0.260 (Exhibit 13-11) S _R = 59.0 mph (Exhibit 13-11) S ₀ = 65.0 mph (Exhibit 13-11) S = 60.9 mph (Exhibit 13-13)	D _s = (Exhibit 13-12) S _R = mph (Exhibit 13-12) S ₀ = mph (Exhibit 13-12) S = mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 SB
Agency or Company	CHA	Junction	SB Merge from SR 149
Date Performed	11-11-13	Jurisdiction	IDOT
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off $L_{up} = 2200$ ft $V_u = 127$ veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L_A 740 Deceleration Lane Length L_D Freeway Volume, V_F 1168 Ramp Volume, V_R 517 Freeway Free-Flow Speed, S_{FF} 65.0 Ramp Free-Flow Speed, S_{FR} 45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off $L_{down} =$ ft $V_D =$ veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1168	0.94	Level	23	2	0.894	1.00	1390
Ramp	517	0.94	Level	4	1	0.978	1.00	562
UpStream	127	0.94	Level	4	1	0.978	1.00	138
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$ $L_{EQ} = 697.69$ (Equation 13-6 or 13-7) $P_{FM} = 0.598$ using Equation (Exhibit 13-6) $V_{12} = 832$ pc/h V_3 or $V_{av34} = 558$ pc/h (Equation 13-14 or 13-17) Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, $V_{12a} = 832$ pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{EQ} =$ (Equation 13-12 or 13-13) $P_{FD} =$ using Equation (Exhibit 13-7) $V_{12} =$ pc/h V_3 or $V_{av34} =$ pc/h (Equation 13-14 or 13-17) Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, $V_{12a} =$ pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}	1952	Exhibit 13-8	No	V_F		Exhibit 13-8	
				$V_{FO} = V_F - V_R$		Exhibit 13-8	
				V_R		Exhibit 13-10	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}	1394	Exhibit 13-8	4600:All	No	V_{12}	Exhibit 13-8	

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R = 11.4$ (pc/mi/ln) LOS = B (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R =$ (pc/mi/ln) LOS = (Exhibit 13-2)
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Speed Determination

$M_S = 0.270$ (Exhibit 13-11) $S_R = 58.8$ mph (Exhibit 13-11) $S_0 = 64.8$ mph (Exhibit 13-11) $S = 60.4$ mph (Exhibit 13-13)	$D_s =$ (Exhibit 13-12) $S_R =$ mph (Exhibit 13-12) $S_0 =$ mph (Exhibit 13-12) $S =$ mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 NB
Agency or Company	CHA	Junction	NB Merge from SR 149
Date Performed	11-11-13	Jurisdiction	IDOT
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off $L_{up} = 2235$ ft $V_u = 401$ veh/h	<table style="width: 100%;"> <tr> <td>Freeway Number of Lanes, N</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Ramp Number of Lanes, N</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Acceleration Lane Length, L_A</td> <td style="text-align: right;">785</td> </tr> <tr> <td>Deceleration Lane Length L_D</td> <td></td> </tr> <tr> <td>Freeway Volume, V_F</td> <td style="text-align: right;">1160</td> </tr> <tr> <td>Ramp Volume, V_R</td> <td style="text-align: right;">132</td> </tr> <tr> <td>Freeway Free-Flow Speed, S_{FF}</td> <td style="text-align: right;">65.0</td> </tr> <tr> <td>Ramp Free-Flow Speed, S_{FR}</td> <td style="text-align: right;">45.0</td> </tr> </table>	Freeway Number of Lanes, N	3	Ramp Number of Lanes, N	1	Acceleration Lane Length, L_A	785	Deceleration Lane Length L_D		Freeway Volume, V_F	1160	Ramp Volume, V_R	132	Freeway Free-Flow Speed, S_{FF}	65.0	Ramp Free-Flow Speed, S_{FR}	45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off $L_{down} =$ ft $V_D =$ veh/h
Freeway Number of Lanes, N	3																	
Ramp Number of Lanes, N	1																	
Acceleration Lane Length, L_A	785																	
Deceleration Lane Length L_D																		
Freeway Volume, V_F	1160																	
Ramp Volume, V_R	132																	
Freeway Free-Flow Speed, S_{FF}	65.0																	
Ramp Free-Flow Speed, S_{FR}	45.0																	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1160	0.94	Level	23	2	0.894	1.00	1381
Ramp	132	0.94	Level	4	1	0.978	1.00	144
UpStream	401	0.94	Level	4	1	0.978	1.00	436
DownStream								

Merge Areas	Diverge Areas
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Estimation of v_{12}	Estimation of v_{12}
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$V_{12} = V_F (P_{FM})$ $L_{EQ} = 626.29$ (Equation 13-6 or 13-7) $P_{FM} = 0.599$ using Equation (Exhibit 13-6) $V_{12} = 828$ pc/h V_3 or $V_{av34} = 553$ pc/h (Equation 13-14 or 13-17) Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, $V_{12a} = 828$ pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{EQ} =$ (Equation 13-12 or 13-13) $P_{FD} =$ using Equation (Exhibit 13-7) $V_{12} =$ pc/h V_3 or $V_{av34} =$ pc/h (Equation 13-14 or 13-17) Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, $V_{12a} =$ pc/h (Equation 13-16, 13-18, or 13-19)
--	--

Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V_{FO}	1525	Exhibit 13-8	No	V_F		Exhibit 13-8	
				$V_{FO} = V_F - V_R$		Exhibit 13-8	
				V_R		Exhibit 13-10	

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V_{R12}	972	Exhibit 13-8	4600:All	No	V_{12}	Exhibit 13-8	

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ $D_R = 8.1$ (pc/mi/ln) LOS = A (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ $D_R =$ (pc/mi/ln) LOS = (Exhibit 13-2)
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Speed Determination	Speed Determination
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$M_S = 0.261$ (Exhibit 13-11) $S_R = 59.0$ mph (Exhibit 13-11) $S_0 = 64.8$ mph (Exhibit 13-11) $S = 61.0$ mph (Exhibit 13-13)	$D_s =$ (Exhibit 13-12) $S_R =$ mph (Exhibit 13-12) $S_0 =$ mph (Exhibit 13-12) $S =$ mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 SB
Agency or Company	CHA	Junction	SB Merge from SR 149
Date Performed	11-11-13	Jurisdiction	IDOT
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO BUILD

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off L _{up} = 2200 ft V _u = 165 veh/h	<table style="width: 100%;"> <tr> <td>Freeway Number of Lanes, N</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Ramp Number of Lanes, N</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Acceleration Lane Length, L_A</td> <td style="text-align: right;">740</td> </tr> <tr> <td>Deceleration Lane Length L_D</td> <td></td> </tr> <tr> <td>Freeway Volume, V_F</td> <td style="text-align: right;">1421</td> </tr> <tr> <td>Ramp Volume, V_R</td> <td style="text-align: right;">293</td> </tr> <tr> <td>Freeway Free-Flow Speed, S_{FF}</td> <td style="text-align: right;">65.0</td> </tr> <tr> <td>Ramp Free-Flow Speed, S_{FR}</td> <td style="text-align: right;">45.0</td> </tr> </table>	Freeway Number of Lanes, N	3	Ramp Number of Lanes, N	1	Acceleration Lane Length, L _A	740	Deceleration Lane Length L _D		Freeway Volume, V _F	1421	Ramp Volume, V _R	293	Freeway Free-Flow Speed, S _{FF}	65.0	Ramp Free-Flow Speed, S _{FR}	45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
Freeway Number of Lanes, N	3																	
Ramp Number of Lanes, N	1																	
Acceleration Lane Length, L _A	740																	
Deceleration Lane Length L _D																		
Freeway Volume, V _F	1421																	
Ramp Volume, V _R	293																	
Freeway Free-Flow Speed, S _{FF}	65.0																	
Ramp Free-Flow Speed, S _{FR}	45.0																	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1421	0.94	Level	23	2	0.894	1.00	1692
Ramp	293	0.94	Level	4	1	0.978	1.00	319
UpStream	165	0.94	Level	4	1	0.978	1.00	179
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = 710.31 (Equation 13-6 or 13-7) P _{FM} = 0.598 using Equation (Exhibit 13-6) V ₁₂ = 1012 pc/h V ₃ or V _{av34} = 680 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = 1012 pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
--	--

Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?
V _{FO}	2011	Exhibit 13-8	No
		V _F	Exhibit 13-8
		V _R	Exhibit 13-10

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?
V _{R12}	1331	Exhibit 13-8 4600:All	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 11.1 (pc/mi/ln) LOS = B (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)
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Speed Determination	Speed Determination
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M _S = 0.269 (Exhibit 13-11) S _R = 58.8 mph (Exhibit 13-11) S ₀ = 64.4 mph (Exhibit 13-11) S = 60.6 mph (Exhibit 13-13)	D _s = (Exhibit 13-12) S _R = mph (Exhibit 13-12) S ₀ = mph (Exhibit 13-12) S = mph (Exhibit 13-13)
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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1207	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	479	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	6.4	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1295	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	514	pc/h/ln	
x f _p)			
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV})
D = v _p / S	6.9	pc/mi/ln	x f _p)
LOS	A		S
			D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1141	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	453	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	6.0	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1436	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	570	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.6	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB B/t Ramps
Agency or Company	CHA	From/To	Segment b/t On & Off Ramps
Date Performed	11/11/13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1009	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	400	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	5.3	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB B/t Ramps
Agency or Company	CHA	From/To	Segment b/t On & Off Ramps
Date Performed	11/11/13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1168	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	463	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	6.2	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1545	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	613	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	8.2	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1586	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	629	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV})
x f _p)			x f _p)
S	75.0	mph	S
D = v _p / S	8.4	pc/mi/ln	D = v _p / S
LOS	A		Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1561	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	619	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV})
x f _p)			x f _p)
S	75.0	mph	S
D = v _p / S	8.3	pc/mi/ln	D = v _p / S
LOS	A		Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1481	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	588	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.8	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB B/t Ramps
Agency or Company	CHA	From/To	Segment b/t On & Off Ramps
Date Performed	11/11/13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1413	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	561	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.5	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB B/t Ramps
Agency or Company	CHA	From/To	Segment b/t On & Off Ramps
Date Performed	11/11/13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - NO Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1421	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	564	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.5	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	NB between SR149 On&Off Ramps
Date Performed	11/12/13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1009	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	400	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	5.3	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	SB between SR149 On&Off Ramps
Date Performed	11/12/13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1168	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	463	pc/h/ln	
x f _p)			
S	75.0	mph	v _p = (V or DDHV) / (PHF x N x f _{HV})
D = v _p / S	6.2	pc/mi/ln	x f _p)
LOS	A		S
			D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1428	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	567	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.6	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
		<input type="checkbox"/> Planning Data	
Flow Inputs			
Volume, V	1541	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})		Design LOS	
x f _p)	611	pc/h/ln	v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	8.1	pc/mi/ln	S
LOS	A		D = v _p / S
			pc/mi/ln
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
		<input type="checkbox"/> Planning Data	
Flow Inputs			
Volume, V	1677	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	665	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	8.9	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	2116	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	840	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	11.2	pc/mi/ln	S
LOS	B		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	NB between SR149 On&Off Ramps
Date Performed	11/12/13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1413	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	561	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.5	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	SB between SR149 On&Off Ramps
Date Performed	11/12/13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1421	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	564	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	7.5	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1824	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	724	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	9.7	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	North of SR 149 (Segment A-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	1856	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00		E _R
E _T	1.5		f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]
			0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	736	pc/h/ln	Design LOS
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	9.8	pc/mi/ln	S
LOS	A		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 NB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-NB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
		<input type="checkbox"/> Planning Data	
Flow Inputs			
Volume, V	2335	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
			mph
			mph
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	927	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	12.4	pc/mi/ln	S
LOS	B		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Highway/Direction of Travel	I-57 SB
Agency or Company	CHA	From/To	South of SR 149 (Segment B-SB)
Date Performed	10/30/2013	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build
Project Description <i>Little Egypt - West Frankfort Access Justification Report</i>			
<input checked="" type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			
Flow Inputs			
Volume, V	2257	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			%RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
			Up/Down %
			0.94
			23
			2
			Level
			mi
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.894
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0	ft	
Rt-Side Lat. Clearance	6.0	ft	f _{LW}
Number of Lanes, N	3		f _{LC}
Total Ramp Density, TRD	0.33	ramps/mi	TRD Adjustment
FFS (measured)		mph	FFS
Base free-flow Speed, BFFS	75.4	mph	
			0.0
			0.0
			1.3
			74.1
LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV})	896	pc/h/ln	
x f _p)			v _p = (V or DDHV) / (PHF x N x f _{HV})
S	75.0	mph	x f _p)
D = v _p / S	11.9	pc/mi/ln	S
LOS	B		D = v _p / S
			Required Number of Lanes, N
Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 11-10, 11-12	f _{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E _T - Exhibits 11-10, 11-11, 11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB					
Agency or Company	CHA		Junction	Proposed NB Exit to North Rd					
Date Performed	9-18-13		Jurisdiction	IDOT					
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - BUILD					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N			3			Downstream Adj Ramp		
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On		
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off		
L _{up} = ft	Deceleration Lane Length L _D			300			L _{down} = 5100 ft		
V _u = veh/h	Freeway Volume, V _F			1677			V _D = 419 veh/h		
	Ramp Volume, V _R			668					
	Freeway Free-Flow Speed, S _{FF}			65.0					
	Ramp Free-Flow Speed, S _{FR}			45.0					
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1677	0.94	Level	23	2	0.894	1.00	1996	
Ramp	668	0.94	Level	4	1	0.978	1.00	726	
UpStream									
DownStream	419	0.94	Level	4	1	0.978	1.00	456	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.677 using Equation (Exhibit 13-7) V ₁₂ = 1585 pc/h V ₃ or V _{av34} 411 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	1996	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1270	Exhibit 13-8	7050	No
					V _R	726	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1585	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 15.2 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.363 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 56.6 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 59.1 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB Exit to IL 149					
Date Performed	9-18-13		Jurisdiction	IDOT					
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - BUILD					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp		Freeway Number of Lanes, N			3			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Deceleration Lane Length L _D			300			L _{down} = 5100 ft	
V _u = veh/h		Freeway Volume, V _F			1541			V _D = 948 veh/h	
		Ramp Volume, V _R			373				
		Freeway Free-Flow Speed, S _{FF}			65.0				
		Ramp Free-Flow Speed, S _{FR}			45.0				
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1541	0.94	Level	23	2	0.894	1.00	1834	
Ramp	373	0.94	Level	4	1	0.978	1.00	406	
UpStream									
DownStream	948	0.94	Level	4	1	0.978	1.00	1031	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.695 using Equation (Exhibit 13-7) V ₁₂ = 1399 pc/h V ₃ or V _{av34} 435 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	1834	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1428	Exhibit 13-8	7050	No
					V _R	406	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1399	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 13.6 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.335 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 57.3 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 60.1 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB					
Agency or Company	CHA		Junction	Proposed NB Exit to North Rd					
Date Performed	9-18-13		Jurisdiction	IDOT					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - BUILD					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp		Freeway Number of Lanes, N			3			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Deceleration Lane Length L _D			300			L _{down} = 5100 ft	
V _u = veh/h		Freeway Volume, V _F			2335			V _D = 411 veh/h	
		Ramp Volume, V _R			922				
		Freeway Free-Flow Speed, S _{FF}			65.0				
		Ramp Free-Flow Speed, S _{FR}			45.0				
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	2335	0.94	Level	23	2	0.894	1.00	2780	
Ramp	922	0.94	Level	4	1	0.978	1.00	1002	
UpStream									
DownStream	411	0.94	Level	4	1	0.978	1.00	447	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.644 using Equation (Exhibit 13-7) V ₁₂ = 2148 pc/h V ₃ or V _{av34} 632 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2780	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1778	Exhibit 13-8	7050	No
					V _R	1002	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2148	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 20.0 (pc/mi/ln) LOS = C (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.388 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 56.1 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 58.9 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB Exit to IL 149					
Date Performed	9-18-13		Jurisdiction	IDOT					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - BUILD					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N			3			Downstream Adj Ramp		
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On		
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off		
L _{up} = ft	Deceleration Lane Length L _D			300			L _{down} = 5100 ft		
V _u = veh/h	Freeway Volume, V _F			1856			V _D = 836 veh/h		
	Ramp Volume, V _R			435					
	Freeway Free-Flow Speed, S _{FF}			65.0					
	Ramp Free-Flow Speed, S _{FR}			45.0					
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1856	0.94	Level	23	2	0.894	1.00	2209	
Ramp	435	0.94	Level	4	1	0.978	1.00	473	
UpStream									
DownStream	836	0.94	Level	4	1	0.978	1.00	909	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.683 using Equation (Exhibit 13-7) V ₁₂ = 1659 pc/h V ₃ or V _{av34} 550 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2209	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1736	Exhibit 13-8	7050	No
					V _R	473	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1659	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 15.8 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.341 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 57.2 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 60.1 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 NB
Agency or Company	CHA	Junction	NB On Ramp from IL149
Date Performed	11-11-13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off L _{up} = 5100 ft V _u = 668 veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L _A 900 Deceleration Lane Length L _D Freeway Volume, V _F 1009 Ramp Volume, V _R 419 Freeway Free-Flow Speed, S _{FF} 65.0 Ramp Free-Flow Speed, S _{FR} 45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1009	0.94	Level	23	2	0.894	1.00	1201
Ramp	419	0.94	Level	4	1	0.978	1.00	456
UpStream	668	0.94	Level	4	1	0.978	1.00	726
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = 705.60 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 724 pc/h V ₃ or V _{av34} = 477 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V _{FO}	1657	Exhibit 13-8	No		V _F	Exhibit 13-8	
					V _{FO} = V _F - V _R	Exhibit 13-8	
					V _R	Exhibit 13-10	

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V _{R12}	1180	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8	

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 8.8 (pc/mi/ln) LOS = A (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)
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Speed Determination	Speed Determination
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M _S = 0.253 (Exhibit 13-11) S _R = 59.2 mph (Exhibit 13-11) S ₀ = 65.0 mph (Exhibit 13-11) S = 60.8 mph (Exhibit 13-13)	D _s = (Exhibit 13-12) S _R = mph (Exhibit 13-12) S ₀ = mph (Exhibit 13-12) S = mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 SB
Agency or Company	CHA	Junction	SB On Ramp from North Rd
Date Performed	11-11-13	Jurisdiction	IDOT - District 9
Analysis Time Period	AM Peak Hour	Analysis Year	2032 - Build

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp	Freeway Number of Lanes, N	3	Downstream Adj Ramp
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N	1	<input type="checkbox"/> Yes <input type="checkbox"/> On
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A	900	<input checked="" type="checkbox"/> No <input type="checkbox"/> Off
L _{up} = 5100 ft	Deceleration Lane Length L _D		L _{down} = ft
V _u = 373 veh/h	Freeway Volume, V _F	1168	V _D = veh/h
	Ramp Volume, V _R	948	
	Freeway Free-Flow Speed, S _{FF}	65.0	
	Ramp Free-Flow Speed, S _{FR}	45.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1168	0.94	Level	23	2	0.894	1.00	1390
Ramp	948	0.94	Level	4	1	0.978	1.00	1031
UpStream	373	0.94	Level	4	1	0.978	1.00	406
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

Estimation of v₁₂

$V_{12} = V_F (P_{FM})$
 L_{EQ} = 869.09 (Equation 13-6 or 13-7)
 P_{FM} = 0.603 using Equation (Exhibit 13-6)
 V₁₂ = 838 pc/h
 V₃ or V_{av34} = 552 pc/h (Equation 13-14 or 13-17)
 Is V₃ or V_{av34} > 2,700 pc/h? Yes No
 Is V₃ or V_{av34} > 1.5 * V₁₂/2 Yes No
 If Yes, V_{12a} = 838 pc/h (Equation 13-16, 13-18, or 13-19)

$V_{12} = V_R + (V_F - V_R)P_{FD}$
 L_{EQ} = (Equation 13-12 or 13-13)
 P_{FD} = using Equation (Exhibit 13-7)
 V₁₂ = pc/h
 V₃ or V_{av34} = pc/h (Equation 13-14 or 13-17)
 Is V₃ or V_{av34} > 2,700 pc/h? Yes No
 Is V₃ or V_{av34} > 1.5 * V₁₂/2 Yes No
 If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V _{FO}	2421	Exhibit 13-8	No	V _F		Exhibit 13-8	
				V _{FO} = V _F - V _R		Exhibit 13-8	
				V _R		Exhibit 13-10	

Flow Entering Merge Influence Area

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V _{R12}	1869	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8	

Level of Service Determination (if not F)

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
 D_R = 13.9 (pc/mi/ln)
 LOS = B (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
 D_R = (pc/mi/ln)
 LOS = (Exhibit 13-2)

Speed Determination

Speed Determination

M_S = 0.265 (Exhibit 13-11)
 S_R = 58.9 mph (Exhibit 13-11)
 S₀ = 64.8 mph (Exhibit 13-11)
 S = 60.2 mph (Exhibit 13-13)

D_s = (Exhibit 13-12)
 S_R = mph (Exhibit 13-12)
 S₀ = mph (Exhibit 13-12)
 S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
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Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 NB
Agency or Company	CHA	Junction	NB On Ramp from IL149
Date Performed	11-11-13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp <input checked="" type="checkbox"/> Yes <input type="checkbox"/> On <input type="checkbox"/> No <input checked="" type="checkbox"/> Off L _{up} = 5100 ft V _u = 922 veh/h	Freeway Number of Lanes, N 3 Ramp Number of Lanes, N 1 Acceleration Lane Length, L _A 900 Deceleration Lane Length L _D Freeway Volume, V _F 1413 Ramp Volume, V _R 411 Freeway Free-Flow Speed, S _{FF} 65.0 Ramp Free-Flow Speed, S _{FR} 45.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1413	0.94	Level	23	2	0.894	1.00	1682
Ramp	411	0.94	Level	4	1	0.978	1.00	447
UpStream	922	0.94	Level	4	1	0.978	1.00	1002
DownStream								

Merge Areas

Diverge Areas

Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = 806.61 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 1014 pc/h V ₃ or V _{av34} = 668 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)
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Capacity Checks	Capacity Checks
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	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V _{FO}	2129	Exhibit 13-8	No	V _F		Exhibit 13-8	
				V _{FO} = V _F - V _R		Exhibit 13-8	
				V _R		Exhibit 13-10	

Flow Entering Merge Influence Area	Flow Entering Diverge Influence Area
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	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V _{R12}	1461	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8	

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 11.0 (pc/mi/ln) LOS = B (Exhibit 13-2)	$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)
---	--

Speed Determination	Speed Determination
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M _S = 0.257 (Exhibit 13-11) S _R = 59.1 mph (Exhibit 13-11) S ₀ = 64.4 mph (Exhibit 13-11) S = 60.7 mph (Exhibit 13-13)	D _s = (Exhibit 13-12) S _R = mph (Exhibit 13-12) S ₀ = mph (Exhibit 13-12) S = mph (Exhibit 13-13)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	Kate Plummer	Freeway/Dir of Travel	I-57 SB
Agency or Company	CHA	Junction	SB On Ramp from North Rd
Date Performed	11-11-13	Jurisdiction	IDOT - District 9
Analysis Time Period	PM Peak Hour	Analysis Year	2032 - Build

Project Description Little Egypt - West Frankfort Access Justification Report

Inputs

Upstream Adj Ramp	Freeway Number of Lanes, N	3	Downstream Adj Ramp
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N	1	<input type="checkbox"/> Yes <input type="checkbox"/> On
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A	900	<input checked="" type="checkbox"/> No <input type="checkbox"/> Off
L _{up} = 5100 ft	Deceleration Lane Length L _D		L _{down} = ft
V _u = 435 veh/h	Freeway Volume, V _F	1421	V _D = veh/h
	Ramp Volume, V _R	836	
	Freeway Free-Flow Speed, S _{FF}	65.0	
	Ramp Free-Flow Speed, S _{FR}	45.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1421	0.94	Level	23	2	0.894	1.00	1692
Ramp	836	0.94	Level	4	1	0.978	1.00	909
UpStream	435	0.94	Level	4	1	0.978	1.00	473
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

Estimation of v₁₂

$V_{12} = V_F (P_{FM})$
 L_{EQ} = 907.61 (Equation 13-6 or 13-7)
 P_{FM} = 0.603 using Equation (Exhibit 13-6)
 V₁₂ = 1020 pc/h
 V₃ or V_{av34} = 672 pc/h (Equation 13-14 or 13-17)
 Is V₃ or V_{av34} > 2,700 pc/h? Yes No
 Is V₃ or V_{av34} > 1.5 * V₁₂/2 Yes No
 If Yes, V_{12a} = 1020 pc/h (Equation 13-16, 13-18, or 13-19)

$V_{12} = V_R + (V_F - V_R)P_{FD}$
 L_{EQ} = (Equation 13-12 or 13-13)
 P_{FD} = using Equation (Exhibit 13-7)
 V₁₂ = pc/h
 V₃ or V_{av34} = pc/h (Equation 13-14 or 13-17)
 Is V₃ or V_{av34} > 2,700 pc/h? Yes No
 Is V₃ or V_{av34} > 1.5 * V₁₂/2 Yes No
 If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

Capacity Checks

	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?
V _{FO}	2601	Exhibit 13-8	No	V _F		Exhibit 13-8	
				V _{FO} = V _F - V _R		Exhibit 13-8	
				V _R		Exhibit 13-10	

Flow Entering Merge Influence Area

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?
V _{R12}	1929	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8	

Level of Service Determination (if not F)

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$
 D_R = 14.5 (pc/mi/ln)
 LOS = B (Exhibit 13-2)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$
 D_R = (pc/mi/ln)
 LOS = (Exhibit 13-2)

Speed Determination

Speed Determination

M_S = 0.267 (Exhibit 13-11)
 S_R = 58.9 mph (Exhibit 13-11)
 S₀ = 64.4 mph (Exhibit 13-11)
 S = 60.2 mph (Exhibit 13-13)

D_s = (Exhibit 13-12)
 S_R = mph (Exhibit 13-12)
 S₀ = mph (Exhibit 13-12)
 S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Information					Site Information					
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB						
Agency or Company	CHA		Junction	Proposed NB Exit to Burlington						
Date Performed	10-24-14		Jurisdiction	IDOT						
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - BUILD - Alt 4						
Project Description Little Egypt - West Frankfort Access Justification Report										
Inputs										
Upstream Adj Ramp	Freeway Number of Lanes, N		3	Downstream Adj Ramp						
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N		1	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On						
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A			<input type="checkbox"/> No <input type="checkbox"/> Off						
L _{up} = ft	Deceleration Lane Length L _D		300	L _{down} = 3500 ft						
V _u = veh/h	Freeway Volume, V _F		1677	V _D = 419 veh/h						
	Ramp Volume, V _R		668							
	Freeway Free-Flow Speed, S _{FF}		65.0							
	Ramp Free-Flow Speed, S _{FR}		45.0							
Conversion to pc/h Under Base Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p		
Freeway	1677	0.94	Level	23	2	0.894	1.00	1996		
Ramp	668	0.94	Level	4	1	0.978	1.00	726		
UpStream										
DownStream	419	0.94	Level	4	1	0.978	1.00	456		
Merge Areas					Diverge Areas					
Estimation of v ₁₂					Estimation of v ₁₂					
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.677 using Equation (Exhibit 13-7) V ₁₂ = 1585 pc/h V ₃ or V _{av34} 411 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Checks					Capacity Checks					
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?	
V _{FO}		Exhibit 13-8			V _F	1996	Exhibit 13-8		7050	No
					V _{FO} = V _F - V _R	1270	Exhibit 13-8		7050	No
					V _R	726	Exhibit 13-10		2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area					
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?	
V _{R12}		Exhibit 13-8			V ₁₂	1585	Exhibit 13-8		4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)					
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 15.2 (pc/mi/ln) LOS = B (Exhibit 13-2)					
Speed Determination					Speed Determination					
M _S = (Exhibit 13-11)					D _S = 0.363 (Exhibit 13-12)					
S _R = mph (Exhibit 13-11)					S _R = 56.6 mph (Exhibit 13-12)					
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)					
S = mph (Exhibit 13-13)					S = 59.1 mph (Exhibit 13-13)					

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB Exit to IL 149					
Date Performed	10-24-14		Jurisdiction	IDOT					
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - BUILD Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp		Freeway Number of Lanes, N			3			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Deceleration Lane Length L _D			300			L _{down} = 3500 ft	
V _u = veh/h		Freeway Volume, V _F			1541			V _D = 948 veh/h	
		Ramp Volume, V _R			373				
		Freeway Free-Flow Speed, S _{FF}			65.0				
		Ramp Free-Flow Speed, S _{FR}			45.0				
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1541	0.94	Level	23	2	0.894	1.00	1834	
Ramp	373	0.94	Level	4	1	0.978	1.00	406	
UpStream									
DownStream	948	0.94	Level	4	1	0.978	1.00	1031	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.695 using Equation (Exhibit 13-7) V ₁₂ = 1399 pc/h V ₃ or V _{av34} 435 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	1834	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1428	Exhibit 13-8	7050	No
					V _R	406	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1399	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 13.6 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.335 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 57.3 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 60.1 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB					
Agency or Company	CHA		Junction	Proposed NB Exit to Burlington					
Date Performed	10-27-14		Jurisdiction	IDOT					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - BUILD Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N		3	Downstream Adj Ramp					
<input type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N		1	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On					
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Acceleration Lane Length, L _A			<input type="checkbox"/> No <input type="checkbox"/> Off					
L _{up} = ft	Deceleration Lane Length L _D		300	L _{down} = 3500 ft					
V _u = veh/h	Freeway Volume, V _F		2335	V _D = 411 veh/h					
	Ramp Volume, V _R		922						
	Freeway Free-Flow Speed, S _{FF}		65.0						
	Ramp Free-Flow Speed, S _{FR}		45.0						
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	2335	0.94	Level	23	2	0.894	1.00	2780	
Ramp	922	0.94	Level	4	1	0.978	1.00	1002	
UpStream									
DownStream	411	0.94	Level	4	1	0.978	1.00	447	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.644 using Equation (Exhibit 13-7) V ₁₂ = 2148 pc/h V ₃ or V _{av34} 632 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2780	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1778	Exhibit 13-8	7050	No
					V _R	1002	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2148	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 20.0 (pc/mi/ln) LOS = C (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S = (Exhibit 13-11)					D _S = 0.388 (Exhibit 13-12)				
S _R = mph (Exhibit 13-11)					S _R = 56.1 mph (Exhibit 13-12)				
S ₀ = mph (Exhibit 13-11)					S ₀ = 71.3 mph (Exhibit 13-12)				
S = mph (Exhibit 13-13)					S = 58.9 mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB Exit to IL 149					
Date Performed	10-27-14		Jurisdiction	IDOT					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - BUILD Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp		Freeway Number of Lanes, N			3			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Ramp Number of Lanes, N			1			<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Acceleration Lane Length, L _A						<input type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Deceleration Lane Length L _D			300			L _{down} = 3500 ft	
V _u = veh/h		Freeway Volume, V _F			1856			V _D = 836 veh/h	
		Ramp Volume, V _R			435				
		Freeway Free-Flow Speed, S _{FF}			65.0				
		Ramp Free-Flow Speed, S _{FR}			45.0				
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1856	0.94	Level	23	2	0.894	1.00	2209	
Ramp	435	0.94	Level	4	1	0.978	1.00	473	
UpStream									
DownStream	836	0.94	Level	4	1	0.978	1.00	909	
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = 0.683 using Equation (Exhibit 13-7) V ₁₂ = 1659 pc/h V ₃ or V _{av34} 550 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2209	Exhibit 13-8	7050	No
					V _{FO} = V _F - V _R	1736	Exhibit 13-8	7050	No
					V _R	473	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	1659	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = 15.8 (pc/mi/ln) LOS = B (Exhibit 13-2)				
Speed Determination					Speed Determination				
M _S =	(Exhibit 13-11)				D _S =	0.341 (Exhibit 13-12)			
S _R =	mph (Exhibit 13-11)				S _R =	57.2 mph (Exhibit 13-12)			
S ₀ =	mph (Exhibit 13-11)				S ₀ =	71.3 mph (Exhibit 13-12)			
S =	mph (Exhibit 13-13)				S =	60.1 mph (Exhibit 13-13)			

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information				Site Information					
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB					
Agency or Company	CHA		Junction	NB On Ramp from IL149					
Date Performed	10-27-14		Jurisdiction	IDOT - District 9					
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - Build Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N			3		Downstream Adj Ramp			
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1		<input type="checkbox"/> Yes <input type="checkbox"/> On			
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A			900		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off			
L _{up} = 3500 ft	Deceleration Lane Length L _D					L _{down} = ft			
V _u = 668 veh/h	Freeway Volume, V _F			1009		V _D = veh/h			
	Ramp Volume, V _R			419					
	Freeway Free-Flow Speed, S _{FF}			65.0					
	Ramp Free-Flow Speed, S _{FR}			45.0					
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1009	0.94	Level	23	2	0.894	1.00	1201	
Ramp	419	0.94	Level	4	1	0.978	1.00	456	
UpStream	668	0.94	Level	4	1	0.978	1.00	726	
DownStream									
Merge Areas				Diverge Areas					
Estimation of v ₁₂				Estimation of v ₁₂					
$V_{12} = V_F (P_{FM})$ L _{EQ} = 705.60 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 724 pc/h V ₃ or V _{av34} = 477 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = 724 pc/h (Equation 13-16, 13-18, or 13-19)				$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Checks				Capacity Checks					
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	1657	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area				Flow Entering Diverge Influence Area					
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	1180	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)				Level of Service Determination (if not F)					
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 8.8 (pc/mi/ln) LOS = A (Exhibit 13-2)				$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					
Speed Determination				Speed Determination					
M _S = 0.253 (Exhibit 13-11)					D _s = (Exhibit 13-12)				
S _R = 59.2 mph (Exhibit 13-11)					S _R = mph (Exhibit 13-12)				
S ₀ = 65.0 mph (Exhibit 13-11)					S ₀ = mph (Exhibit 13-12)				
S = 60.8 mph (Exhibit 13-13)					S = mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information				Site Information					
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB On Ramp from Burlington					
Date Performed	10-27-14		Jurisdiction	IDOT - District 9					
Analysis Time Period	AM Peak Hour		Analysis Year	2032 - Build Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N			3		Downstream Adj Ramp			
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1		<input type="checkbox"/> Yes <input type="checkbox"/> On			
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A			900		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off			
L _{up} = 3500 ft	Deceleration Lane Length L _D					L _{down} = ft			
V _u = 373 veh/h	Freeway Volume, V _F			1168		V _D = veh/h			
	Ramp Volume, V _R			948					
	Freeway Free-Flow Speed, S _{FF}			65.0					
	Ramp Free-Flow Speed, S _{FR}			45.0					
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1168	0.94	Level	23	2	0.894	1.00	1390	
Ramp	948	0.94	Level	4	1	0.978	1.00	1031	
UpStream	373	0.94	Level	4	1	0.978	1.00	406	
DownStream									
Merge Areas				Diverge Areas					
Estimation of v ₁₂				Estimation of v ₁₂					
$V_{12} = V_F (P_{FM})$ L _{EQ} = 869.09 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 838 pc/h V ₃ or V _{av34} = 552 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = 838 pc/h (Equation 13-16, 13-18, or 13-19)				$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Checks				Capacity Checks					
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2421	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area				Flow Entering Diverge Influence Area					
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	1869	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)				Level of Service Determination (if not F)					
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 13.9 (pc/mi/ln) LOS = B (Exhibit 13-2)				$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					
Speed Determination				Speed Determination					
M _S = 0.265 (Exhibit 13-11)					D _s = (Exhibit 13-12)				
S _R = 58.9 mph (Exhibit 13-11)					S _R = mph (Exhibit 13-12)				
S ₀ = 64.8 mph (Exhibit 13-11)					S ₀ = mph (Exhibit 13-12)				
S = 60.2 mph (Exhibit 13-13)					S = mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET								
General Information				Site Information				
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 NB				
Agency or Company	CHA		Junction	NB On Ramp from IL149				
Date Performed	10-27-14		Jurisdiction	IDOT - District 9				
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - Build Alt 4				
Project Description Little Egypt - West Frankfort Access Justification Report								
Inputs								
Upstream Adj Ramp	Freeway Number of Lanes, N			3		Downstream Adj Ramp		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1		<input type="checkbox"/> Yes <input type="checkbox"/> On		
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A			900		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		
L _{up} = 3500 ft	Deceleration Lane Length L _D					L _{down} = ft		
V _u = 922 veh/h	Freeway Volume, V _F			1413		V _D = veh/h		
	Ramp Volume, V _R			411				
	Freeway Free-Flow Speed, S _{FF}			65.0				
	Ramp Free-Flow Speed, S _{FR}			45.0				
Conversion to pc/h Under Base Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	1413	0.94	Level	23	2	0.894	1.00	1682
Ramp	411	0.94	Level	4	1	0.978	1.00	447
UpStream	922	0.94	Level	4	1	0.978	1.00	1002
DownStream								
Merge Areas				Diverge Areas				
Estimation of v ₁₂				Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ L _{EQ} = 806.61 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 1014 pc/h V ₃ or V _{av34} = 668 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks				Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity	LOS F?
V _{FO}	2129	Exhibit 13-8		No	V _F		Exhibit 13-8	
					V _{FO} = V _F - V _R		Exhibit 13-8	
					V _R		Exhibit 13-10	
Flow Entering Merge Influence Area				Flow Entering Diverge Influence Area				
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?	
V _{R12}	1461	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8		
Level of Service Determination (if not F)				Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 11.0 (pc/mi/ln) LOS = B (Exhibit 13-2)				$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				
Speed Determination				Speed Determination				
M _S = 0.257 (Exhibit 13-11)				D _S = (Exhibit 13-12)				
S _R = 59.1 mph (Exhibit 13-11)				S _R = mph (Exhibit 13-12)				
S ₀ = 64.4 mph (Exhibit 13-11)				S ₀ = mph (Exhibit 13-12)				
S = 60.7 mph (Exhibit 13-13)				S = mph (Exhibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information				Site Information					
Analyst	Kate Plummer		Freeway/Dir of Travel	I-57 SB					
Agency or Company	CHA		Junction	SB On Ramp from Burlington					
Date Performed	10-27-14		Jurisdiction	IDOT - District 9					
Analysis Time Period	PM Peak Hour		Analysis Year	2032 - Build Alt 4					
Project Description Little Egypt - West Frankfort Access Justification Report									
Inputs									
Upstream Adj Ramp	Freeway Number of Lanes, N			3		Downstream Adj Ramp			
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> On	Ramp Number of Lanes, N			1		<input type="checkbox"/> Yes <input type="checkbox"/> On			
<input type="checkbox"/> No <input checked="" type="checkbox"/> Off	Acceleration Lane Length, L _A			900		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off			
L _{up} = 3500 ft	Deceleration Lane Length L _D					L _{down} = ft			
V _u = 435 veh/h	Freeway Volume, V _F			1421		V _D = veh/h			
	Ramp Volume, V _R			836					
	Freeway Free-Flow Speed, S _{FF}			65.0					
	Ramp Free-Flow Speed, S _{FR}			45.0					
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p	
Freeway	1421	0.94	Level	23	2	0.894	1.00	1692	
Ramp	836	0.94	Level	4	1	0.978	1.00	909	
UpStream	435	0.94	Level	4	1	0.978	1.00	473	
DownStream									
Merge Areas				Diverge Areas					
Estimation of v ₁₂				Estimation of v ₁₂					
$V_{12} = V_F (P_{FM})$ L _{EQ} = 907.61 (Equation 13-6 or 13-7) P _{FM} = 0.603 using Equation (Exhibit 13-6) V ₁₂ = 1020 pc/h V ₃ or V _{av34} = 672 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = 1020 pc/h (Equation 13-16, 13-18, or 13-19)				$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Checks				Capacity Checks					
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2601	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area				Flow Entering Diverge Influence Area					
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	1929	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)				Level of Service Determination (if not F)					
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 14.5 (pc/mi/ln) LOS = B (Exhibit 13-2)				$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					
Speed Determination				Speed Determination					
M _S = 0.267 (Exhibit 13-11)					D _s = (Exhibit 13-12)				
S _R = 58.9 mph (Exhibit 13-11)					S _R = mph (Exhibit 13-12)				
S ₀ = 64.4 mph (Exhibit 13-11)					S ₀ = mph (Exhibit 13-12)				
S = 60.2 mph (Exhibit 13-13)					S = mph (Exhibit 13-13)				